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The Effectiveness of Multimedia Learning of Science Adventure Game "The Adventure of Flora" as Practice Question for Junior High School Students

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Abstract

Learning media is a benchmark for teachers' success in delivering material and managing the class. This research aims to develop a valid, practical and effective learning media "The Adventure of Flora". This media is a practice question in the form of a website-based learning game with plant classification material. The type of research used is R&D with a 4D model consisting of definition, design, development, and dissemination. The subjects of this study are 28 students of class VII-A MTsN 1 Kediri City. The research data was analyzed using a likert scale to measure the level of validity and an independent sample t-test to measure the level of effectiveness of a media. The average percentage obtained from the validity test was 91.5% with the category of suitable for use, from the practicality test it got 96% with the category of very practical and from the independent sample t-test it got a score of sig.(2-tailed) 0.000 which means H_0 is rejected and H_a is accepted. It can be concluded that a website-based educational game has been produced that is valid, practical, and has a significant impact when used. Thus, this product can be disseminated to all junior high school students.

How to Cite

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INTRODUCTION

Learning media is a benchmark for teachers' success in delivering material and managing the class. An indicator of a teacher's success in running a classroom is the formation of effective learning. Based on the results of observations made by researchers at MTsN 1 Kediri City, the use of learning media is very minimal. Teachers only use learning video media on YouTube. Some students noticed and some students enjoyed chatting with their classmates. When every student is able to fully participate in the learning process at the mental, physical, and social levels, it is considered effective learning (Apriansyah, 2020). One type of media that can support fun learning is educational games.

Game learning theory is also included in the cognitive learning process (Hascan & Suyadi, 2021). Because in the context of games, this can mean understanding the game of the rules, strategies and various aspects contained in the game. Students can develop understanding by solving problems, processing information, and remembering solutions that make them win in the game. It's important to remember that these theories often work in tandem with each other in the context of games, and that the type of game, learning objectives, and player characteristics can all affect how effective they are. In addition, as game design and technological advancements continue to evolve, these theories can be modified for use in modern gaming environments one example is educational games.

According to the opinion (Dahlan, 2010) in the book entitled Creative and Fun Science Games, one of the goals of educational games is to provide educational value by making games that were initially only used for entertainment later can also be used for learning or practicing. The importance of game development in the science learning method is because it can train a student's skills in solving a problem that has occurred next which can be called a science adventure. The development of this game-based learning media is stated to help students understand the material more quickly because in science learning there are many readings that make students lazy to read.

The science adventure game is one of the media developed with a learning model in the form of a game, which contains science learning materials that make students happy and understand the material faster. There are several advantages in opinion (Tomy Arifin et al., 2015) including 1) Increasing students' motivation to learn about the material presented, 2) Students feel comfortable and happy, 3) It is one of the independent learning media for students, 4) It can develop a way of thinking critically, 5) It increases students' confidence in appreciating themselves because they can complete the game.

Based on research conducted by (R. Fitri & Yogica, 2018) that students who study plant classification material many do not understand the material because of students' limitations in memorizing it. If students only get material from the teacher's explanations and practice questions from the science handbook, then students will have some weaknesses in understanding it. Based on research that has been carried out, the application of learning media in the form of game science adventures can help students understand the material delivered by the teacher in the classroom and students can also learn independently at home.

From the research (Puspaningrum et al., 2020) construct 2 is used as a medium for the development of learning media that can be built on android devices. Construct 2 is a game creation tool built on Hyper Text Markup Language (HTML)5. Construct 2 is object-based, making it relatively simple to design objects and preserve their attributes, in contrast to other tools that require programmers to write line-by-line code. In addition, Construct 2 has capabilities that even experienced programmers, can easily utilize and understand.

Based on the two studies that have been presented, the researcher will develop a learning game science adventure application that contains practice science questions on plant classification material for junior high school students using Construct 2. So that students can evaluate learning at home and in the classroom. This game science adventure is named "The Adventure of Flora" which will consist of several levels. To find out the feasibility of this educational game, tests will be carried out using the filling out of questionnaires given to validators, including media experts, material experts, and individuals. It is hoped that the results of this research can be used as a reference to develop the creativity of game-based learning media in accordance with the characteristics of junior high school students.

Based on the results of previous research, the gap in this study lies in the special focus contained in the game "The Adventure of Flora" for junior high school students, providing multimedia learning media with interactive practice questions. And the updates made in this study are in the form of the development of learning media

that uses renewable technology that has a purpose in education, and its potential for practical classroom use in science education.

METHOD

This research is the development of learning media. Research and Development (R&D) model (Sugiyono, 2017) modified by Thiagarajan, which uses a 4D (Define, Design, Development, Dissemination) research design. The material used by this study is plant classification. The selection of the material is based on the analysis of the results of class observation and research time. The subject of the study was MTsN 1 Kediri City in grade VII students. The instrument used was in the form of a questionnaire using a closed questionnaire. The research steps carried out are as follows:

Define : at this stage the researcher will compile learning objectives on plant classification materials, needs analysis, and concept analysis are completed

Design : at this stage the researcher will make an initial plan using the design of the user interface or storyboard

Develop : at this stage the researcher will realize the product. Furthermore, the conceptual design will be realized in the development stage, resulting in a final product that will be prepared for implementation

Disseminate : this is the final stage of this research, namely the activity of disseminating products that have been tested

Development research that contains inventions, testing and development must be tested in quality. According to the opinion put forward by (Nieveen, 1999) there are three quality criteria, namely the product development, namely validity, practicality and effectiveness. Based on the review, the researcher conducted several media quality tests, including:

1. Test the Validity and Reliability of Learning Media

This test was carried out with the aim that the results of the questionnaire obtained valid and reliable results. The validity test uses the pearson product moment technique using the following formula:

$$r_{xy} = \frac{n\sum X_i Y_i - (\sum X_i)(\sum Y_i)}{\sqrt{\{n\sum X_i^2 - (\sum X_i)^2\}\{n\sum Y_i^2 - (\sum Y_i)^2\}}}$$

After knowing the validity results, a reliability test was carried out using the formula from the Alpha Cronbach method. The Alpha cronbach formula is used to find the reliability of instruments whose scores are not 1 and 0, the formula is:

$$r_{11} = \left(\frac{k}{(k-1)}\right)\left(1 - \frac{\sum \sigma b^2}{\sigma^2 t}\right)$$

The results of the instrument data from the calculation with the alpha cronbach formula using the SPSS program, the interpretation of the values of the Alpha Cronbach calculation is as shown in the table below.

Table 1. Reliability Interpretation

Coefficient of r Value	Reliability Criteria
0,81 < r11 ≤ 1,00	Very High
0,61 < r11 ≤ 0,80	High
0,41 < r11 ≤ 0,60	Enough
0,21 < r11 ≤ 0,40	Low
0,00 < r11 ≤ 0,21	Very Low

(Source: Arikuntoro & Jabar, 2018, p. 75)

2. Analysis of the Practicality of Learning Media

Based on the theory put forward by (Nieveen, 1999) that practical learning media when practitioners or experts show that media can be used. If the score is above 60, at least 61 is considered a practical learning medium in line with research conducted by (I. L. Fitri, 2022). To calculate the average score of the student response questionnaire using the following formula:

$$P = \frac{\sum xi}{n}$$

Table 2. Media Practicality Questionnaire Criteria

Score Interval	Practicality Criteria
0% < P ≤ 20%	Impractical
20% < P ≤ 40%	Less Practical
40% < P ≤ 60%	Quite Practical
60% < P ≤ 80%	Practical
80% < P ≤ 100%	Very Practical

(Source : Tejo et al., 2017)

3. Analysis of the Product's Significance as a Learning Medium

The analysis of the results of the trial of the learning media "The Adventure of Flora" using the percentage of learning completeness was then changed into qualitative criteria by referring to the guidelines of the assessment criteria (Kemendikbud, 2016). The independent sample T-Test,

or t-test, is another method used to assess the efficacy of the media used.

RESULT AND DISCUSSION

The results of the research that have been carried out by the researcher are as follows:

1. Define Stages

At this stage, it is the initial stage of the development of learning media in research. Based on research that has been conducted by Melayasari (2016), data in the form of functional needs analysis and non-functional needs analysis were obtained. Functional analysis is an analysis that is used to find out what information can be generated by the system and the capabilities that the system must fulfill to meet the data that must be used in developing a product. Meanwhile, non-functional analysis is an aspect of the system related to how the system performs the functions that have been added to support the creation of media.

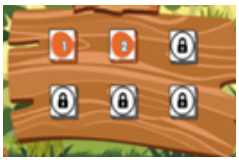
Based on the results of the study, the researcher also analyzed several needs needed in making learning media. Which is in accordance with the reality that occurs in the field. The researcher also made observations in schools that will be used as research sites. And prepare media that are in accordance with the situation in the field. Starting from functional analysis and non-functional analysis that has been carried out by researchers before. At the define stage based on the results of observations made by researchers at MTsN 1 Kediri City, the use of learning media is very minimal. Teachers only use learning video media on YouTube. Some students noticed and some students enjoyed chatting with their classmates. In addition, when conducting observations, the researcher found the following.

a. Plant classification material is considered difficult for students, because they have a lot of Latin and have difficulty memorizing it.
b. The learning resources used are printed books or package books obtained at school for science learning.
c. The learning model still uses the traditional cerva and question and answer model without using supportive learning media.
d. When learning the sub-chapter of plant classification, students are less interested and do not pay attention to what the teacher is explaining. The lack of learning resources and non-innovative learning models cause students to get bored quickly in class and pay less attention during learning because they enjoy chatting with their classmates.

2. Design Stages

Researchers create a preliminary draft of content that will be used to teach plant taxonomy at this stage. Using media construct 2, which includes storyboards, observations, and data collection tools. The researcher made a draft of game science adventure learning media in the form of a game science adventure "The Adventure of Flora". These drafts are then verified by user validators and experts.

Table 3. "The Adventure of Flora" Game Creation Design

No	Description	Picture
1.	Splash screen display. It is the first page when starting the game, where the game logo appears.	
2.	Layout home. It is a layout that users use to start the game and access other buttons such as sound, music, exit, developer profile and start	
3.	Main menu. It is a layout that will appear when the user presses the "start" button and is used to select the level to play	
4.	Layout help. Which has functions as game instructions and descriptions of several buttons.	
5.	Game initial view. It is the display of the game that will be played by the user in completing the mission.	
6.	Question layout. This question will appear after the user receives the key. There are multiple-choice questions on the question page and users can choose the correct answer.	

3. Development Stages

At this stage of development, it consists of expert validator assessments, practitioner validators and product development tests. The results of filling out the media feasibility assessment sheet as well as suggestions and comments for the improvement of the learning media "The Adventure of Flora".

a. Test the Validity and Reliability of Learning Media

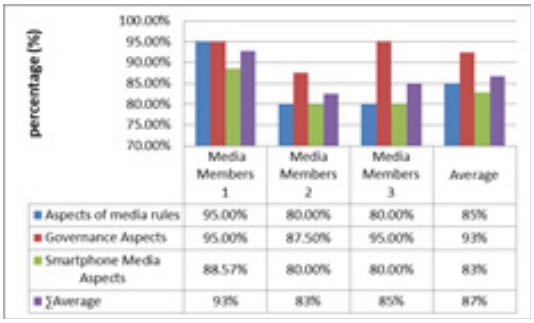


Figure 1. Bar Diagram of Media Expert Percentage

Based on figure 1, it shows that the results of the feasibility assessment of the "The Adventure of Flora" media by media expert I get a score of 93%. Meanwhile, the assessment of the feasibility of the "The Adventure of Flora" media by media experts II received a score of 83%. And the results of the assessment of "The Adventure of Flora" by media experts III received a score of 85%.

From the data obtained by the researcher, it can be compared with the feasibility results carried out by (Auliani, 2017) who obtained media validity data of 93.10%, material validity of 100% and from 78.2% of respondents who were calculated on average to obtain the category of suitable for use or valid.

The results of the above study use the calculation of the formula proposed by (Arikuntoro & Jabar, 2018) and are seen using a table of score convergence criteria according to (Rayanto & Sugianti, 2020). So based on the results of the feasibility calculation of the learning media "The Adventure of Flora", an average score of 87% was obtained by obtaining the Good or Valid criteria.

The results of the validation test by material experts are in the form of responses and assessments from material experts, then from the results of the data obtained are analyzed and product revisions are carried out according to the suggestions. The results of the data are shown in Figure 2.

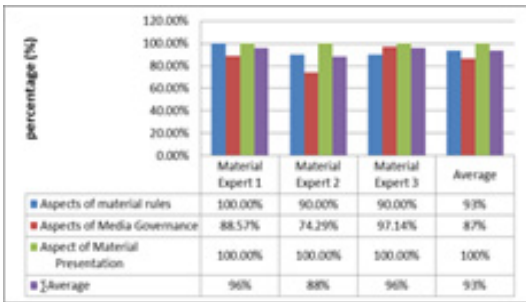


Figure 2. Percentage Bar Diagram of Material Experts

Based on figure 2, it shows that the results of the feasibility assessment of the "Adventure of the Flora" media by material expert I received a score of 96%. Meanwhile, the feasibility assessment of the media "The Adventure of Flora" by material experts II received a score of 80%. And the results of the assessment of "The Adventure of Si Flora" by material experts III received a score of 96%. So based on the results of the feasibility calculation of the learning media "The Adventure of Flora" obtained an average score of 93% by obtaining the Good or Valid criteria.

Then the data obtained was tested for validity by testing the instrument on 28 students of class VII-A MTsN 1 Kediri City. Then the data obtained was analyzed using the pearson product moment technique with the help of the SPSS application. The validity test of Pearson product moment uses the principle of correlating the score of each questionnaire item with the total score of the respondent's answers.

Next, the reliability testing stage using the SPSS application. The reliability test in this study uses internal testing. Reliability testing with internal consistency is carried out by trying the instrument once, then the data obtained is analyzed with certain techniques. Reliability testing using the alpha cronbach formula. It can be seen in the following.

Reliability Statistics

Cronbach's Alpha	N of Items
,888	16

Figure 3. Alpha Cronbach Reliability Test Results

From figure 3, it means that there are many items of the questionnaire questions, namely 16 items with an alpha cronbach value of 0.888. So that from the results of the calculation based on the r-value interpretation table, the reliability of

the instrument is included in the Very High category.

The use test was carried out at MTsN 1 Kediri City by 28 students of class VII-A. The instruments used include the aspect of display, aspect of material presentation and media benefits. Instruments that are already valid and reliable can be used for further tests.

b. Test the practicality of Learning Media

The pragmatic test of the game science adventure learning media "The Adventure of Flora" was obtained from the results of filling out a questionnaire as a response of students after using the learning media. The results of practicality from 28 students as respondents were found that the learning media "The Adventure of Flora" developed can be categorized as Practical. Most students said that the media developed was very practical. Few say it's quite practical and no one says it's impractical and less practical. Of the 28 students as practitioners, 97% said that the interactive learning media developed was very practical, 3% of students said that the learning media "The Adventure of Flora" was quite practical. And the average score was 92.85% with a very practical category.

The criteria for a media can be said to be practical according to the opinion of Van Den Akker and Nieveen in the study (I. L. Fitri, 2022) stating that development research needs to pay attention to quality criteria that are influenced by Validity, Practicality, and effectiveness. The practicality criterion refers to the level at which the product developed can be used and liked under normal conditions by users. As the results obtained by (Meidhita, n.d.) the response from students was 88.84% and the teacher's response was 91.67% who received the category of very practical.

Data from the practicality analysis carried out obtained the result that this game science learning media is very practical to be used as one of the learning media. This result means that the learning media of the game science adventure "The Adventure of Flora" has fulfilled 5 practicality considerations as stated by (Sukardi, 2008).

c. Analysis of the Practicality of Learning Media

The effectiveness of the game science adventure learning media "The Adventure of Flora" is seen from the acquisition of data on the results of doing exercises in the form of media that has been developed. The test result data obtained from the field showed that 28 students who had learning outcomes met the criteria for completion. So that the percentage of student completion of 28 students is in accordance with the calculation of 28/28×100% = 100%. So that the percentage of students who complete is 100%, which means that fulfilling is very high.

Furthermore, to prove whether the difference between the two groups is significant (real) or not can be seen from the table data below:

Table 4. Test Results Independent Samples T-Test

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					
								95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar	Equal variances assumed	.354	.554	-8.127	54	.000	-8.14286	.7559	-7.6550	-6.6274
	Equal variances not assumed			-8.127	46.503	.000	-8.14286	.7559	-7.6536	-6.6210

Based on the table, it is known that the value of sig. (2-tailed) is 0.000 < 0.05, then the basis for decision-making in the independent sample T-Test test is H_0 rejected and H_a accepted. Thus, it can be concluded that there is a significant (real) difference between the average learning outcomes of group A and group B. The conclusion from the above explanation is that the application of manual practice with game-based practice will produce different learning outcomes.

Therefore, it can be concluded that the learning media of the game science adventure "The Adventure of Flora" which is used as a form of practice for junior high school students in the sub-chapter of plant classification is effective. Has a significant impact on learning outcomes. This means that game learning media can achieve success for the achievement of a goal set by (Astuti, 2013) in his research.

4. Stages of Dissemination

This stage is the stage where the media that has been validated and revised is disseminated where this stage is the final stage of this research and development. At this stage, the researcher included media in web hosting so that it could be widely accessed using the internet and disseminated it at MTsN 1 Kediri City and several TIPA IAIN Kediri students.

CONCLUSION

The results of this research and development product are in the form of learning media in the form of a science adventure game "The Adventure of Flora" which has gone through the validation stage from media experts, material experts and users, namely IAIN Kediri students

and grade VII MTsN 1 Kediri City students. Which has been revised and tested in the field. The science adventure learning media game "The Adventure of Flora" developed has obtained criteria that match the eligibility criteria of a product. A media is said to be worthy of being based on the theory put forward by (Nieveen, 1999) which is often used by several researchers that development research requires quality criteria to be influenced, namely validity, practicality, and effectiveness. And the results of this study are in accordance with the three quality criteria for learning media development.

REFERENCES

Anggraeni, S. W., Alpian, Y., Prihamdani, D., & Winarsih, E. (2021). Development of Video-Based Interactive Learning Multimedia to Increase Elementary School Students' Interest in Learning. *Jurnal Basicedu*, 5(6), 5313–5327. https://doi.org/10.31004/basicedu.v5i6.1636

Apriansyah, M. R. (2020). Development of Animation-Based Video Learning Media for Building Materials Science Courses in the Building Engineering Education Study Program, Faculty of Engineering, State University of Jakarta. *Jurnal PenSil,* 9(1), 9–18. https://doi.org/10.21009/jpensil.v9i1.12905

Arikuntoro, S., & Jabar, S. A. (2018). *Evaluation of Educational Programs (2nd ed.)*. Sinar Grafika Offset.

Astuti. (2013). *Development of Learning Media Using Videos of Basic Cosmetology Courses of the Cosmetology and Beauty Education Study Program, Faculty of Engineering, UNP*. Universitas Negeri Padang.

Dahlan, T. (2010). *Creative & Fun Science Games*. Ruang Kata.

Fitri, I. L. (2022). Development of Prezi Learning Media Based on Heuristic Strategies on Problem Solving Skills in Number Materials in Grade VII of Bina Utama Junior High School Pontianak *[Doctoral Dissetation]*. IKIP PGRI Pontianak.

Fitri, R., & Yogica, R. (2018). Validity of Koa Game-Based Plant Classification Educational Game as a Biology Learning Media. *Pedagogi Hayati: Jurnal Ilmiah Pendidikan Biologi*, 2(2), 25–30.

Hascan, M. A., & Suyadi. (2021). Application of Cognitive Learning Theory in PAI Subjects at the Junior High School Level at SIT Bina Insan Batang Kuis. *EDUMASPUL Jurnal Pendidikan*, 5(2), 138–146.

Kemendikbud. (2016). *Permendikbud No 020 tahun 2016 About Competency Standards for Elementary and Secondary Education Graduates*. Kemendikbud.

Meidhita, B. (2020). Development of Learning Media Using Construct 2 on Relationship and Function Materials for Grade VIII Junior High School.

Melayasari, N. S. (2016). The Influence of The Adventure of Science Game as a Learning Media for Addictive Substances and Psychotropics on Students' Learning Enthusiasm. *PENSA: E-Journal of Science Education*, 4(02).

Naimah, J., Winarni, D. S., & Widiyawati, Y. (n.d.). Development of Science Advanture Educational Games to Improve Students' Problem-Solving Skills.

Nieveen, N. (1999). Prototyping to reach product quality. Design Approaches and Tools in Education and Training, 125–135.

Puspaningrum, A. S., Suaidah, S., & Laudhana, A. C. (2020). Media Tenses Learning for Android-Based Junior High School Children Using Construct 2. *Jurnal Informatika Dan Rekayasa Perangkat Lunak*, 1(1), 25–35.

Sugiyono, D., P. (2017). *Qualitative and R&D Quantitative Research Methods (Vol. 25)*. CV Alfabeta.

Sukardi, M. (2008). Evaluation of Principles and Operational Education. Bumi Aksara.

Tejo, D. N., Triyoga, T., Hendrastomo, G., & Januarti, N. E. (2017). *Module for the Development of Information Technology-Based Sociology Teaching Materials.* Universitas Negeri Yogyakarta.