

Development of education game media for xii multimedia class students in vocational school

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Development of education game media for xii multimedia class students in vocational school

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Abstract. According to the results of interviews with teachers it is known that students experience difficulties in understanding action script material. This is because this material has a high level of complexity, it is proven that only 30% of students are able to achieve the learning objectives. This study aims to produce educational game media in terms of the feasibility and effectiveness of the media. The development model used is ADDIE (analyze, design, development, implementation, evaluation). Methods of data collection using interview techniques, questionnaires, and tests. From this study the results are based on validation with material experts and media experts by getting a very good category, so that the media can be said to be suitable for use in learning. The results of the post-test value of the experimental class and the control class were analyzed using the t-test obtained by $t_{count} = 4.584 > t_{table} = 2.038$ which is a significant difference, so it can be concluded that the media is effectively used in learning.

1. Introduction

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One of the formal education in Indonesia is vocational high school education. Vocational high school education is generally pursued by people ranging in age from 15 years to 17 years, and taken for 3 years.

Students who study in vocational schools will be equipped with the ability to make them ready to work. There are many types of majors in vocational schools, but in this study the focus was on students majoring in multimedia. The multimedia department is a department that focuses on students abilities regarding computer technology, but focuses on computer technology regarding design software.

Vocational high school majors in general, there are several subjects in the vocational field. One of the subjects that a student should take is interactive multimedia subjects. In the interactive multimedia subject itself there are some material in it, one of which is action script material

The action script material is the key material in making interactive multimedia, because interactive multimedia is a media that can only be used when there is a script in it. Action scripts in making interactive multimedia vary depending on the usefulness of each script, because each response given interactive multimedia is different from the script used.

The obstacle faced by students when practicing is that the time is relatively short, the number of devices that require students to practice alternately, so that there are still many students who do not understand action script material, it is proven that only 30% of students achieve the learning goals.

From the results of the analysis of researchers, to overcome this problem the development of educational game media is needed with the consideration that 95% of students in class XII multimedia have a smartphone that can be used to open the game.



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2. Context and Review of Literature

2.1. Media

Media is anything that can be used to channel the message, so it can stimulate the attention, thoughts, interest, and feelings of students in learning activities to achieve learning objectives [1]. Media can be defined from its technology, symbol systems and processing capabilities. The characteristics of the most prominent medium are the technology, the mechanical and electrical aspects that determine its function, and in certain cases concerning other physical forms and appearance [2]. Media is a physical means that contains messages or means to convey messages [3].

2.1.1. Media usability. In general the media has a usefulness: Clarify the presentation of the message so it is not too verbal; enlarge the attention of students, increase the excitement of learning, increase more direct interaction between students and the environment and reality; laying out important foundations for the development of learning, therefore making lessons more solid; provide a real experience so that it can foster self-employment activities among students according to their abilities and interests; foster regular and continuous thinking, it is mainly found in the living picture; overcome the limitations of space, time and sense power [4].

2.1.2. Media classification. Types of media are based on three main elements, namely: visual, sound, and motion. Based on the three elements, the media is divided into several groups, namely: audio, print, silent visual, visual motion, semi motion audio, semi motion, silent audio visual, and audio visual motion [5]. Classification of learning media based on five categories is based on their physical form and characteristics, based on the type and level of experience gained, based on sensory perceptions obtained, based on their use, based on their utilization [6].

2.1.3. Media selection. The selection criteria for the media are in accordance with the learning objectives, according to the learning material, according to the characteristics of the students, according to the student's learning style, in accordance with the school environment [7]. The selection of media should pay attention to several principles, namely: whether for the purposes of entertainment, clarity of intent and selection of media, general information, learning, and so forth; media relation, which involves knowledge of the nature and characteristics of the media to be selected [8].

2.2. Media education game

The definition of educational games is a fun activity that can be used as an educational educational tool [9]. Educational game is a game that is designed as an enrichment in supporting learning that contains material that will be delivered in learning designed in interactive games [10]. Definition of educational games is a game designed to teach students to certain material, develop concepts and understanding and guide and train students' abilities [11]. Educational games are a context between individual players and teams that are limited by principles and regulations, competencies to objectively achieve game results. [12].

2.2.1. The benefits of education game

The benefit of using games in learning is to increase motivation, through media games that deliver material in a fun manner can create a distinct impression for students in finding learning experiences; complex understanding, complex messages can be conveyed well through games, this can facilitate students in understanding the complex material; reflective learning, through game activities students can reflect between the results they get with the decisions they make; feedback and self-regulation, through the results shown in the game can make students think about parts of mistakes and ways to correct the mistakes they make [13].

2.2.2. Mechanical of education game

In a game there is a mechanical need to be considered so that the game's appeal increases. Mechanical games like compilers of a game are an added value for the game when played. Some mechanical in games, including: Levels/progression, which is a means to show the development of players; Quests/Challenges, are challenges that must be passed by players to be able to continue to a higher level; Achievements/Rewards, a prize aimed at satisfying activities from players with the aim of these activities can occur again; Leaderboards, a simple comparison list that aims to increase motivation with a ranking system; Competition, aims to make players interact through challenges to each other to get the highest score in a particular activity [14].

2.2.3 Media education game eligibility

Media feasibility of the education game carried out by conducting a feasibility test by media experts, material experts, and students. Material experts and media experts examine media education game before media is tested to the students, while editor feasibility tests are performed on individual trials and small group trials. Individual testing performed to determine the response of the students as a user before tested to users in small groups [15].

3. Methods

The development model used is the ADDIE development model. The ADDIE development model has several stages: Analysis, Design, Development, Implementation, Evaluation [16]

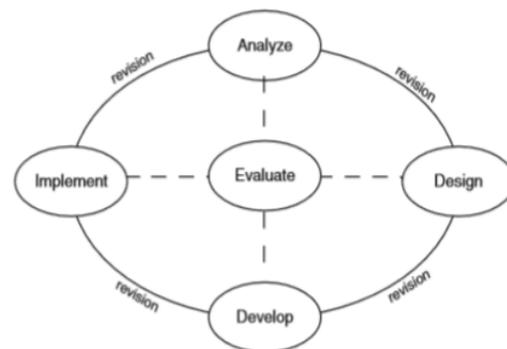


Figure 1. Model Development Phase of ADDIE

If seen from the picture, steps can be taken in the ADDIE model, including: Analyze, in this stage the researcher must look for problems in learning; Design, at this stage the researcher is required to design the media to be developed; Develop, the purpose of this stage of development is to produce media and conduct validation of the media developed; Implement, at this stage the researcher must prepare a learning environment to apply the media that has been developed after various types of trials have been carried out; Evaluate, the purpose of this stage is to assess the quality of the learning processes and products developed.

The stages of the development of the ADDIE model:

Table 1. Development Stages of the ADDIE Model

Phase Development	Activity
Analyze	Performance analysis and needs analysis.
Design	Design and manufacture of draft education game.
Development	Design specifications into physical form that produces prototype products.
Implementation	Implementing the education game and carrying out trials.
Evaluation	Carry out assessment by using formative evaluation and summative evaluation.

The subjects of this study were material experts, media experts, and students. Data collection methods used in this development research are structured interviews, questionnaires, and test. Data analysis technique used is education game validation analysis and education game feasibility test. The education game is analyzed by using rating scale with four choices of answers: "very appropriate", "appropriate", "less appropriate", and "inappropriate". The level of feasibility of the education game is measured using the criteria of the validity of teaching materials, this can be seen in table 2.

Table 2. Criteria of material validity

No.	Percentage (%)	Criteria	Level of validity
1.	85.01%-100.00%	Very valid	Very valid or usable but needs to be revised.
2.	70.01%-85.00%	Valid	Valid or usable but needs to be revised.
3.	50.01%-70.00%	Less valid	Less valid is recommended not to be used because revisions are too large.
4.	01.00%-50.00%	Invalid	Invalid or may not be used.

(Adapted from [17])

4. Discussion

The development stages of the ADDIE model:

4.1 Analyze

At this stage the first thing to do is to look for gaps that occur between real conditions through interviews with teachers and ideal conditions seen in RPP. Formulate research objectives and analyze the research objectives in determining solutions. Determine relevant parties in research such as material experts, media experts, and students.

This ideal condition is obtained from RPP analysis. Students can understand the basis of action scripts used in programming interactive multimedia products correctly. Students can mention terms in the basis of action scripts that are used in programming interactive multimedia products correctly.

The real condition is obtained through interviews with students' daily subject teachers who can be declared complete only 30% of 50 students. From the results of interviews with subject teachers it was found that the learning objectives had not been achieved well, students had difficulty learning, especially in the action script material that has a high level of complexity

The next step is to determine the goals that should be achieved by students after going through learning activities. This goal is determined in the lesson plan which will later become a goal that researchers must achieve in solving the problem that occurs. The learning objective is that students can understand the basis of action scripts that are used in programming interactive multimedia products correctly, students can mention terms in the basis of action scripts that are used in programming interactive multimedia products correctly.

Based on ideal and real conditions and learning objectives, it is necessary to develop educational game media.

4.2 Design

After determining the media to be developed, make the initial design in the form of a flowchart and storyboard to facilitate the making of the media. Designing lesson plans and evaluation instruments that will be used in research.

4.3 Development

Select the material to be published in the media by considering the approval of the material expert. Designing the accompanying material as the main media companion, which contains identification, how to use, how to care for the media and RPP for media use also functions as a guide for the teacher. Designing the instructions needed in the media to facilitate students in using the media. Perform media production in accordance with the flowchart and storyboard that had previously been designed taking into account the material and pre-determined instructions. Perform validation as follows: Validation with material experts obtained a percentage of 95.25% Validation with 15 media experts obtained a percentage of 96.55%; 15 individual trials obtained a percentage of 95.75%; Small group trials obtained a percentage of 97.65%; Large group trials obtained a percentage of 98.85%.



Figure 2. Education Game Design

4.4 Implementation

At this stage research has begun in learning activities. Prepare the teacher as a companion when testing in learning activities. Preparing students with a pre-test after being randomly conducted to determine the equality of thinking skills between the experimental class and the control class. The pre-test value of the experimental class with the control class obtained $t_{count} = 0.115 < t_{table} = 2.038$, it can be

concluded that the results of the pre-test between the experimental class and the control class there were no significant differences.

4.5 Evaluation

At this stage a post-test was carried out in both classes after going through different treatment learning activities, namely the experimental class was given media when the learning activities while the control class conducted learning activities without being given media. The value of the experimental class post-test with the control class obtained $t = 4.584 > t_{table} = 2.038$, it can be concluded that the results of the post-test between the experimental class and the control class have significant differences.

This research is a development research that produces a product. The product produced from this study is an action script educational media game for Vocational students in class XII Multimedia.

After going through the stages of the research, through the results of validation with material experts, media experts, individual tests, small group tests, and large group tests the percentage results ranged from 95.25% to 98.85%, the value categories were very good and could be stated very suitable for use in learning activities [18].

The value of the post-test results obtained is calculated using the t-test and obtained $t = 4.584$. Then the price of t count is consulted with the distribution table t using significant level of 5% and $df = n - k = 30 - 2 = 28$, obtained by the price of the table $t = 2.038$. From results of the consultation between t count and t table obtained $t_{count} = 4.584 > t_{table} = 2.038$, the results of the post-test between the experimental class and the control class have significant differences. It can be concluded that the media is effective for use in learning activities.

5. Conclusion

The development of this educational game media uses the ADDIE development model, name Analysis, Design, Development, Implementation, and Evaluation. Based on the results of the study, it can be concluded that this educational game media is feasible and effectively used in learning.

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