



Prototype of Learning Media for Vocational School Students Based on Project-Based Learning

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ARTICLE'S INFORMATION

Article history:

Received: June-27-2022

Reviewed: Aug-12-2022

Accepted: Aug-19-2022

Keywords: Learning Media, Project-Based Learning, Prototype

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ABSTRACT

The rapid development of information technology marks the 21st century, but there are still teachers who only use student worksheets as a learning resource. Project-based learning media can be used and utilized easily by teachers and students during direct teaching and learning activities. In addition, they can be used by students online as a source of student learning to increase independence, motivation, and better learning outcomes. This research aims to develop project-based learning media so students can easily understand the material and be directly involved in project activities. This study uses the ADDIE development model. The resulting product is the validity of project-based learning media on statistical material for vocational students. The first step in this research is to create a flowchart as a media flow and then interpret it using PowerPoint media. The validation of learning media results that have been carried out through the validator obtained an average score of 3.65 with a decent category for media and an average score of 3.85 for material with a very decent category.

INTRODUCTION

Education that has good quality is education that can increase the potential development and knowledge contained in students. But unfortunately, teaching and learning activities in the classroom that have been found so far have always made students objects that must be filled with various kinds of information and materials that are piled up and must be memorized by students so that there is no concept planting in students. This can create a communication relationship that applies only one direction, namely between teachers and students, while students are not given the space to communicate the potential within themselves [1].

To improve the quality of learning in Indonesia, the Education Unit continues to make improvements through improving learning by exploring changes and developments in life that are currently happening in the 21st century. One of the improvements is implementing curriculum revisions from KTSP to Curriculum 2013 and curriculum prototypes. The prototype curriculum is a competency-based curriculum that supports educational rehabilitation through project-based learning activities (Project Based Learning) supporting character development per the Pancasila Student Profile [2].

Teaching and learning activities will be better if all students can be directly involved in learning activities [3]. In the process of learning mathematics at school, it is not only related to understanding mathematics material as much as possible. Besides that, there are goals to be achieved in the training program that has been planned.[4]. Good learning outcomes can be seen through how students can master the material well and solve the problems given [5].

Rachmawati said that to successfully implement the prototype curriculum the education department had to fulfil several stages, namely (1) registration and data collection because introducing this model curriculum is an option in the ongoing driving school curriculum. (2) School efforts can make Education Unit Operational Curriculum (KOSP) by referring to the Pancasila Student Profile [2]. The school curriculum framework must develop eight National Education Standards (NSP) to improve student performance by using project-based learning (Project Based Learning). That can adapt to follow the vision and mission of each school. (3) Better teacher preparation in innovative learning to develop student character based on the Pancasila student profile using project-based learning (Project Based Learning).

The learning model used by the teacher in classroom learning activities can also influence the increase in interest, motivation, and student learning outcomes. One of the learning models that teachers can use to increase learning motivation is project-based learning. The same thing was also stated by [6] that the project-based learning model is considered one of the best learning models for improving the various basic abilities that students must have, such as the ability to make decisions, creative abilities, and problem-solving abilities. The Ministry of Education and Culture said 6 phases must be considered in the steps of working on project-based learning in learning[7], namely: (1) project determination, (2) designing project plans, (3) compiling schedules, (4) project completion, (5) assessment, phase (6) evaluation.

Fathurrohman said project-based learning is a learning model that uses the direct involvement of students in making projects or activities as a learning tool to gain attitude, knowledge, and skill competencies [7]. According to[8]. Using project-based learning implementation, students will learn more things in projects because they are directly involved and tend to be active, namely thinking about what they have learned and then applying what they have learned in real situations.

Based on the results of the initial investigation carried out by researchers at the Bagan Batu Development Vocational School, the researchers conclude that teachers only use student worksheets as a support and source of students' mathematics learning in the learning process. Teachers still use conventional learning by using lecture and question and answer methods, and there is no use of mathematics learning media when the classroom learning process occurs. In an era that is already sophisticated and the use of technology is very rapid, teachers should be good at utilizing and using technology as a source and support for learning activities in the classroom because, at this time, students are also inseparable from the use of digital. One of them utilizing technology is using learning media during the learning process.

The quality learning process must be supported by educational media presented by the teacher to students. Quality educational media are media that can increase academic motivation, are instant and easy to use, trigger and attract students' attention, and share assumptions and feedback, urging students to carry out educational practices correctly.[1]. Consumption of teaching media in the teaching and learning process can generate new will and attention, create motivation, stimulate learning activities, and psychologically affect students. The use of teaching media in teaching orientation sessions must help the effectiveness of the educational process and delivery of lesson content. In addition to generating student motivation and attention, learning media can also help improve student understanding, present information in an exciting way, facilitate understanding of information, and condense data [9].

The rapid development of technology is undoubtedly a challenge for teachers to play a role and facilitate students to build knowledge in the global era[10]. The use of technology is

unavoidable because teachers and students should follow the development of increasingly advanced age. Teachers must also follow these changes and developments to prepare students to face change [11]. One consequence of the rapid growth of science and technology requires the formation of quality human resources, namely human resources who have competence in mastering science and technology and can balance and utilize them properly. Furthermore, to face the era of globalization, mastery of technology is very important to be owned by students so that they can face globalization and are not outdated [12].

The teaching materials used should be teaching materials that can be used by students independently and can train students' higher-order thinking skills [13]. One of the teaching materials that can be used is learning media. Nurrita said that learning media is a tool that can help to teach and learn activities so that learning in class is more meaningful and the material delivered has a clear learning flow [14]. As a result, learning objectives can be achieved effectively and efficiently. In addition, there are several benefits to using instructional media 1) providing guidelines for teachers to achieve learning objectives so that they can explain learning materials in a systematic order and assist in presenting exciting material to improve the quality of learning, 2) can increase students' motivation and interest in learning so that students can think and analyze the subject matter given by the teacher well with a fun learning situation and students can understand the subject matter easily.

Junaidi said that learning media could convey messages or information in the teaching and learning process to stimulate students' attention and interest in learning [15]. Meanwhile, according to [16], Learning media can transmit messages from the sender to the recipient to stimulate students' thoughts, feelings, concerns and interests, and willingness in such a way that the learning process occurs to achieve learning objectives. A tool that teachers can use to convey learning messages effectively and efficiently to increase student motivation and learning outcomes

In connection with the minimal level of student participation, especially on the quality of learning, this needs to get more attention and effort from educators in the teaching process to increase the quality of good learning. According to [17], the media can be used as a teaching aid, developing rapidly in accordance with technological advances. Many kinds and types of media are used according to the circumstances and readiness, time and material presented. Whereas [18] said learning media is one of the technologies that support the learning process that can increase students' motivation and understanding of concepts, improve student learning outcomes and help teachers in the learning process in education.

Based on the results of the exposure of several experts above about learning media, the researchers concluded that learning media is a technology that can simplify and easily be used in teaching and learning activities, with the use of media also being able to increase motivation and good learning outcomes.

One of the materials that can be used in project-based learning is statistics. Based on the 2013 curriculum, statistics is one of the materials that class XII SMK students want to learn in semester 1. In statistics subjects, students must be familiarized and directly involved in the process of learning activities so that students can understand, process, and interpret data correctly. This can be done by applying students directly by giving assignments or projects because, according to [19], projects can increase students' curiosity.

Based on the background that the researcher has described, the researcher proposes a problem formulation: "How is the prototype of learning media for project-based learning based, vocational students." However, due to the researcher's limited time, the research's purpose was only for the

development stage of validating project-based learning-based learning media for vocational students.

Research has been done [20] by researching the design of Android-based mathematics learning resources. While the research was conducted under the title "Design of interactive learning media to improve learning outcomes in analogue electronics courses" [21]. Through the results of these two studies, researchers have come up with ideas for making learning media prototypes for project-based learning-based vocational students. However, there are differences between the two studies. The process carried out is to design mathematics learning resources and learning media. At the same time, the researchers did in this study to create teaching media for SMK students based on project-based learning on the subject of statistics. Only the stages carried out by researchers were until validation. media by several validators.

Project-based learning media can be used and utilized easily by teachers and students during direct teaching and learning activities. In addition, they can be used by students online as a source of student learning to increase independence, motivation, and better learning outcomes.

METHODS

The research method used in this research is research and development (R&D). This study used the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model. The ADDIE development model includes the stages of Analysis, Design, Development, Implementation, and Evaluation[22]. Due to the limitations of the researcher's problem in conducting this research, the formulation of the problem that has been determined, and the limited time in the study in the process of developing the Project Based Learning (PjBL) learning media design, the researcher modified the ADDIE model to become ADD (Analysis, Design, Development.) or only up to the Development stage. For the clearer stages of the ADDIE model, the researcher displays Figure 1 below.

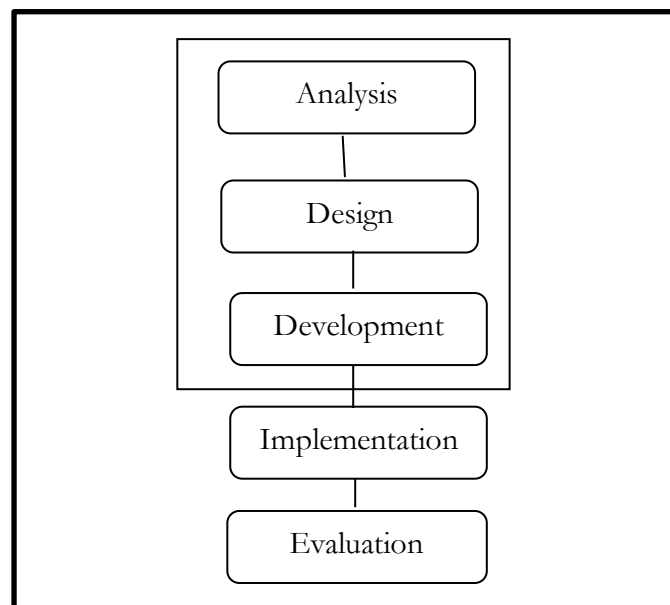


Figure 1. The Stages of the Addie Development Model

Determining the feasibility of learning media design for vocational students based on project-based learning is obtained by calculating the average obtained from the validation of media experts and material experts. The mean score obtained from the validator is then matched with the feasibility of the learning media. The eligibility criteria for learning media can be seen in Table 1 below:

Table 1. Ideal Assessment Criteria Guidelines

No.	Qualitative Score Range	Qualitative Category
1.	$\bar{x} \geq 4.2$	Very Worthy
2.	$3,4 \leq \bar{x} < 4.2$	Worthy
3.	$2.6 \leq \bar{x} < 3.4$	Decent enough
4.	$1.8 \leq \bar{x} < 2.6$	Not feasible
5.	$\bar{x} < 1.8$	Very Inappropriate

Modified from: [23]

Information :

\bar{x} = Average value

The description of the ADD stages carried out by researchers in the design process of Project Based Learning (PjBL)-based learning media is as follows:

1. **Analysis** At this stage, the researcher analyzes to find out what a problem is and attempts to find a solution. One of the necessary analyses is needs analysis, student characteristics analysis, ability and competency analysis that students need to achieve, and analysis of the applicable curriculum. One of the steps taken at this stage is to see the results of students' daily tests on the statistics given by the teacher and interviews with teachers at schools. Researchers do this to obtain information and data related to student characteristics, student learning types, the applicable curriculum, learning strategies and modern implementation in schools.
2. **Design Phase** Based on the analysis results, the researchers designed a design. This was done to make the media more focused on the design. Several steps at this stage were collecting references, compiling learning media design and designing learning media.
3. **The Development phase** of the design results that researchers have made then researchers carry out development by carrying out the next stage, namely by making media which is then validated by the validator team to get improvements and data to obtain valid learning media or suitable for use by teachers for students in classroom learning activities.

RESULTS AND DISCUSSION

The results of the research from the stages that have been carried out are ADD or analysis, design, and development. The explanation for each stage is as follows:

1. Stages of analysis

At this stage, there are several analyzes carried out by researchers as follows:

a. Curriculum Analysis

In statistics material, the selected basic competencies are in accordance with the main material in SMK to achieve the desired learning objectives, namely how students can improve their understanding of statistical material properly, starting by explaining the basic concepts of statistics, presenting data in the form of tables and diagrams, calculating sizes. single and group data centring, calculating the size of single and group data spread, solving problems related to the single and group data centring and spreading size.

b. Material Analysis

The researcher carried out the stages of material analysis to determine the selection of material to be developed in making learning media for project-based vocational students. The material chosen by the researcher has also been adjusted to the applicable standards and set by the education unit. In

this study, the researcher chose statistical material. In the media, the researcher displayed project tasks so that students were directly involved in understanding the material, and project assignments increased student learning motivation.

c. Student Analysis

Researchers conducted the student analysis phase to determine students' needs in student learning activities. After the initial observation, the researcher determined that the learning media was appropriate for student learning activities at school to support the statistical learning process with the given project assignments.

2. Design stage

Design is a creative activity in the form of a design that is generally functional in solving a problem so that it has more value and is useful for its users (Thabrani, 2019). At the design stage there are several things the researchers did as follows:

a. Design skeleton creation

Before the researcher made a project-based learning media design, the researcher first made a flowchart as a flowchart for the project learning media design framework using the help of Microsoft word. The flowchart made by the researcher can be seen in the following figure.

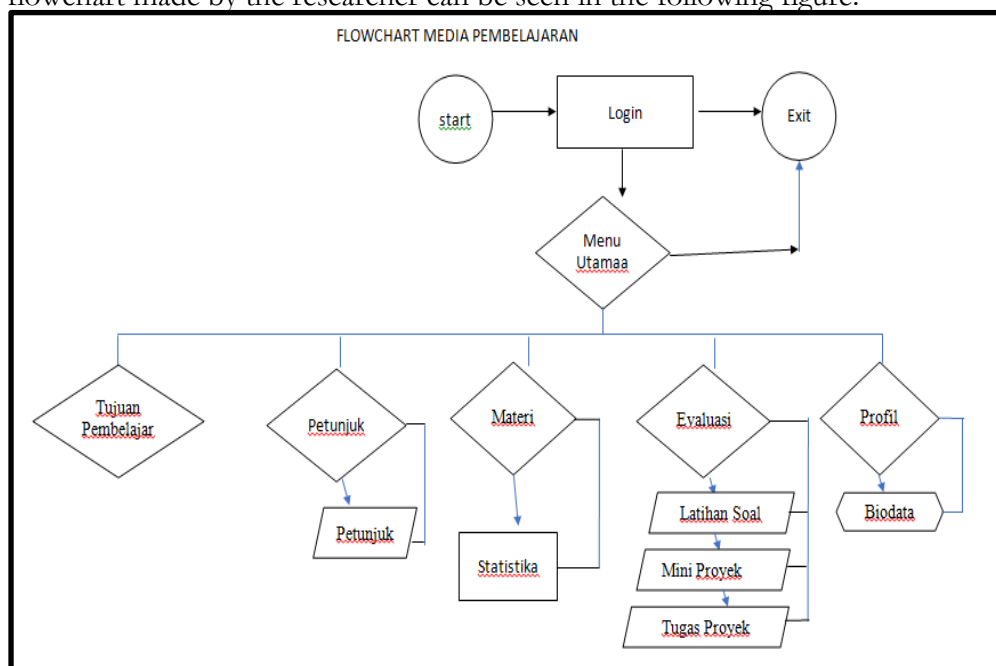


Figure 2. Flow Chart Project-Based Statistical Learning Media

The flowchart of the design framework made in the form of a flowchart has displayed the menus and animations that will be displayed on each slide in the design of learning media on project-based statistical materials.

b. Design Making

After making the learning media design flow with a flowchart, the researcher carried out the next stage, namely the design of learning media using the help of PowerPoint media. The following is the result of the design made by the researcher.

1) Introductory Part

The introductory section displays a display to get started, then login to the next page. After that,

the menu display and instructions for using the buttons contained in the media appear.



Figure 3. Opening Section on Learning Media for Project-Based Statistics Materials

2) Contents Section

In the content section, the researcher makes a concept flow, contains statistical materials in accordance with the subject matter of vocational students, and displays several project assignments.

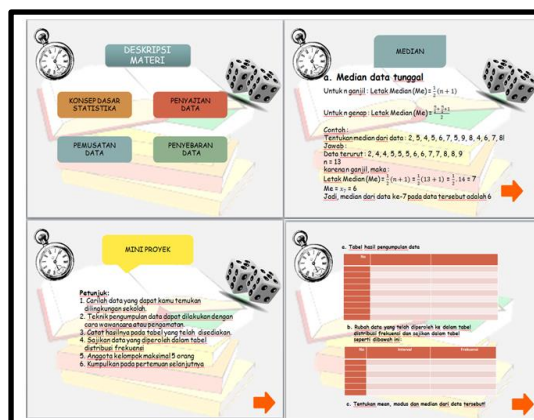


Figure 4. Contents Section on Project-Based Statistics Learning Media Materials

3) Cover Part

In the closing section, the researcher displays his profile with photos, personal biodata, and educational history and gives thanks.



Figure 5. Closing Part on Project-Based Statistics Learning Media Materials

3. Development Stage

At the development stage, validation is carried out in making media to ask for consideration and input from media experts and material experts so that the media created by researchers is suitable for use as a source and support for learning in class. Through the results of expert validation obtained by researchers, there are several spaces in the media that researchers must revise. Then the product

revision discusses the shortcomings of the developed learning media, which researchers correct in accordance with the direction and correction of the validator. The following table 2 is used by researchers as a benchmark to test the feasibility of project-based learning media when viewed from a media perspective.

Table 2. Media Eligibility Grid

No	Aspect	Indicator
1.	Language Eligibility	Legibility Information clarity Conformity with the rules of the Indonesian language
2.	Serving Eligibility	Clarity of purpose Order of serving Complete information
3.	Graphic Eligibility	Use of fonts (type, colour, size) Use of spaces Layout Illustration, drawing Display design

[25]

The results of the validation and the average score on learning media for SMK students obtained using the eligibility grid can be seen in table 3 below:

Table 3. Media Eligibility

Validator	Average Score	Criteria
V1	3.8	Worthy
V2	3.5	Worthy
Average	3.65	Worthy

Based on table 3, the results of the validation of learning media, which obtained an average value of 3.65 with a decent category, the PjBL-based learning media was declared valid to be used. The following table 4 is used by researchers as a benchmark in testing the feasibility of the material presented in the learning media.

Table 4. Material eligibility grid

No	Aspect	Indicator
1.	Content Eligibility	Conformity with KI, KD
		Suitability to student needs
		Conformity with the needs of teaching materials
		The truth of material substance
2.	language	Legibility
		Information clarity
		Conformity with good and correct Indonesian language rules
3.	Material Serving	Complete information
		Order of serving

[25]

The results of material validation are based on 3 aspects, namely 1) content feasibility, 2) language, and 3) material presentation. So that the score obtained from the validator that is in accordance with the instrument grid can be seen in table 5 as follows.

Table 5. Material Eligibility

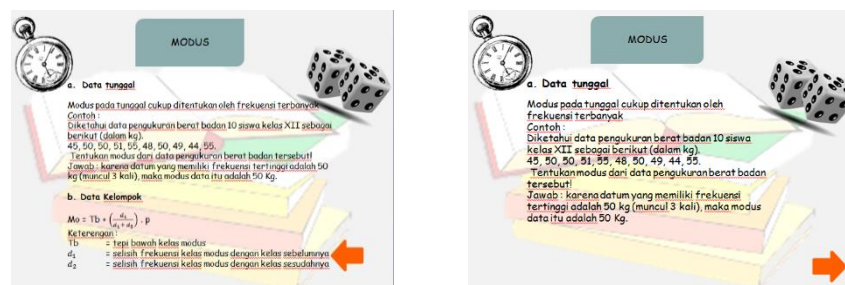
Validator	Average Score	Criteria
V1	4.0	Very Worthy
V2	3.7	Worthy
Average	3.85	Worthy

It can be seen in table 5 that the results of the validation of the material experts that are in accordance with the material lattice get an average value of 3.85, so the project-based learning media for vocational students is declared valid or feasible to be used in the learning process. The results of the validation of the learning media prototype for SMK students developed by the researchers have improvements which the researchers in table 6 below have described.

Table 6. Validation Results

No.	Repair	Before Repair	After Repair
1.	Make the instructions in the instructions clearer by using good punctuation		
2.	Change the chart to better and understandable data collection materials		
3.	Pay attention to the location of the material subtitles and the size of the text		
4.	Write subtitles in one line and pay attention to the size of the text		

5. Splitting slides between single data and group data



Based on the results of the evaluation of the discussion regarding the prototype of learning media for project-based vocational students on statistical material, the researchers hope that the media is useful for students in studying and understanding statistical material. Students can gain mastery of the material independently and be able to increase the level of student learning motivation.

CONCLUSIONS AND SUGGESTIONS

Statistics material that learns about how to plan collect, analyze and interpret data and then how students present the data they have obtained. Through the results of curriculum analysis, researchers design project-based learning media on statistical material for vocational students. The initial step taken by the researcher was to make a flowchart as a flow of media creation. Then, the researcher interpreted the project-based learning media design using the help of PowerPoint media. In the next stage, researchers carry out an improvement process in making project-based learning media. Regarding the improvements that researchers have made to obtain appropriate learning media results to increase independence and increase motivation in studying and understanding statistical material. The results of the media validation obtained from the validator stated that the validity of the project-based learning media was declared valid or suitable for use in the learning process.

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