Development of Technological, Pedagogical and Content Knowledge Based Learning Media

Nurrohmatul Amaliyah
Sekolah Pascasarjana Universitas Muhammadiyah Prof. Dr. HAMKA, Jakarta, Indonesia

Abstract
Problems in education are very diverse, one of which is that students are lazy to read and do not understand how to draw the right conclusions so that this has an impact on the learning achievement of Indonesian language students in grade VI SDN Petojo Utara Complex, which is less than optimal, especially in making decisions in a paragraph. Therefore, it is necessary to have learning media that can assist in conveying material to students and support students' understanding in drawing conclusions from a paragraph, one of which is learning media.based on TPACK (Technological, Pedagogical, Content Knowledge). The research method used in this research is the ADDIE development research model which is a model that involves the stages of model development with five development steps/phases, including: Analysis, Design, Development or Production, Implementation or Delivery and Evaluations. The results showed that the development of TPACK-Based Learning Media was implemented at MI Pembangunan UIN Jakarta. The results of student assessments of the TPACK-based learning media development assessment obtained an average value of 4.7 close to strongly agreeing with the statements submitted. Student responses to the e-module varied, the majority of class 1D and 1G MI Pembangunan UIN gave a positive response. However, some students gave responses that were difficult to understand because they were not in accordance with the learning styles of students. Therefore, it is important for e-module developers to pay attention to the quality and characteristics of e-modules in order to generate positive responses from students.

INTRODUCTION

Science and technology are continuously developing, causing extraordinary changes and demanding teachers to have a variety of abilities and knowledge so that the learning process is carried out properly. The teacher as a facilitator who manages the learning process in the classroom has a stake in determining the quality of education, the teacher must prepare (plan) everything so that the learning process in the classroom runs effectively. Teachers must continue to improve their abilities or competencies, not only mastering one competency, but all four competencies must be owned and mastered (Rusmiyati, 2018).

Professional teachers must master adequate TPACK competencies because the pattern of developing teacher competence with the term TPACK is a smart

way to ensure the implementation of learning according to the demands and changes that occur (Nofrion, 2018). Based on the statement above, the application of TPACK in learning is in accordance with the demands of the 21st century which utilize technology in classroom learning. Many studies have been conducted on TPACK, but connecting TPACK with learning media is still very limited. While the application of technology-based learning media is important.

Previous research was conducted by (Yanti & Hafitri, 2020) with the aim of developing an e-module that integrates TPACK in learning to write descriptive texts. The developed e-module was tested on class VIII students at a junior high school in Bandung and the results showed that the e-module was effective in improving students' ability to write descriptive texts. In addition, the research was conducted by (Widayanti & Mardikanto, 2020) by taking a sample of junior high school students at one of the junior high schools in Semarang City. The results showed that the use of TPACK-based learning media has better effectiveness than the use of conventional media in improving student learning outcomes in social studies subjects. From these studies it can be concluded that TPACK and the use of TPACK-based learning media play an important role in improving student learning outcomes and the ability of teachers to carry out learning. In addition, the development of TPACK-based e-modules can also be effective in improving students' ability to learn a learning material.

Learning media plays an important role in the learning process. Appropriate and quality media will help and facilitate teachers and students in achieving learning goals. According to Alwi (2017) learning media is anything that can be used as an intermediary to channel messages, stimulate students' thoughts, interests, feelings and willingness so that they can encourage the learning process in students. Students can learn on their own through learning media, but the existence of teachers is very important as adults who provide support and guide students during the learning process (Supriadi, et al: 2017).

Teachers must have the ability to choose quality learning media so that learning is right on target and students' learning interest can be increased. The teacher's ability to choose the right and suitable media for learning material will also determine the achievement of the learning process. Quality learning media, namely media that can encourage students to provide feedback, feedback, including carrying out learning practices correctly (Rasyid, 2016). This statement is confirmed by Astatin (2016) that learning media minimizes verbalism, namely the learning process of students who are only given experience (knowledge, attitudes and skills) through words alone. Students do more learning activities. Students not only listen to the teacher's explanation, but also do other activities such as observing, doing,

Media is used to make it easier for teachers to convey material in the learning process, the use of media is adjusted to the purpose of use and the information to be conveyed (Paramita, 2018). Based on the background of these problems, the researcher purpose to find out Development of Technological, Pedagogical, Content Knowledge-Based Learning Media.

METHODS

The research method used in this research is the ADDIE development research model which is a model that involves the stages of model development with five development steps/phases, including: Analysis, Design, Development or Production, Implementation or Delivery and Evaluations. The ADDIE model was developed by Dick and Carry in 1996, to design a learning system (Mulyatiningsih, 2016).In product development steps, ADDIE's research and development model is considered more rational and more complete. Mulyatiningsih (2016) suggests that this model can be used for various forms of product development in learning activities such as models, learning strategies, learning methods, media and teaching materials.
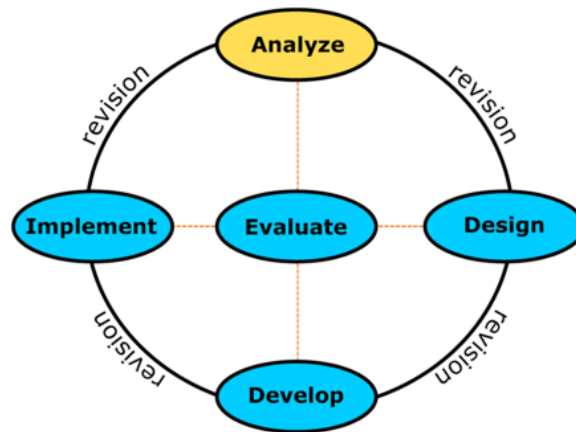
Figure 1. ADDIE Model

Analysis, in this stage what is done is to carry out a needs analysis related to learning media that has been carried out in elementary schools. The next stage is design, which is in the form of making a design/framework related to learning media. Development is the development of the design that has been made. Implementation is carried out in the form of trials in the research target schools. And the evaluation is carried out in the form of carrying out a repair analysis of the suggestions obtained regarding the learning media.

RESULTS & DISCUSSION

There are several problems related to some learning in elementary schools. This is based on the information obtained, namely that there are several problems related to learning Indonesian at SDN Petejo Utara 03 Pagi Jakarta. The problem is that students are lazy to read and do not understand how to draw the right conclusions so that this has an impact on the Indonesian language learning achievement of class VI students at SDN Petojo Utara Complex, which is less than optimal, especially in making decisions in a paragraph. According to the class VI teacher, it is necessary to have learning media that can assist in conveying material to students and support students' understanding in drawing

conclusions from a paragraph, one of which is learning media b.based on TPACK (Technological, Pedagogical, Content Knowledge). As for one of the research results obtained is the existence of a product in the form of an e-Module (Electronic Module) reading beginning for students in grade 1 SD/MI. This media was developed using the ADDIE development model with the following stages:
1. Analysis Phase (Analyze)

On hold analysis, the first step taken in this study is a preliminary study. The preliminary study was carried out by observing, mapping students' reading abilities, interviewing grade 1 teachers, as well as analyzing basic competencies related to thematic lessons, especially in early reading learning.
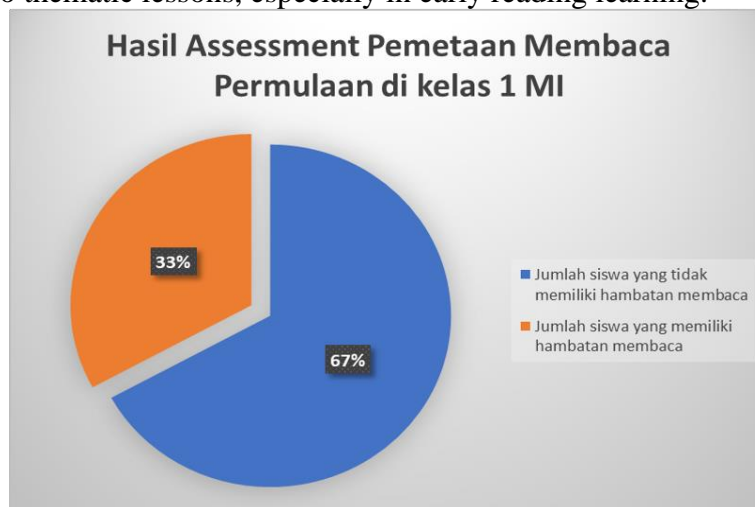

Figure 2. Reading Mapping Assessment Results

2. Planning Stage (Design)

The development of the reading e-module begins after the analysis stage is carried out, then the next stage is the planning (design) stage. The design for making e-modules is done by making an outline of the e-module. The preparation of the e-module outline uses the Book Creator application, which is done online.
3. Development Stage (Development)

This stage is the realization of the activities in the previous stage. The product design that has been developed includes learning content and presentation of material which is outlined in the form of attractive images, audio adapted to grade 1 students, as well as activities that invite students to actively participate in following the instructions in the e-module. Instructions in the e-module are made in writing and instructions that can be heard directly from the audio.
4. Implementation Stage (Implementation)

After the e-module has been validated by experts and has been repaired, the e-module is tested on a limited basis. This limited trial was conducted to determine the feasibility of the e-module being developed during field implementation. Following are some of the e-module eligibility criteria:
1. Relevance: e-modules must be relevant to the curriculum and materials taught in specific learning contexts.

2. Readability: e-modules must be easy for students to read and understand by paying attention to grammar and the use of language that is clear and easy to understand.
3. Interactivity: e-modules must offer good interactivity with students such as examples, assignments, quizzes, and links that can deepen the material.
4. Ease of access: e-modules must be easily accessible and can be downloaded by students easily and can be accessed through various devices.
5. Multimedia content: e-modules must present multimedia content such as images, videos and animations that can help students understand the material better.
6. Consistency: e-modules must be consistent with content and grammar to ensure uniformity in learning.
7. Measuring learning outcomes: e-modules must offer an effective and efficient system for measuring and evaluating student learning outcomes.
8. Appropriateness: e-modules must be in accordance with the target learners such as age level, educational level, and cultural background.

After conducting limited trials, the weaknesses of this e-module will be obtained. Weaknesses that appear based on student responses in using the e-module from this trial will become a reference material in making further revisions or improvements. The e-module was tested on class 1C students of MI Pembangunan UIN Jakarta with a total of 22 students. Class 1C students as respondents gave an assessment response to the e-module reading beginning based on aspects of appearance, aspects of material presentation and learning aspects. Here are the details of the question:

Table 1. Display Aspect

No	Question	Score	Student Answers
1	Is the display of the e-module attractive and easy to understand?	1-5	Score 5 = 18 students Score 4 = 4 students
2	Is the e-module page layout neat and easy to follow?	1-5	Score 5 = 15 students Score 4 = 3 students Score 3 = 4 students
3	Do the pictures or graphics used in the e-module help understand the material?	1-5	Score 5 = 19 students Score 4 = 3 students
4	Does the e-module have easy-to-use navigation?	1-5	Score 5 = 17 students Score 4 = 3 students Score 3 = 1 student

Based on table 1, it was obtained that the average score of students for the display aspect was 4.7 or strongly agreed.

Table 2. Aspects of Material Presentation

No	Question	Score	Student Answers
1	Is the material presented in the e-module complete and easy to understand?	1-5	Score 5 = 19 students Score 4 = 1 student Score 3 = 2 students
2	Do the examples given in the e-module help understanding the material?	1-5	Score 5 = 20 students Score 4 = 2 students
3	Is the material in the e-module well structured?	1-5	Score 5 = 15 students Score 4 = 7 students
4	Does the e-module present an interesting variety of activities?	1-5	Score 5 = 16 students Score 4 = 5 students Score 3 = 1 student

Based on table 2, it was obtained that the average score of students for the display aspect was 4.7 or strongly agreed.

Table 3. Learning Aspects

No	Question	Score	Student Answers
1	Does the e-module provide clear guidance on how to use it?	1-5	Score 5 = 22 students
2	Does the e-module help increase your motivation and interest in learning?	1-5	Score 5 = 16 students Score 4 = 6 students
3	Does the e-module help you understand the learning concept?	1-5	Score 5 = 17 students Score 4 = 3 students Score 3 = 2 students
4	Does the e-module provide sufficient feedback on your learning outcomes?	1-5	Score 5 = 16 students Score 4 = 4 students Score 3 = 2 students

Based on table 3, it was obtained that the average score of students for the display aspect was 4.7 or strongly agreed.

Information:
1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

In the next stage, a large-scale trial was carried out or the application of the product that had been developed, namely the e-module for reading starters at MI Pembangunan UIN Jakarta. At the implementation stage, 2 classes were used, namely class 1D and class 1G MI Pembangunan UIN as a large-scale trial class in implementing the e-module for starting reading. This implementation stage was carried out to determine the feasibility of the initial reading e-module in the form of student responses after a series of stages carried out for the development of the previous initial reading e-module.

Table 4. Student Assessment Responses

Assessment Aspects	Rating Average	
	Class 1D	**1G**
Display Aspect	4,2	4,4
Aspects of Material Presentation	4,6	4,2
Learning Aspects	4,7	4,6

Student responses to the e-module varied, the majority of class 1D and 1G MI Pembangunan UIN gave a positive response. However, some students gave responses that were difficult to understand because they did not match the learning styles of students. Therefore, it is important for e-module developers to pay attention to the quality and characteristics of e-modules in order to generate positive responses from students. In addition, developers also need to consider students' learning preferences and provide easy access and technological support needed to maximize the use of e-modules.

5. Evaluation stage (Evaluate)

After going through the process from the previous stages, the development of the e-module received several improvements that had to be made based on the results of the assessment of material experts, media experts, and students' responses to the e-module. This evaluation stage is an overall evaluation. Input from validators and from students is considered so that the e-modules that have been made are better. To evaluate the TPACK-Based Learning Media Development research, it is first necessary to know the objectives of the research. In this study, the main objective was to develop TPACK-based learning media to improve student learning outcomes in social studies subjects at MI Pembangunan

UIN. After knowing the purpose of the research, an evaluation can be carried out by looking at several aspects,

1. Development method: The evaluation is carried out by looking at the TPACK-based learning media development method used. Is the development method effective and efficient in achieving research objectives.
2. Quality of learning media: Evaluation is done by looking at the quality of learning media developed. Does the learning media meet quality standards, such as easy to use, attractive, and according to student needs.
3. Effectiveness of learning media: Evaluation is done by looking at the effectiveness of TPACK-based learning media in improving student learning outcomes

The results of the evaluation of this study can be concluded that the development method is effective and efficient in achieving research objectives. Then, the learning media meet quality standards, such as easy to use, attractive, and according to student needs.

CONCLUSION

Development of TPACK-Based Learning Media (Technological, Pedagogical, Content Knowledge) implemented at MI Pembangunan UIN Jakarta, initially the research was carried out on a small scale involving 22 students. Then the research was continued on a larger scale, namely two classes 1G and 1D. During the research, students were asked to make an assessment on a scale of 1-5 (strongly disagree - strongly agree) on 3 aspects, namely the appearance aspect, the presentation aspect of the material and the Learning Aspect.

The results of student assessments of the TPACK-based learning media development assessment obtained an average value of 4.7 close to strongly agreeing with the statements submitted. Student responses to the e-module varied, the majority of class 1D and 1G MI Pembangunan UIN gave a positive response. However, some students gave responses that were difficult to understand because they were not in accordance with the learning styles of students. Therefore, it is important for e-module developers to pay attention to the quality and characteristics of e-modules in order to generate positive responses from students. So it can be concluded that TPACK-based learning media is considered effective in helping to convey material to students and support students' understanding in drawing conclusions from a paragraph.

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