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The Development of Online Mathematic Module Based on Dick and Carey Theory for Junior High School Student

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ABSTRACT: This study aims to develop an online mathematic module using Dick and Carey's development model. This research was conducted at SMP Al-Kahfi Sepulu Bangkalan Regency. The validation and quality assessment was conducted by questionnaire, namely questionnaires of expert modules, design experts, and teachers' colleagues. The trials were carried out by students in small groups and large groups. The researchers first tried it in a small group (5 students) before implementing it to a large group of students.

The results of this research are obtained from the subject matter expert assessment, peer teacher's questionnaire, and field tests for small and large groups of students. These processes are required to fulfill the validation requirements so that the learning media produced is of high quality. The researcher concluded that the online learning module was feasible. Therefore, this product could be distributed to teachers and students for a better learning experience.

KEYWORDS: Mathematics Module, Online Learnin, Dick and Carey.Theory

I. INTRODUCTION

Seeing the unmotivated and less independent students in SMP Al-Kahfi Sepulu Bangkalan to follow math class, some efforts are made in the learning process. So far, the action of developing learning material seems to be less effective. Even when the current teaching method has combined experimentation, lectures, and discussion, the students still need something more intuitive.

By developing an online module for students, it is expected that students can be independent and can increase the interest and likes to learn mathematics even more. By increasing the willingness to learn, students will be easier to master mathematical subjects at school. Finally, it will improve their achievement and learning outcomes at school. Therefore, there is no impression that mathematics lessons are problematic and frightening. More than that, an online module is expected to foster the spirit and willingness to learn mathematics independently.

The online mathematics module developed is sourced from many collections of material summaries and several questions compilation that are quite a lot. By being online, it opens the gate to possible revisions and additions are tailored to learning needs.

The online learning module is one part of learning technology. Learning Technology (Based on AECT definition in 1977) is a complex and integrated process that involves people, procedures, ideas, equipment, and organizations to analyze problems, seeking ways to solve problems - implementing and managing solving problems in situations where teaching and learning activities have goals and control. This definition views that many issues in the teaching and learning process must be solved to achieve learning goals.

Learning technology is part of educational technology, so that the implementation area is not only informal education institutions but also wherever learning is needed, including learning organizations. Conceptually, learning technology is defined as theory and practice in design, development, management, assessment and research, processes, sources, and systems for learning (Seels & Rickey in Miarso: 2004). Development is a legal process of design specifications into physical form. There is a complex relationship between technology and theories that control message design and learning strategies in the development domain. In principle, the development domain can be described: (1) Messages controlled content, (2) learning strategies controlled theories and manifestations of technology that can physically be shaped hardware, software, and subject matter.

Dick and Carey Model Learning Design is designed to create an attractive, effective and efficient learning process. This learning model is developed using a system approach (system approach) to system design's essential components, including analysis, design, development, implementation, and evaluation. The steps of the learning model compiled by Dick and Carey have more complex parts when compared to other learning models, and Dick and Carey Model Learning Design is not a systematic approach but is an organized learning method.

Developing a module requires specific procedures that follow the goals to be achieved, the structure of the learning content is clear, and meets the criteria that apply to the development of learning. The development of the module must follow systematic

steps. These steps are:

1. Analysis of the objectives and characteristics of the contents of the field of study
2. Analysis of learning resources
3. Analysis of learning characteristics
4. Setting targets and learning content
5. Establishing a strategy for organizing the contents of learning
6. Establishing the Submission Strategy for Learning Contents
7. Establishing Learning Management Strategies
8. Development of Procedures for Measuring Learning Results

Steps (1), (2), (3), and (4) are steps for analysis of learning conditions, steps (5), (6), and (7) are steps in development, and steps (8) are Steps for measuring learning outcomes.

Learning media is all needed source in communicating with students (Martin & Briggs, 1986). Selecting and using media in learning must be considered how the level of the interaction has. We must also pay attention to the characteristics of students. Like Heinich, Molenda, & Russell (1985) in DeGeng (2008), said that "IF Instructional Media Are To Be Used Effectively, There Mus Be A Match Between The Characteristics of Learner and The Content of the Learning Material and Its Presetation. This means that it is closer to the differences in characteristics of students in choosing the media, the higher the level of motivation to be loaded by the media.. "

The online world can convey any information, so anyone can access electronic documents to enrich their studies. Online media used to access data from sources are also used to communicate with other students and learners (SMALDINO, Lowther, Russell, 2011). The most important is that learning can interact with online learning by providing an interactive environment.

There are two types of apps that will support the developed online module. First, it is the application intended for students of his studies in completing its easy access tasks in the form of a web or teacher blog. The second online application is developed on computers/laptops or smartphones that have been designed and are in great demand and used students with reference to the ease principles in collaborating and communicating in the learning process such as e-mail, telephone, SMS, Messenger, and WhatsApp.

In this learning, students will be given the freedom to use the application he likes and is mastery in collaborating and communicating between colleagues, the teacher, or anyone. Online applications carry out the learning process with the Blended Learning learning model when students or teachers do discussions (online tutorials) and make agreements in the learning process. (Fatirul, 2012)

The module teaching material that has been developed will be pinned on the site called Google Classroom. The material is separately pinned into the Google Classroom in the content of teaching materials. Students freely take material or material that will be explained every time. Packaging dishes beside teaching materials are also separated between teaching materials, the tasks that students do, evaluations, and assessment guidelines. While the task will be placed separately in its content, this will facilitate the separation of each task and simplify the assessment.

II. RESEARCH METHODS

The theory used for this learning media development is the Dick and Carey Model. The Dick and Carey Model components include teachers, students, material, and the environment. Similarly, the non-formal education environment has; teachers, students, materials, and learning environments. All interaction must be done in the learning process to achieve the goals. When viewing components work satisfactorily or not, it is necessary to develop an evaluation format (Dick and Carey, 2001). If the evaluation results show that the work is unsatisfactory, the component is revised to achieve effective criteria to attain learning goals.

The components and stages of the DICK model and Carey are more complex when compared to other learning models such as Morrison, Ross, & Kemp (2001). Although the Morrison, Ross, & Kemp model also views the learning design as a system but is slightly different. They mention learning design as a systematic method but not a systematic approach. The stages used are planning, development, evaluation, and process management. At the same time, the essential component of the system includes Learners, Objectives, Methods, and Evaluation which are subsequently developed into 9 (nine) learning design plans.

In general, the first stage in learning design is an analysis to determine the needs in learning and identify what problems will be solved. Dick and Carey's Models apply this stage. Thus the development is carried out by needs and problem-solving. The recommended product in this model is a product that can be used for independent learning (Nasution, 1987). This model also allows learning citizens to be actively interacting because it establishes environmental-based strategies and learning types.

To achieve the effectiveness of the teaching, the mathematics module will be designed in a teaching design model developed by Dick & Carey (2001), which uses the following stages:

1. Analysis of the need to determine goals.
2. Conduct learning analysis.
3. Recognize the behavior of input and characteristics of students.
4. Formulate unique goals.

5. Develop an assessment instrument.
6. Develop learning strategies.
7. Develop learning material.
8. Designing and developing formative evaluations.
9. Revise learning.
10. Develop summative evaluation.

Data obtained from testing module development products are qualitative. Qualitative data from the questionnaire deployment to the expert fill in the field of study, design experts/design learning, subject teachers, and class VII students of SMP Al-Kahfi Sepulu.

The data collection instrument used in developing this form module is a questionnaire. The purpose of data collection is to obtain data on the truth of the contents, the accuracy of the design, and the quality of the module so that the questionnaire is prepared based on the indicators of the ideal condition of the product development of learning from the components that build it.

This study using a questionnaire consisting of: (1) expert fill in the field of study with Code A, (2) design and design experts with Code B, (3) Teacher Overview Subject with C code, (4) Overview of small group students (Five students) with code D and large groups (thirty students) with code E. Questionnaire is designed in the form of questions with four answer choices. Each answer choice was given a weight of

- 5 (very suitable, very clear, very interesting, perfect, and very easy),
- 4 (convenient, clear, attractive, proper, and easy),
- 3 (quite appropriate, quite clear, quite interesting, enough Right and relatively easy)
- 2 (less suitable, less clear, less attractive, less appropriate, and less easy),
- and 1 (very less suitable, very unclear, very less attractive, very less appropriate, and very easy).

The five alternative answers are categorized into 2 (two) groups of alternative answers 5, 4, and 3 classified as very appropriate, precise, clear, easy, and attractive quite precisely, quite clear, relatively easy, and quite interesting (feasible), while alternative answers 2 and 1 Scriptfully not suitable, improper, unclear, not easy and not attractive (not feasible).

Analysis and results of research trials in developing mathematical modules are descriptive. This analysis was conducted to process the results of the expert review of the field of study, design experts, learning designs, and teachers of class VII mathematics subjects in SMP Al-Kahfi Sepulu. The results of this data analysis are then used to revise the module accordingly in the design of the trial to provide meaning in the decision making of the module of modules used by the feasibility level assessment qualification with the following criteria:

Table 1. Likert Scale

Score	Criteria	Further Action
5	Very Feasible	No need revision
4	Feasible	No need revision
3	Fair	No need revision
2	Unfeasible	Need revision
1	Very Unfeasible	Need revision

III. RESULTS AND DISCUSSION

The development research offers online module that can be seen below:

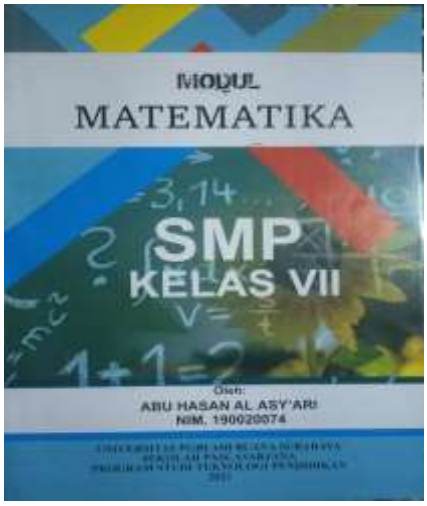

Image 1. Online Mathematic Module

The data presented in the first stage is the result of the review of the expert fill in the subject module in the form of qualitative data compiled by questionnaire review expert contents of the subject module. The results of the expert review were in the state of assessments, comments, and suggestions used as the basis for revising module product improvements. In this trial, there was a slight revision of the review of the learning module about the suitability of the content of learning to achieve learning goals in the 7th-grade mathematical module. The results of this assessment were said to be feasible.

The results of the revised module from the first stage were assessed by the design of the learning design. Next, it is submitted to the design experts/design learning to evaluate the accuracy of the learning design in the module, which is compiled by the questionnaire. From the assessment results of learning experts on the use of the design of learning in grade 7th, mathematical modules can be said to be feasible.

Product Development Module The results of the revision of the second phase of learning experts were continued by the Mathematics subject teacher. Data from mathematical subject teachers in the form of qualitative data, namely comments and suggestions gathered using a questionnaire printed a statement directly from the mathematical subject teacher, is said to be feasible.

After going through three test trials consisting of experts testing the subject module, trials of learning design, and field trials/subject teachers followed by the last trial, namely field trials for students, both small groups and large groups. The results of students' review of online modules (small groups) are presented by the results of students in small groups (5 students) to mathematics modules. Comments and suggestions from students are also said to be decent and received a positive response. The results of students' review of textbooks/modules (large groups) are presented by the results of students in large groups (30 students) on mathematics modules. Students' comments and suggestions will be used as a footing for revising modules development products are also said to be decent and get a positive response.

The development of the Mathematical Learning / Module Package follows the procedural flow model Dick and Carey (2001), a reference. This development is systematic because it follows the development steps contained in the model used. Furthermore, with the reference resulting from the analysis of the needs of the field, the presence of systematic products is expected to be able to solve the existing problems. This thought is outlined in the form of development creativity to carry out modification activities so that the product meets the expected criteria.

The problem of Riel and Essential that underlies the idea of the development of mathematical modules, because of the experience in the field, many questions are quite a lot. Therefore, it doesn't just disappear. Thus, after through the analysis of the needs of the field, the researchers view the need to develop written learning resources in the form of modules equipped with supporting facilities in the form of instructions, specific purposes of learning, content description, pictures, summaries, exercise questions and answer keys, all of that to be easily learned.

Furthermore, the teaching module was tested to get data as returning to the product. The data will indicate the need for teaching modules. The trial involves the expert of the contents and learning draft experts. The researchers choose the subject matter experts based on their competence in their field. Other trials involved 1 (one) Mathematics Teacher Class VII Middle School Al-Kahfi Sepulu 35 grade VII students of SMP Al-Kahfi Sepulu, using a questionnaire to assess the feasibility of teaching modules produced.

From the series of test experts, learning design experts, teachers of the learning, and students, their inputs are in the form of comments and suggestions that produce textbook modules worthy of use in class VII Al-Kahfi Middle School Sepulu. Based on feedback and advice from subject teachers and students, researchers revised. Revisions are carried out gradually through analysis in line with the specified trial procedure. After going through five analysis and content trials stages, the teaching module mathematics was the final product.

There are some difficulties faced by the researcher when preparing this module:

1. Limited sources of supporting materials used as a reference in the preparation of modules. To further expand the contents of learning material, the relevant material resource is needed,
2. The time available to prepare teaching materials and product trials is minimal, so the authors struggled to find the right moment.

Fortunately, after analyzing the results of the questionnaire taken by both students and subject matter expert, the researcher found some advantages of this module, such as:

1. The development of the Mathematics module with the Dick and Carey model can be applied in class VII Al-Kahfi Sepulu Middle School.
2. Development of Mathematics Modules Class VII Middle School Al-Kahfi Sepulu Worth Used.
3. Learning with student value modules is increasing.
4. Learning with student modules makes students more independent.

However, there are also some weaknesses of this product worth mentioning:

1. This module, in its use, still needs to be supported by other slide and LCD media. This is because the media used in the module book is limited to graphics media, book prints. Thus the user still needs to prepare other media that can support the learning process of class VII students of Sepulu Al-Kahfi Junior High School.

2. This module is still in the context of research. There is a need for socialization and adaptation of the possibility of using mathematical modules in class VII Al-Kahfi Sepulu Middle School.

IV. CONCLUSIONS

From the research above, it can be concluded that:

1. The researcher can use Dick and Carey's (2001) model to the learning curriculum in junior high school.
2. The assessment results of these overall experts and users have been declared good and feasible to use.
3. This developed module makes it easier for students and teachers to learn, using the Mathematics Mathematics Module in Junior High School Al-Kahfi Sepulu.
4. Chapter I to IV in the Mathematics Module Book developed as a whole and has fulfilled both theory and tasks/tests because organizing is based on the results of needs in the field.
5. Physical Display and Disclosure of Module Contents allow students and the teacher to use it. This condition is based on the arrangement and use of letters and size letters and layout that provides more concrete clarity, making it easier for students and teachers.
6. The results of learning using this module, students are expected to have the ability and skills to resolve questions, and more than that, it helps them develop learning independence..

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