

Development of Learning and Teaching Material in Faculty of Teacher Training and Education of Batanghari University Jambi

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ABSTRACT: The applied teaching material is still using many old references that are less appropriate to the recent condition, hence a material that is suitable with student's need is required. This study aims to develop learning and teaching materials oriented to the system approach. The method used was research and development (R & D) and the product was designed with an instructional development model (MPI) using these following steps: needs analysis and objectives formulation, instructional analysis, identified learners' initial behavior and characteristic, wrote specific instructional objective, arranged learning strategy, developed instructional material, constructed design and conducted formative evaluation, conducted a revise, obtained the desired instructional system. Results of product development are in the form of printed material with the learning design expert validation reaches 94.4%, material expert reaches 95.4% and media expert reaches 94.8%, so all experts recommended learning materials can be used. Individual trial result reaches 93.81%, small group trial reaches 93.96% and field trial reaches 89.22%, hence in general, teaching material and learning development is feasible to be used. Resulted teaching material will be one of the sources that is suitable for the student's need.

KEYWORDS: teaching material, instructional development model, teaching and learning

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I. INTRODUCTION

The quality of learning outcome is closely related to the quality of learning process, there is an assumption that a quality learning outcome can only be achieved through a quality learning process, this is very reasonable because if the learning process is not optimal, it is very difficult to expect a quality learning outcome. The main problem of the learning outcome quality lies more in the problem of implementation process or educational activity process itself. Conceptually, there are many factors affecting the quality level in the higher education in Indonesia. One of the factors is the learning quality factor that can be seen through the quality of the learning outcome and the quality of the alumni (Zulyadaini and Martinis, 2016).

In the university learning process, lecturers become the main focus, since the lecturers directly influence, assess and develop students' ability to be intelligent, skilled and moral people (Zulyadaini, 2017). Learning process that originally is teacher centered or teacher oriented that prioritized the role of teachers becomes learner centered or learner oriented that centered on learners (AtwiSuparman, 2012). Micro-learning in college has changed a lot in the level of curriculum, for example, number and variety of course subject, number of semester credit unit, arrangement of courses, subject name and code, means of learning as well as direction and purpose of education. However, the change does not occur in the form of learning, type of tasks, way of assessment and paradigm of education.

Results of field observation show that many lecturers are still using old published book as references. During the interview, lecturers said that it is difficult to find the latest references, especially in Jambi. From the reference in use, there are materials that have not been arranged in a systematic arrangement, it is difficult to understand and monotonous, so that it takes a long time for the student to understand it.

Based on these facts, it is necessary to design and develop the teaching and learning material. In this development process, it needs to be studied How is the learning of teaching and learning subject at Faculty of Teacher Training and Education of Batanghari University Jambi? And how to develop teaching and learning material at Faculty of Teacher Training and Education of Batanghari University Jambi?

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In order to understand teaching material development, it is necessary to understand the theories of instructional development model, teaching material.

Development Model

According to Directorate General of Education Personnel and Directorate General for Quality Improvement of Teachers and Education Personnel (Tegeh et al., 2014), development research is a series of process or step in order to develop a new product or improve the existing product in an accountable manner.

Instructional development is a systematic way of identifying, developing and evaluating a set of materials and strategies directed towards achieving a specific educational objective. Therefore, this study uses Instructional Development Model (MPI).

Instructional Development Model (MPI)

Instructional Development Model (MPI) characteristic are: first, each step of instructional development model is always meant for practical purposes rather than theoretical purposes. Second, this instructional development is a plan to identify learning problems and how to solve problems using a plan on trial and feedback implementations as an evaluation.

The development model structure can be seen in the figure 1.

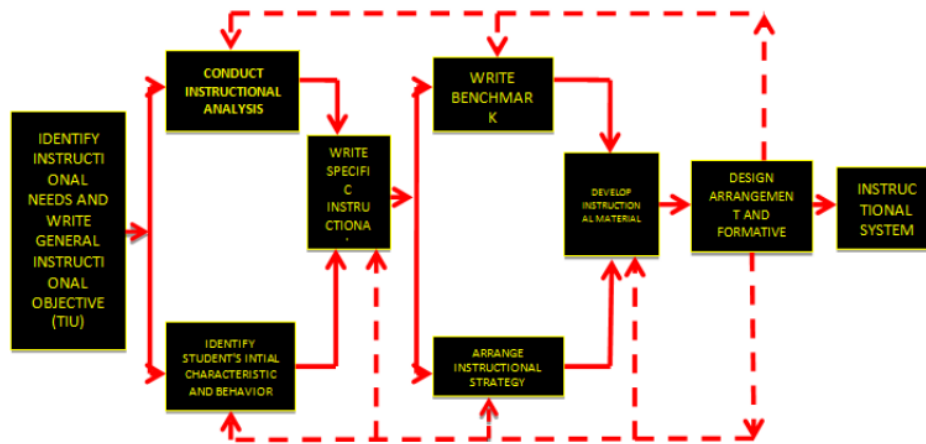


Figure 1. Instructional Development Model (MPI) (AtwiSuparman, 2004)

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Based on figure 1.1, the Instructional Model elements are:

- Identify the instructional needs and formulate the general instructional objective. The first step in this research is the researcher identifies the existing course, especially teaching and learning subject existing in several universities. The methods used by the researcher were conducting in-depth interview, making field notes and documenting them well. Then, the researcher formulate its development form and its general instructional objective.
- Identify students' initial behavior and characteristic in the university to understand students' behavior prior to development and compare it to their behavior after the instructional development.
- Conduct a competence analysis that is describing the general behavior into a specific behavior arranged logically and systematically. This activity is conducted to identify specific behaviors that can describe a general behavior in details.
- Formulate a basic competence, namely by discussing the concept and how to formulate the competencies, so that it can be used as the basis of test preparation and instructional strategy.
- Prepare a benchmark reference test, namely describing the technique and procedure of test preparation that can be used as a tool to measure how far the students' success level in achieving the instructional objective.
- Arrange an instructional strategy. This stage discusses how the lecturers should arrange the sequence of their instructional activities.
- Develop instructional materials. This stage discusses the directly documented instructional materials or media.
- Design and implement a formative evaluation. This stage discusses how to carry out a formative evaluation

on instructional materials that has been produced by the researcher in the form of learning materials, lecturer guidelines, student guidelines and tests. In addition, the evaluated factor is the instructional activity implementation using produced materials.

- i) Obtain the desired instructional system.

The instructional development model is a very simple and easy to understand model because the stages are clear and allow all time revisions. Do not think a model is the best model since every model is good and appropriate for a certain condition (AtwiSuparman, 2012).

Development Model Relevance

The relevance that makes *Instructional Development Model* (MPI) as a model to be used in the teaching and learning development system is partly because MPI has a clear relevance to the development of a learning process. In addition, instructional development model is very simple and easy to understand, and the *output* of this model is expected to have these following criteria: (1) there is a clear needs analysis and general instruction objective; (2) the content in accordance with the learning specific objective; (3) the order is right; (4) there is an instruction for teaching material usage; (5) there is an exercise; (6) there is an exercise example; (7) there is a performance test; (8) there is an evidence of learners' progress; and (9) there is an instruction for the learners to the next activity.

Teaching material

Ministry of Education (2008) stated that teaching material is all forms of material used to assist teacher/instructor in carrying out teaching and learning activity. Then, according to Lestari (2013) teaching material is a set of objective or learning tool that contains learning materials, methods, limitations and how to evaluate them, it is systemically and attractively designed in order to achieve the expected objective, namely to achieve competence or sub-competence with all of its complexity. This condition shows that teaching material has an important role in a learning process. Therefore, without a teaching material, it is impossible to achieve learning's objective and learner's basic competence mastery.

Teaching material is categorized into four types: visual teaching material consists of printed and non-printed materials, teaching material with audio, audio-visual teaching material, interactive teaching material (Amri&Ahmadi (2010)). Based on the technology used by the Ministry of Education, (2008) which classifies teaching material into four categories, namely printed teaching material, audio teaching material, audio-visual teaching material, interactive teaching material and web-based teaching material.

Printed teaching material is able to present an easily understood material to its user. Therefore, a designer, lecturer, instructor, and teacher, should be able to create printed teaching material suitable for the learner's needs. There are many kinds of printed material according to (Amri&Ahmadi, 2010) some of them are handout, book, module, student worksheet, brochure, leaflet, wall chart, and photo/picture.

II. RESEARCH METHODOLOGY

This study aimed to see the learning process of teaching and learning course at Faculty of Teacher Training and Education of Batanghari University Jambi. The research was done through a system approach conducted through problem solving stages in which each step was understood and produced an alternative solution. The applied method was a research and development (*R & D*) that will produce a product or test the effectiveness of a certain product. This teaching material was developed using the following steps: 1) preliminary study, 2) development planning, 3) validation, evaluation and revision, 4) and implementation. In order to create developed teaching material, then Validation and formative evaluation were conducted and reviewed by: (1) *one to one expert*, i.e. material expert, instructional designer and multimedia expert, (2) *one to one learner*, i.e. individual testing conducted on the user subject, which was the students as user consisted of three students who have low, medium and high ability, (3) *small group*, i.e. a small group trial about the learning principle ability with the applied principal tested to 9 students consisting of 3 students with low ability, 3 students with medium ability and 3 students with high ability, (4) *field trial*, i.e. a field trial conducted on 20 students.

III. RESULTS AND DISCUSSION

1. Needs Analysis and Objective Formulation

Results of needs analysis obtained through questionnaire and learning activity direct observation, resulting in the conclusion that student wants and needs a new teaching material as learning medium and facility. In addition to distributing questionnaire to student, other instruments used are interview with other lecturers or peers. Results of the interview gives a conclusion that the teaching material used is not

systematically arranged yet. The learning material only using old published textbook and book. So it needs new teaching material in order to make it more systematic and in accordance with the students' need.

General Instructional Objective. In general, after taking the teaching and learning course, students are expected to be able to implement it and solve the problems of teaching and learning in everyday life.

2. Instructional Analysis

Needs analysis is the process of describing the general behavior into a specific behavior arranged logically and mathematically. This activity is conducted to identify specific behaviors that can describe general behavior in details.

The competency map uses operational verbs of: Describe the nature of teaching and learning; Explain the learning significance and interest; Explain Learning Theory; Explain Factors affecting learning process; Explain learning Motivation; Explain approach Definition in learning; Explain the role of approach in learning; Explain Types of approach in learning (a. Individual approach, b. Group approach, c. Variation approach, d. Educational approach, e. Religion approach, f. Meaningfulness approach; explain the types of approach (a. Contextual Approach, b. Constructivism Approach, c. Deductive Approach, d. Inductive Approach, e. Concept Approach, f. Process Approach, g. Science, Technology, and Society Approach).

3. Identifying Initial Behavior and Characteristic

Initial Behavior is a Group of Targets or students who are the participants taking the teaching and learning course registered on Batanghari University (UNBARI) in the IV (fourth) semester of 2016/2017 Academic Year. Students' Characteristic can be seen using questionnaire instruments and observation. The results of such information gathering are based on the students' characteristic who will use the material with heterogeneous educational backgrounds, such as from high school, vocational school and MA (Islamic High School) and all of them can read well.

4. Formulate Specific Instructional Objective

From the general instructional objective above, a specific instructional objective can be described as follows: Students can Describe the nature of teaching and learning; Student can explain learning significance and interest; Student can explain the Learning Theory; Student can explain factors affecting the learning process; Student can explain the Motivation in learning; Student can explain approach Definition in learning; Student can explain the Role of approach in learning; Student can explain types of approach in learning (a. Individual approach, b. Group approach, c. Variation approach, d. Educational approach, e. Religion approach, f. Meaningfulness approach; Student can explain the types of approach (a. Contextual Approach, b. Constructivism Approach, c. Deductive Approach, d. Inductive Approach, e. Concept Approach, f. Process Approach, g. Science, Technology, and Society Approach).

5. Assessment Tool

The assessment consists of midterm, final semester, participation, and competency tests.

6. Arrange Learning Strategy

The learning strategy used in teaching and learning material in this course consists of three main activities, namely introduction, core activity, and closing activity. In addition, it is given the method used, time, media and tool, as well as the ability test.

7. Develop Learning Material

Learning material development is in the form of a textbook. The feasibility of the developed learning material based on the steps above needs to be assessed. Therefore, the feasibility results consisting of validation and formative evaluation are as follows:

a. Expert Test (*one to one expert*)

1) learning design expert

The validation results by learning design expert based on the indicator is shown in chart 1:

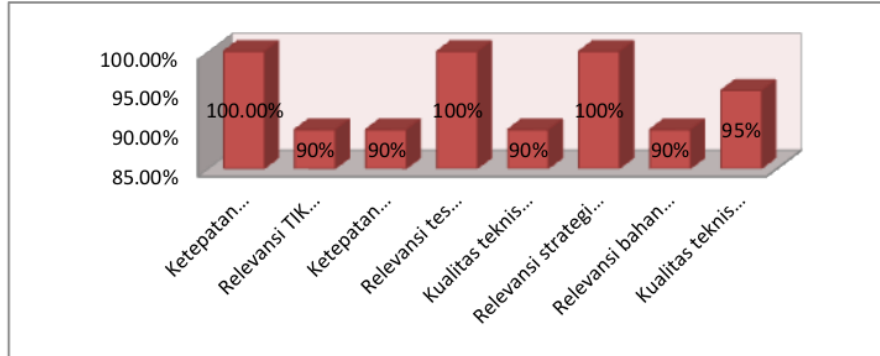


Chart 1. The 1st validation result of learning design expert

2) Material Expert

The validation results by material expert based on the indicator for the teaching and learning material is shown in chart 2.

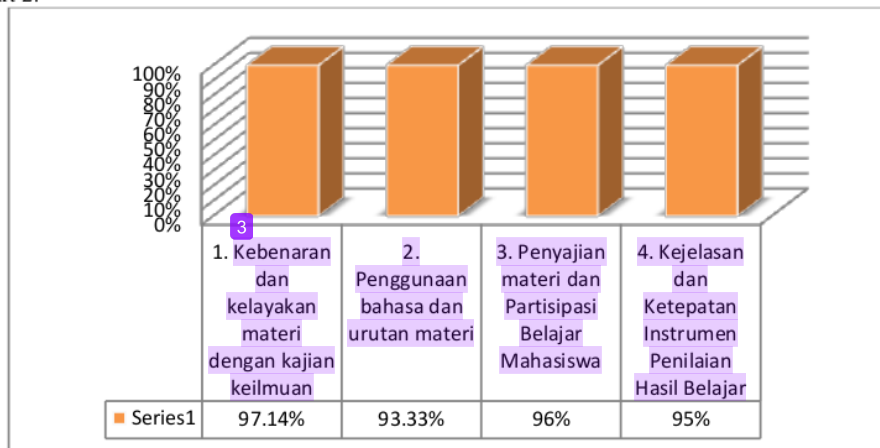


Chart 2. Material Expert Validation Result

3) Media Expert

The validation results by media expert on the teaching and learning material draft is shown in Chart 3.

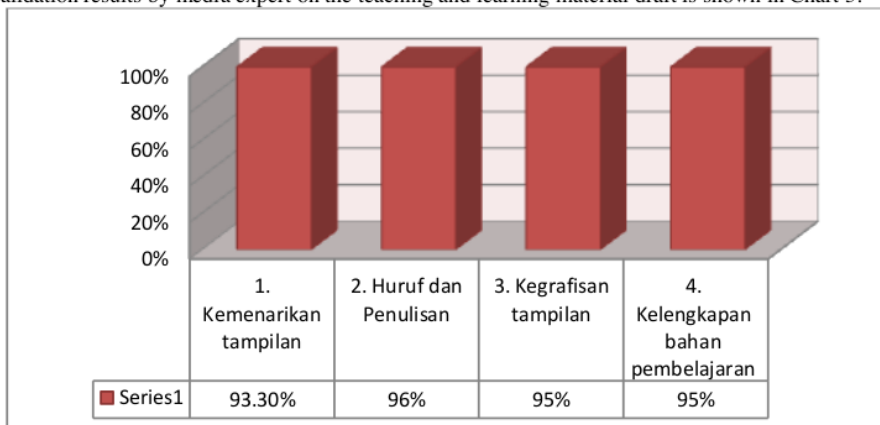


Chart 3. Media expert validation result

4) Expert's Revision and Suggestion

Design/technological education expert revision. Revision that needs to be done is the language or sentence and learning objective's affirmation. In addition, it needs to be done in order to add *behavior* in the formulation of Specific Instructional Objective (TIK). Another improvement of the operational verb in Specific Instructional Objective is the creation of variations from the easy one to the complex one as well as the simplification of sentence's rationality in Specific Instructional Objective. Then, the *condition* of each test item is shown, because in the test, there are people who learn (audience), desired *behavior*, learning *condition*, and *degree* of achievement.

Material expert revision. The material expert does not specifically recommend an improvement or a detailed review because the whole material is already very good. However, there are some points that need to be improved in the correction results on learning material such as mistyping, images that need to be relocated. The parts of error have been fixed and approved by the material expert, so it is recommended to proceed to the individual testing phase.

Learning media expert revision. Specifically, the Learning media expert does not give any detailed recommendation. However, there is a little recommendation that the color integrity should be taken into account. The error has been fixed and approved by the material expert, so it is recommended to proceed to the individual testing phase.

b. Individual test (*one to one learner*)

The results of individual test (*one to one learner*) taken through an assessment based on the above indicator is presented in chart 4.

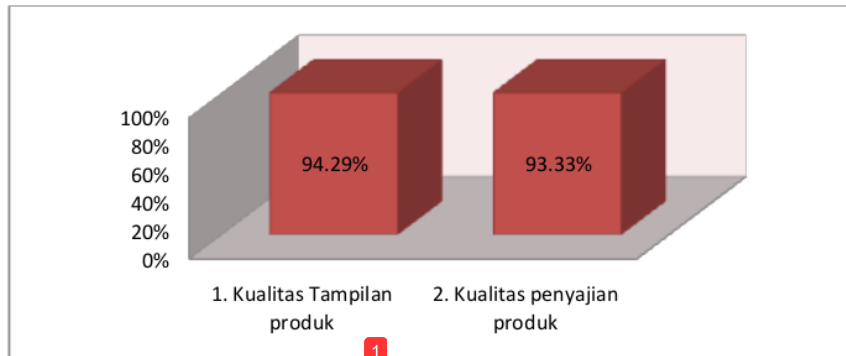


Chart 4. Results of the Individual Test (*One To One Learner*)

c. Small group test

Small group test is conducted on a group of students of mathematic program study with different abilities: 3 high-ability students, 3 medium-skilled students, and 3 low-ability students.

The subject response to small group test taken on the basis of the above indicator is presented in chart 5.

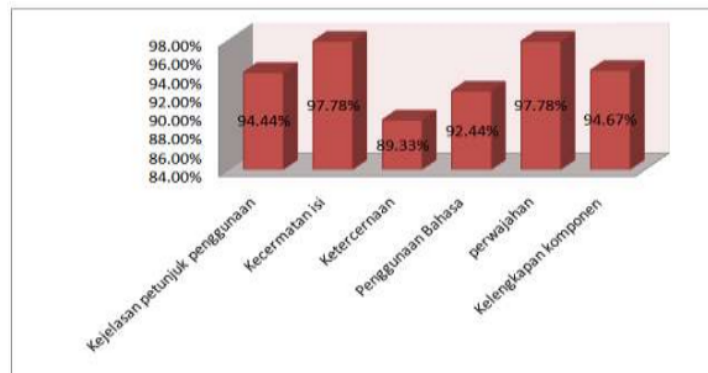


Chart 5. Small group test subject response.

d. Field group test (field trial)

Field group test (*field trial*) is conducted on 20 students with different abilities. Field group test results (*field trial*) in the 7 (seven) indicators is presented in chart 6 below:

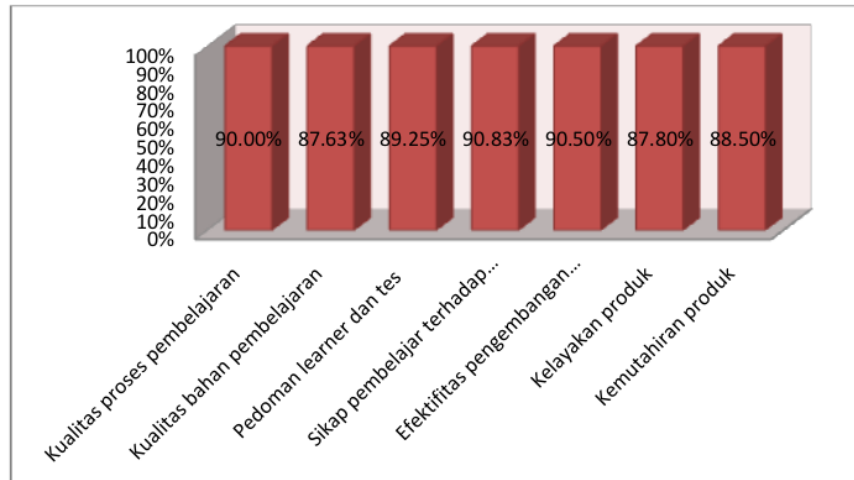


Chart 6. Field test response (*field trial*)

IV. DISCUSSION

Role of Learning Material and Teaching in Learning

Learning material aims to facilitate learners to learn the material or information submitted in order to learn effectively and efficiently to achieve the instructional objective. This condition indicates that a learning process will run effectively and efficiently if it starts with a description of learning material designed properly for the learners' need.

In the learning process, the textbook used is an old-published book. The learning conditions are different because students today are influenced by the development of information technology. That is, the characteristic and initial behavior of students should be reviewed and adjusted to the current conditions. The difference of characteristic and initial behavior as an analysis in the learning process affects the ability of lecturers to plan learning strategies implemented. It shows that differences in students' characteristic will result in different learning strategies on each characteristic that has been analyzed.

Learning material acts as a representation of lecturer explanation which can be used as a guidance for learning activity including target and goal to be achieved. In addition, learning material plays a role as the tool or media to achieve the established instructional objective. Therefore, the preparation of learning material must follow the established general instructional objective. Refers to the condition above, the learning process needs an innovation. The simplest way is to develop learning material matched the students' characteristic and ability.

1. Teaching and learning material development procedure

Instructional Development Model (MPI) starts from needs analysis with the results showing that students need the learning material development and proceed with the general instructional objective determination. An instructional analysis is needed to achieve general instructional objective to determine the limitation of competency that must be achieved by students. The next step is to analyze the students' characteristic and initial ability so that they can determine the starting point of the material and the strategy to be used. It is followed by specific instructional objective determination and benchmark reference test, as well as learning strategy development so that it can develop learning object containing learning material.

2. Study Limitations

In the applied model development theory, the researcher uses instructional development model (MPI). From the development steps, the researcher only reaches the eighth step and does not continue to the ninth and tenth steps because the last two steps include conducting formative evaluation and innovation diffusion. In addition to the limitations above, there are other limitations such as: adequate consideration is required in implementing the development starting from preparation, implementation, product development, validation until the test process. Each of these steps requires material and assistance of others that will cost a lot; The study was

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conducted only for the teaching and learning course at Batanghari University (UNBARI) Jambi which has the characteristic and initial ability in accordance with the preliminary research;

V. CONCLUSION

1. The implementation of teaching and learning course is still using the old-published book and not systematically arranged. The learning materials used are only textbooks with conventional lecturer-centered learning.
2. The procedure of designing and developing teaching and learning material is using a combination of an instructional development model (MPI) and product in the form of books then conducting expert validation. The validation concludes that the product of teaching and learning material development on the related course has been performed in accordance with the methods, procedures, and principles. The expert teams recommend that the developed model is feasible to use and followed by one, small group and field trial with good results.

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