

## CHAPTER III

### METHOD OF RESEARCH

#### A. Development Model

The researcher used the method of research and development because the researcher wanted to produce interactive media. Procedural model of product development is the adaptation model developed by Alessi and Trollip which includes 10 stages: 1) determine objectives and needs, 2) collect reference materials, 3) learns content, 4) brainstorming, 5) design learning, 6) creates a flow chart, 7) create storyboards, 8) program material, 9) creates support material, and 10) evaluation and revision.<sup>56</sup> The developer uses this model will be more targeted, more time saving, and can produce a good product.

Developer doing adaptations resulting in a product with the following components: (1) logo, (2) picture pray before the study and after the study, (3) material (4) material, (5) examples, (6) evaluation, (7) summary, and (8) the instructions. This adaptation was done with the hope that the resulting product has a complete component in accordance with the requirements of the material.

Logos is basically the introduction program. But in function, the logo is intended as an introductory program identity. Material are needed to explain of least common multiple in everyday life and how to save energy effectively.

This Model generally can be described as follows. The first programs are the logo or opening slide. Next, the students are invited to pray before the study, the material, studying examples, do an evaluation.

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<sup>56</sup> Alessi dan Trollip, "*Computer Based Instruction: Methods And Development*", New Jersey: Prantice Hall, 1991.

## B. Procedure Development

Designing or developing learning programs (courseware) is a process that requires planning and special skill. Courseware is usually developed by a team of various professions, for example, material expert, design expert, linguists, teacher class, and other related. Nevertheless, there is also a courseware developed individually.<sup>57</sup>

Development of courseware requires three stages, namely planning, development, and evaluation.<sup>58</sup> Alessi and Trollip spell out in detail the third stage it into 10 stages here: 1) determine objectives and needs, 2) collect reference materials, 3) learn content, 4) brainstorming, 5) design learning, 6) creates a flowchart, 7) create storyboards, 8) program material, 9) creates support material, and 10) evaluation and revision. Developers use the development Model Alessi and Trolli to develop this interactive media. It is based on that this model is a complete and detailed model. In addition, this model makes it easy for the implementation of the development.<sup>59</sup>

The procedure product development can be explained as follows.

### 1. Determine Objectives and Needs.

Activities performed at this stage are to determine the material, the purpose of learning the material data analysis needs.

### 2. Collect Reference Materials

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<sup>57</sup> Soulier, *The Design and Development of Computer Based Instruction* (Massachussets: Allyn and Bacon, Inc, 1988), hlm 1

<sup>58</sup> Ibid, hlm 2

<sup>59</sup> Abdussakir, *op.cit.*

Activities performed at this stage are to collect the necessary reference materials. Reference materials collected include materials or books related to learning materials, interactive media development, programming and computer.

### 3. Learn Content

Activities performed at this stage are learning reference materials have been collected in the previous stage.

### 4. Brainstorming

Activities performed at this stage are to collect ideas from everywhere, which related to development will be carried out. The idea is based on learning objectives, learning material and learning methodology. In addition, the ideas collected relating to the design and shape of the programs that will be developed. The ideas are collected and then selected based on ease of implementation and suitable to the material.

### 5. Design Learning

Activities performed at this stage are (1) analyze the study and concepts, learning, (2) make the description of learning, and (3) evaluate and revise the plan as well as the evaluation of learning.

### 6. Create A Flowchart

Flowchart contains not only the order of presentation of the materials start to finish, but also all the possibility that would happen. For example, decision making and when students make mistakes. Flowcharts are useful

as programming directions. So it's to facilitate the preparation of programming.

#### 7. Create A Storyboard

An activity performed at this stage is to create storyboards. Create a storyboard is the process of creating a form of display on a paper that will be "transferred" to the computer screen. Storyboards contain material that includes learning the material will be presented, questions, feedback, instructions, pictures, and animations. Storyboards are called worksheet or instructional design.

#### 8. Program Material

Activities performed at this stage are the process of "moving" the display from storyboards to the computer screen. This stage is called programming.

#### 9. Create Support Material

Activities performed at this stage are to make support material that is required in the operation of the program. Support material such as computer specifications, and product content.

#### 10. Evaluation and Revision

Activities performed at this stage are to evaluate and revise the program that has been developed. Evaluation and revision are done based on feedback, comments, and suggestions of some experts such as material experts, design experts, linguist, and teacher class. Evaluation and revision of the trial results are also carried out.

## C. Product Trials

### 1. Trial Design

The tests used for collecting data as a basis to know about valid, practical, and effectiveness of the product. Before that, the product has to consult with several experts like material, design, and language. After consultation, the product was recognized and valued by the teacher class.

Trial design uses descriptive. Descriptive design allows a developer to get quantitative data and qualitative data which are very beneficial to perfecting the product.

The test phase was carried out is a consulting, research and response, and individual tests. Each of these stages can be described as follows.

#### a. The consultation phase

The consultation phase consisted of some of the following activities.

- 1) Material experts, design experts, and linguists give comments and suggestions on the draft I interactive media.
- 2) Developer performs data analysis the results of consultations in the form of comments and suggestions for improvement.
- 3) Developer fixes drafts I produced interactive media into interactive media products II the drafts based on the results of data analysis consultation.

#### b. Response and assessment phase

Response and assessment phase consists of the following activities.

- 1) Teacher class provides feedback and assessment of draft II.

- 2) Developer responses data analysis and assessment.
- 3) The developer makes improvement drafts II became draft, III based on data analysis and assessment responses.

c. Individual trials phase

Individual test do twice. The first phase of the individual trials conducted three students and a second phase of individual trials were committed six students. The implementation of individual trials twice based on interactive media product that is more focused on individual learning.

1) Individual trials of the first phase.

Individual trials of the first phase consist of the following activities.

- a) Developer observed that students are learning the material theme energy saving sub theme 2 learning 4 using interactive media product draft III and continued by doing the interview.
- b) Developer performs data analysis the results of observation and interviews.
- c) The developer makes improvements to draft III to draft IV based on the results of data analysis observation and interview.

2) Individual trials second phase

Individual trials second phase consists of the following activities.

- a) Developer observed that students are learning the theme energy saving sub theme 2 learning 4 using drafts IV and continued by doing the interview.
- b) Developer performs data analysis the results of observation and interviews.
- c) The developer makes improvements from draft IV to final product based on the results of data analysis, observation and interview.

## 2. The Subject Tests

Interactive media development, test subject is material expert, design expert, linguists, teacher class, and the students of fourth grade Islamic Global School. Selection of Islamic Global School as a location for a test based on several reasons, namely (1) the students has difficulty learning the theme energy saving sub theme 2 learning 4, (2) has a computer lab but there has been no use of the maximum by the teacher. Because of the there has been no software in accordance with thematic, and (3) the ability of the students is very diverse.

While the developer chooses the fourth grade test as a subject because it is based on getting the curriculum 2013. In addition, the material is difficult because the student must memorize multiple and related with daily problem.

a. Material expert

Material expert in the development of interactive media is someone who has a master's degree in mathematics education. Selection material expert is based on the consideration that those concerned have competence in the field of mathematical material. Material expert gives comments and suggestions about learning material in interactive media.

b. Design expert

Expert in the design development of interactive media is a lecturer of elementary education, which already has a working time of at least 5 years. Selection design expert is based on the consideration that the lecturer is often associated with the world of children and have competence in the development of interactive media.

c. Linguists

Linguist in the development of interactive media is an Indonesian lecturer and became a lecturer in primary education who already has at least 5 years working period.

d. Teacher class

This teacher class is an undergraduate education as well as a teacher's class at the Islamic Global School in Malang. Selection teacher class was based on the consideration that has had a lot of teaching experience and is more aware of the character of students.



Teacher class gives feedback and assessment. Moreover, teacher class gives comments for repair of components are assessed.

e. Fourth grade students

Individual tests do in the first year of lessons 2014/2015. Execution of individual tests is conducted in two phases. The first phase of the individual test carried out in December 2014. Individual trial subjects are the first phase of three students in fourth grade Islamic Global School. These three students taken at random and representative groups capable of low, medium and high score test. The selection of the subject tests is also based on consideration of the teacher class that is easy to be interviewed. The second phase of the individual trials conducted in December 2014. Subjects of individual trials second phase are six students in fourth grade Islamic Global School. Six students are taken at random and representative groups capable of low, medium, and high score test. The subjects of the second phase of the individual trials were taken from different individual test subjects in the first phase. Selection of test subjects is also based on consideration of the teacher class that is easy for the interview.

3. Types of Data

The Data collected in this interactive media development are qualitative and quantitative. Qualitative data are obtained from the results of consultations with material expert, design experts, linguists, and teacher class. The qualitative data were also obtained from the

observation and interview. Quantitative data obtained from the assessment from the validator and student at fourth grade.

#### 4. Data Collecting Instrument

Data collecting instrument includes assessment and response. Question form responses and rates given to the teacher class. Teacher class gives feedback and assessment of all aspects of each component of the interactive media. Assessment, responses and question form designed with four choices of scores are 1, 2, 4, 5. The score 3 is not included with consideration to facilitate the classification of answers in relation to decision making for the repair of the product. A description of the values 1, 2, 4, and 5 can be seen in Table 3.3.

Data are also obtained through consultation with material expert, design experts, and linguists. Another activity to obtain data is doing observations on students who are following the trials of individuals and continued with the implementation of the interviews of all trial subjects.

#### 5. Data Analysis Techniques

Data analysis in the development of interactive media is descriptive. A descriptive analysis was conducted to process data the results of consultations, the results of the assessment and feedback, observations, and interviews. The results of the data analysis used as a basis for the implementation of improvements to the media. To determine percentage from the result of response, developer uses this formula as follows:

$$P = \frac{\Sigma x}{\Sigma xi} \times 100\%$$

**Description:**

$\Sigma X$  : score the answers by the validator

$\Sigma xi$  : score the highest answer

P : percentage rate valid

In order to provide meaning and decision-making responses and results data from assessment to revision of media used the eligibility levels qualifying criteria as in Table 3.3 below.

**Table 3.3**  
**Eligibility Qualifications**

| Qualification assessment |  | The eligibility rate | Describes revision |
|--------------------------|--|----------------------|--------------------|
| Scale                    | Description  |                      |                    |
| 5                        | Very appropriate, very readable, very accurate, very regular, very excellent, very capable, and very substantial               | Valid                | No revision        |
| 4                        | Appropriate, readable, accurate, regular, excellent, capable, and substantial  | Valid                | No revision        |
| 2                        | Less appropriate, less readable, less accurate, less regular, less excellent, less capable, and less substantial               | Less Valid           | Need revision      |
| 1                        | Very inappropriate, very less readable, very less accurate, very poorly organized, very ugly, very poor, very less substantial | Very less valid      | Need revision      |