

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Method

This research used a developmental research method. The approach can explain the instrument and app development process in this studies and consequently evaluate readability and validity. Developmental research provides different models, instruments, and techniques to be studied. The technique is separated into several phases where the reporting and analysis of information are involved in each phase.

This research method is suitable for the research, which is to develop mobile learning android application in mitigation of earthquake for junior high school students, because the research focuses on development process of both instrument and application rather than merely gathering data.

3.2 Research Design

The researcher develops mobile learning in form of Android application in mitigation of earthquake topic. According to the developmental research method, in this study, the application development model was used to systematically arrange this research. The application development model is a model where the construction of a design begins with collecting the data in the literature review, designing the flowchart and storyboard until a final acceptable prototype is reached which forms the foundation for the final product development. The flow of the model is shown in Figure 3.1 as follow:

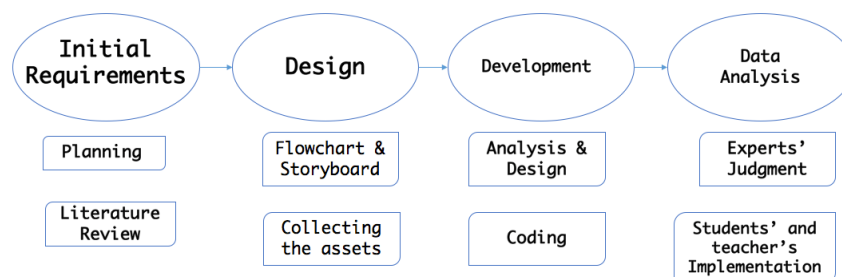


Figure 3.1. The Flow of Developing the Application

This research uses this model because in each step the evaluation instrument created in this passed through cycles that help improve the application quality. The user assessment cycle the instrument passed is testing by expert judgment and assessment of students.

Final paper supervisors then supervised the mobile learning application before the experts that expertize in content (Science), language (English), and artwork (IT) assess it. After a sequence of suggestions and revisions until the final assessment, the mobile learning application was brought to science teachers and students to be reviewed.

3.3 Population and Sample

The subject of this research was the validation of mobile learning apps by three experts in each aspect: scientific content, language and artwork (IT). These different aspects will be evaluated by experts with a background based on each of their skills. Junior High School learners will evaluate the media for impression of mobile learning applications.

The location of this research is in the region of Bandung in particular. The school uses Bilingual (English & Bahasa) as the communication in teaching-learning process. The curriculum applied in this school is the 2013 national curriculum. The population in this research will be 8th grade students who already learn about Earthquake topic. The sample will be 30 students from Laboratorium Junior High School in Bandung whom will be chosen through simple random sampling.

This school was selected because it was accredited "A" by the Ministry of Education of Indonesia and also because the students come from an average to a greater family background, which makes it easier for the students to have facilities such as mobile phones to provide supporting teaching-learning

method and atmosphere. The population in this research will be 30 students from Laboratorium Junior High School Bandung.

Simple random sampling technique was used to select the sample from population. (Aftab, 2017). Simple random sampling is one in which each individual has equal opportunities to be chosen from a population. The population includes all who are eligible for the study (Arlene, 1995).

3.4 Operational Definition

This study describes some operational definitions in order to avoid misunderstanding in these studies. In these terms, the following are defined:

3.4.1 Mobile Learning

Mobile learning is a model of teaching that uses mobile technology and mobile devices as educational media. M-learning is developed with a multimedia format that presents text, images, audio and minimizes video and animation in order to be easily accessible via mobile phones so that it becomes interesting and easy to understand. The content, language and artwork of the mobile learning implementation were evaluated on the basis of the judgement rubric of specialists and the readability of the mobile learning application replied by the questionnaire of students and science educators.

3.4.2 Mitigation of Earthquake Topic

The mitigation of earthquake materials is divided into three stages which are before the earthquake, during and after the earthquake.

3.5 Research Instrument

The instrument is used in these studies to collect or gain information. The tools used are the assessment and questionnaire for learners and science educators to assess the suitability of the mobile app and how its design satisfies the students' real requirements to understand the dynamic electricity subject.

3.5.1 Likert Scale and Ratings

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A Likert scale and scores are used to evaluate the rubric that will be used in these studies. There are two elements to rubrics, namely the method and features of creating cellular learning apps. Earth layer subject, language, and cellular learning design itself are content with the features. The scale is 1 to 5 to determine if the points in the implementation for cellular teaching are filled with plans, objectives, and expectations. Table 3.1 will explain the Likert scale for experts' judgment rubric below.

Tabel 3.1
Likert Scale for Experts' Judgment Rubric

Scale	Criterion	Point
SD	Strongly Disagree	1
D	Disagree	2
A	Agree	3
SA	Strongly Agree	4

The questionnaire for students and teacher is also using the Likert scale and ratings. The ratings were to identify the compatibility of the mobile learning application for Junior High School level.

3.5.2 Written Review

The rubric and questionnaire consist of blank space for suggestion, opinions, or comments about the mobile learning application for the improvement of the application.

3.6 Instrument Validation

Before the instrument is tested and used, the supervisor must evaluate several analyzes. The objective of the assessment is to determine whether or not the tools are suitable. Test quality must fulfill the norms that are measured before specialists, students, and science educators use it.

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3.7 Data Collection

In this research, several distinct methods are taken in order to acquire information using an instrument as earlier mentioned, which are explained as follows:

3.7.1 Experts

There is three expert's judgment in this research. For the expert judgment science content and language, the content rubric and storyboard with details explanation about the material was given to the expert judgment content and language. After that, the Artwork rubric was given to the expert judgment and the researcher asked the third expert judgment (Artwork) to install the application. After all expert judgment finish with the rubric, all data was collected.

3.7.2 Students and Teacher

For the students, the questionnaire was given to students and the researcher asked students to install the application on their phone. The researcher explains the materials and demonstrate on how to use the application. For the teachers, the researcher asked and help the teachers on how to install the application and the questionnaire was given to be assessed. After the students and teacher finish with the questionnaire, all data was collected.

3.8 Data Analysis Technique

After all the information was gathered using the instruments, the outcomes of each variable were analyzed in a descriptive way. The methods for data analysis are as follows:

3.8.1 Likert Scale and Ratings

A quantitative measurement, adapted from (Riduwan, 2010), evaluated the judgment rubric of the experts. Then, the result is transformed into a proportion by

$$\% = \frac{Na}{Nx} \times 100\%$$

comparing the total

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quantity of the lowest score and the outcome

(3.1)

Mobile learning apps can be developed using the program's percentage range category and descriptive criteria (Arikunto, 2000). The following is defined in the category:

Table 3.2

Percentage Range and Descriptive Criteria of Program

No.	Interval	Criterion
1	$76% < \text{score} \leq 100\%$	Very Good
2	$51% < \text{score} \leq 75\%$	Good
3	$26% < \text{score} \leq 50\%$	Fair
4	$0% < \text{score} \leq 25\%$	Poor

Meanwhile, the students and teachers' questionnaire using the Likert scale from Table 3.2.

3.8.2 Written Review

The written review is analyzed descriptively which the first thing that has to do is analyze the input, the grouping the analysis result and the last step is comparing the result to literature (Cresswell, 2011). The descriptive analysis

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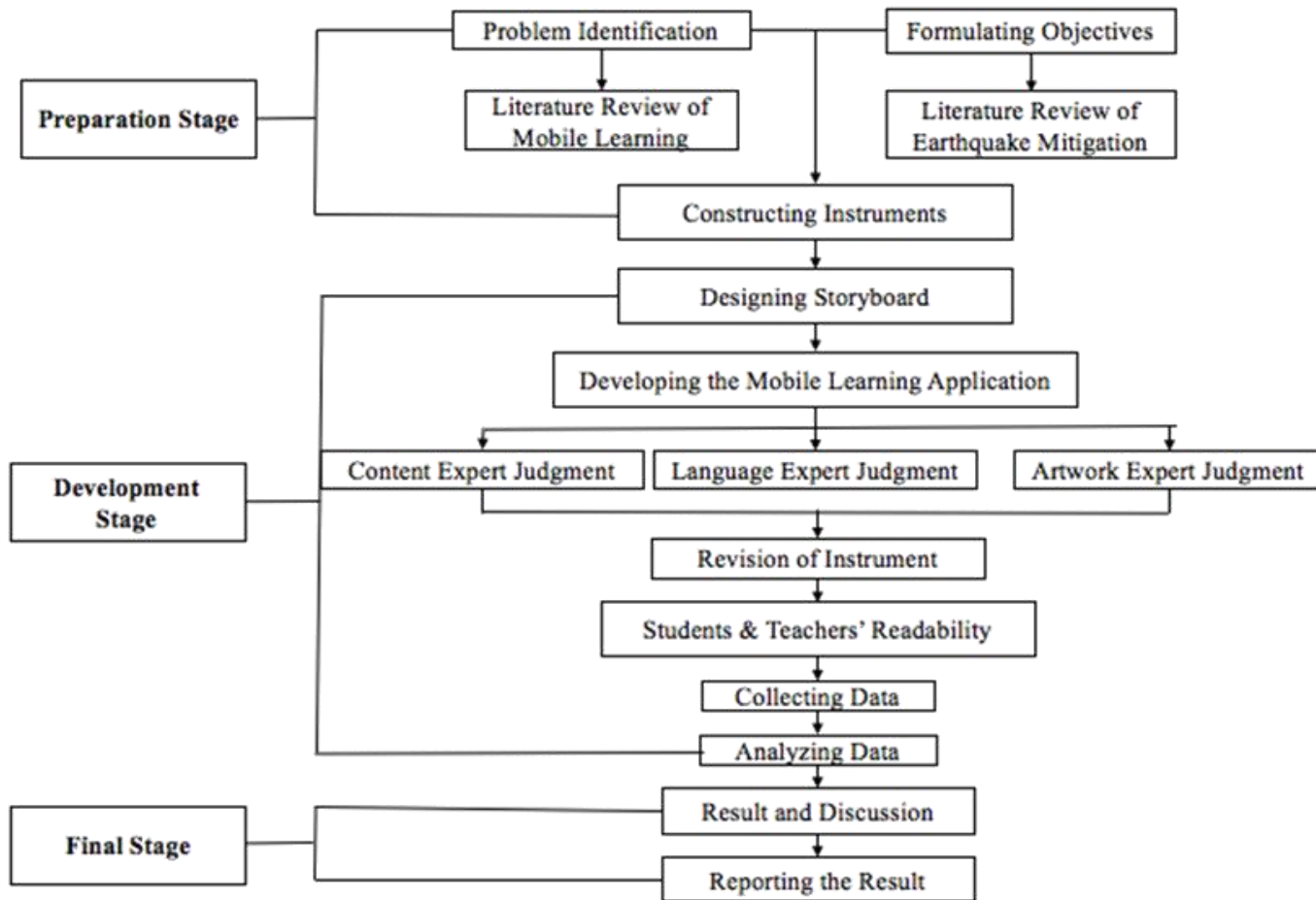
is separated based on the respondent, which is the experts, students, and teachers that included the aspects evaluated.

3.9 Research Procedure

There are three phases of the procedure, including preparing, development, and the final phase, to make this study systematically structured. Figure 3.1 shows the research plan. The first phase of the preparing is to define the problem to be investigated, formulate the research objectives, evaluate the literature interview on earthquake mitigation and mobile learning. The next step is to obtain the instruments for students and science teacher at Junior High School that are the judgment rubric and readability questionnaire for professionals.

The second stage is the implementation stage which started from designing the storyboard, developing the application and investigating the instrument by the expert judgment. There are three things that will be judge which are, science content, language and artwork, and then revising the instrument based on the expert judgment and analysis. After that the researcher will try the application to several students and a science teacher to construct the readability. Then the data will be collected and analyzed.

The final method in taking out this research is the final phase that involves some measures. The first one produces an outcome and discussion, concluding on the basis of data analysis. Finally, reporting the outcome.



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Figure 3.2. Research Procedure