CHAPTER III
RESEARCH METHOD

This study consists of a description and discussion about some topics in Media Development in the study. It includes the Research Design, Research and Development (RnD) method and Waterfall as Model of Development, and the Product Specification.

A. Research Design

This study is aimed to develop learning media using MIT App Invertor for Preschool English vocabulary. We need learning media that can overcome it and based on this reason, the Waterfall model is needed. The waterfall is a classic model that is systematic, sequential in building software. The name of this model is the "Linear Sequential Model". This model is often referred to as the "classic life cycle" or the waterfall model that is included in the Research and Development (R & D) method. Research and Development (R & D) is a process used to develop and validate educational production.[1]A method of Research and Development (RnD) is a research method used to produce a particular product, and test the effectiveness of the product. And waterfall model is included in the generic model in software engineering and was first introduced by Winston Royce around 1970 so it is often considered obsolete, but it is the most widely used model in Software Engineering (SE)[2].

The process of research and development (R&D) consists of studying research finding pertinent to the product to be developed, developing the product based on the findings, field-testing the product in the setting where it would be used eventually, and revising it to the correct deficiencies found in the field-testing stage. Hence, the background reason for this R&D is to develop MIT App Inventor. To develop it, the researcher conduct needs analysis as the first step in the development of “My Vocabulary” media from Codular to find out the real information about the problem of students. After that, the researcher developed the “My Vocabulary” app in the material that will be given to the students. And from the result of the need analysis, the researcher found the problem that occurs in the process of learning experienced by the students that use of varied media is urgently needed. Therefore, as the following step, I decided to develop instructional media-based CALL that is

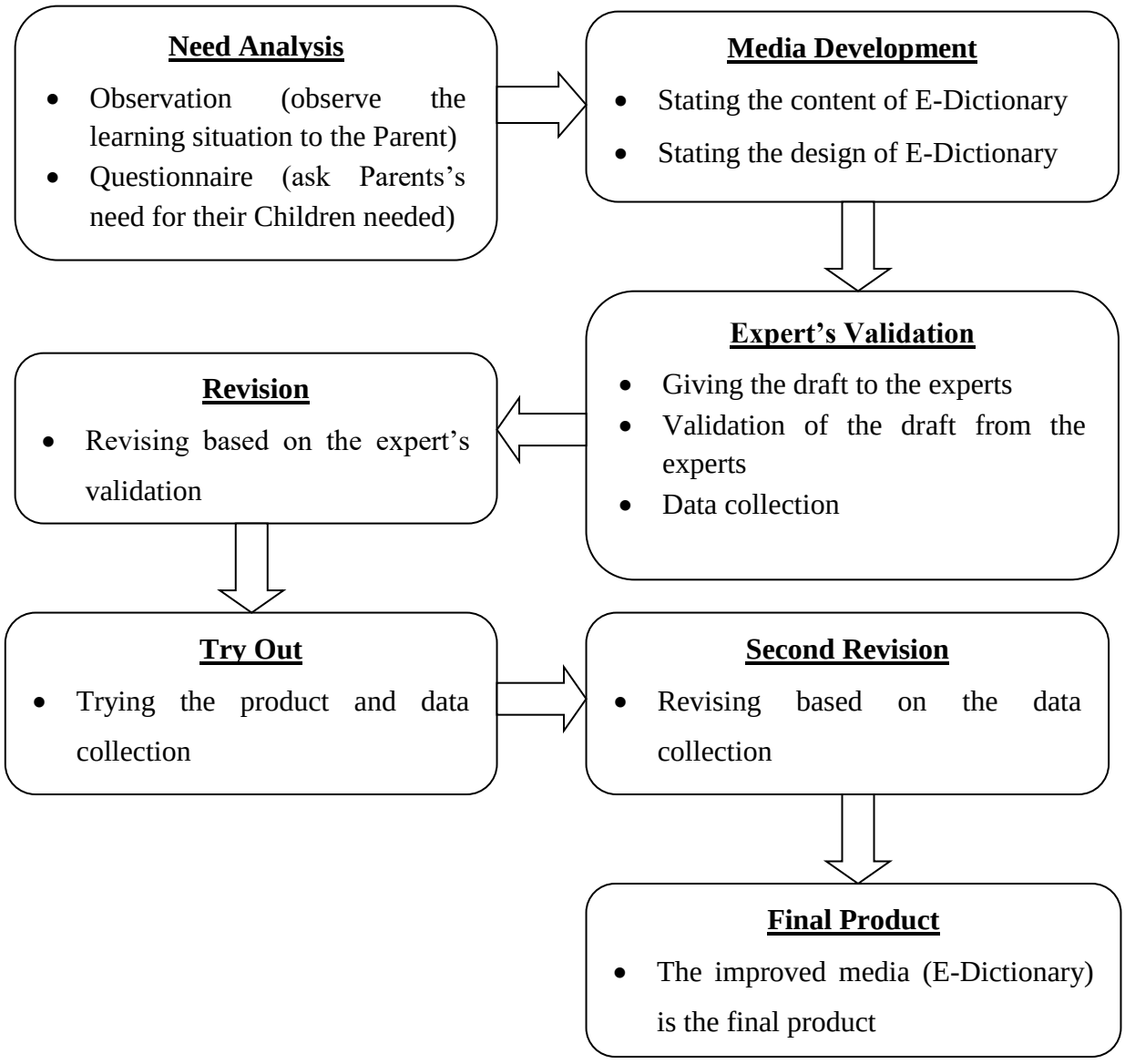
[1] Borg, W. R., & Gall. M., D.*Educational Research an Introduction,* (New York and London: Longman, 1983)
[2] Pressman, Roger. *Software Engineering: A Practitioner’s Approach – 7th ed*. (America: McGraw-Hill Companies, 2010) p.42

different from other media, and provide effective learning something that could also increase the motivation of students, either explanation or tasks that will be given to the students.

B. Media Development

I need RnD because it is a prime way to do this research, and on the other side, I need the Waterfall model to apply in media development. So, first of all, I use a small scale of RnD into 7 steps, they are (1) Need analysis, (2) Media Development, (3) Expert Validation, (4) Revision, (5) try Out, (6) Second Revision, and the last is Final Product.

Model in developing E-Dictionary (Adapted from Borg and gall, 1983)



Picture 3.1 Model of Developing Media

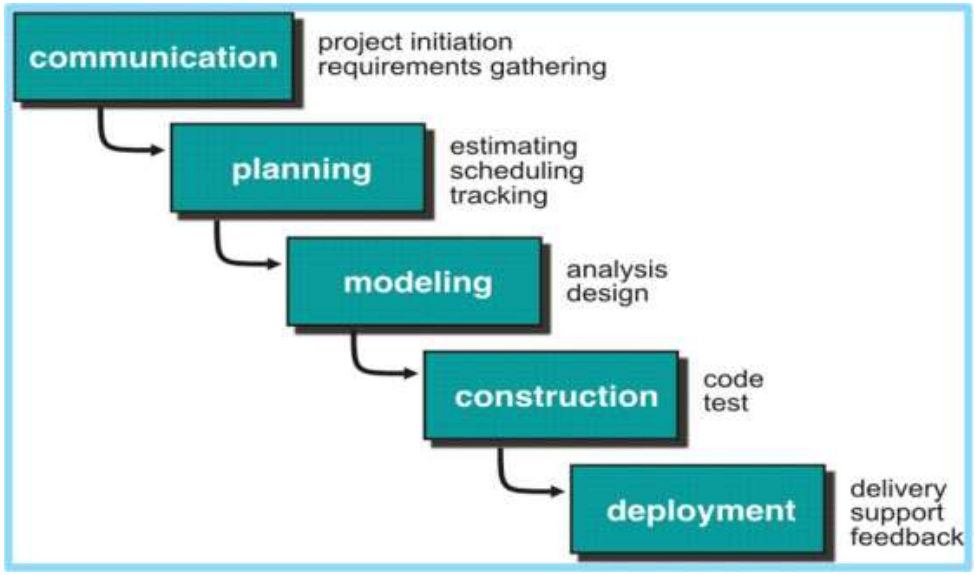
1. **Need Analysis**

Need analysis conducted to know all matters and information that allow in the field. This information comes from Parents of Children at the Preschool level that we use in the development of materials. So, in this stage, we need a field note, evaluation checklists, questionnaires, and others. Here, I need an analysis related to the use of exiting E-Dictionary for preschool level.

2. **Media Development**

Some steps are needed to apply the process of Waterfall models as a media development, they are Communication, Planning, modeling, construction, and deployment. But in the first step, the researcher will not make a communication, because this media will be used directly by the public via "Google Play Store". So the researcher is going to make a plan to make a simple E-dictionary using *MIT App Invertor* based on Preschool level. And after the planning of the media is ready to be made, the researcher will start to make the app completely. And after the app is ready, the media will do some test to know about the weaknesses of the media. And the last, software maintenance is needed to keep the stability of the media.

This model approaches systematically and sequentially. Called the waterfall because step by step through must wait for the completion of the previous stage and walk-in sequence. The phases in the Waterfall Model according to Pressman's reference



Picture 3.2 Waterfall Pressman (Pressman, 2015:42)

a. Communication (Project Initiation & Requirements Gathering)

Before starting technical work, it is very necessary to have communication with the customer to understand and achieve the goals to be achieved. The result of this communication is project initialization, such as analyzing problems encountered and collecting necessary data, and helping define software features and functions. Additional data collection can also be taken from journals, articles, and the internet.

b. Planning (Estimating, Scheduling, Tracking)

The next stage is the planning stage which explains the estimated technical tasks to be performed, the risks that can occur, the resources needed to make the system, the work products to be produced, the scheduling of work to be carried out, and the tracking of the process of working the system.

c. Modeling (Analysis & Design)

This stage is the design and modeling stage of the system architecture that focuses on designing data structures, software architectures, display interfaces, and program algorithms. The aim is to better understand the big picture of what will be done.

d. Construction (Code & Test)

This stage of construction is the process of translating a design form into code or form/language that can be read by a machine. After the coding is complete, testing the system and also the code that has been made. The goal is to find errors that might occur to later be corrected.

e. Deployment (Delivery, Support, Feedback)

The deployment stage is the stage of implementing the software to the customer, maintaining software regularly, repairing software, evaluating software, and developing software based on feedback given so that the system can continue to run and develop according to its function. (Pressman, 2015: 17)

When should the waterfall method be used? Some theories are concluded several things, namely:

1. When all the requirements submitted are well understood at the beginning of program development
2. Product definitions are stable and no changes are made during development for any reason. Therefore, the technology used must also be well understood

3. Produce new products or products with new versions. If you produce a new version of the product, then it includes incremental development, which is every step the same as the waterfall method then repeated
4. Porting existing products into a new platform. Thus, the waterfall method is considered a more suitable approach for project development of new systems and also software development with a small level of risk and long development time. But one of the most fundamental weaknesses is to equate the development of hardware and software by negating changes during development. Errors are known when the software is run, and changes will often occur.

3. Expert Validation

To determine the level of media quality that we developed, from the standpoint of effectiveness, accuracy, and efficiency, it needs validation from someone who is an ICT expert, exactly in MIT App Invertor and who is an expert in the Preschool level. Some things that can be assessed in the validation of a medium can be taken from the design used, language content, and level of product complexity for users. And I will show several questions to the expert about the E-Dictionary, such as:

	Question	**Scale**				
		1	**2**	**3**	**4**	**5**
1	The media is suitable for the learning/teaching situation					
2	The reading passages and associated activities are suitable for my children' level and interest					
3	• The purpose of exercises is clear and consistent. • The exercises are interesting. • The types of exercise are varied. • There are extra exercises such as games, song puzzle, or crossword					
4	The language is clear and understandable					
5	The layout is structurally clear and attractive to the student					
6	The material is systematically organized					
7	The instructional can be understood by my children					

Table 3.1 Questionnaire of Expert Validation

Note:

1 : Strongly disagree 4: Agree

2 : Disagree 5 : Strongly Agree

3 : Uncertain

To give the decision on product quality, the researcher used achievement level conversion on a scale of 5. If the score is above 80%, it means that the developed media is good to be used for the user.

Percentage	Qualification	Discussion
90% - 100%	Very Good	No revision needed
75% - 89%	Good	Revision needed
65% - 74%	Enough	Revision needed
55% - 64%	Poor	Revision needed
0% - 54%	Very Poor	Revision needed

Table 3.2 Level of media percentage

4. Revision

The researcher collects their product first to the expert and revised the development and media based on the feedback from the expert. All data were compiled and analyzed.

5. Try-Out of the media

To determine the usefulness, effectiveness, and advantages of this media to the users, it needed to be tried out. And after that, the researcher gets the results that determine the success rate of product media or material provided. The tryout was conducted at the test in E-Dictionary by a small class. And the small class consists of preschool level and their parents. During the try-out of the media, the researcher used a questionnaire and field notes to know the real condition of the students while they are using the E-Dictionary media in their learning process from their parents. The question asked to the parents deal with language, tasks, and design of the E-Dictionary. The data from the questionnaires obtained from the parents was analyzed quantitatively using percentages. If at least 80% of the parents judge E-Dictionary is appropriate for their children, the product does not

need to be revised. And this is an example of the questionnaire in try out of the materials:[3]

No	Question	Scale				
		1	2	3	4	5
1	Tampilan dalam media ini menarik dan jelas					
2	Petunjuk-petunjuk dalam media ini jelas, tepat, dan mudah dipahami					
3	Materi yang diberikan dalam media ini jelas dan sesuai dengan konteks yng dipelajari					
4	materi yang diberikan dalam media ini bisa memotivasi anak saya untuk aktif dalam pembelajaran					
5	Tugas yang diberikan di dalam media ini bisa membantu anak saya untuk menggunakan bahasa inggris dengan baik					
6	Materi di dalam media ini sudah mencakup aspek-aspek yang menjadi kebutuhan dan minat anak saya dalam bahasa inggris					
7	Bahasa yang digunakan dalam media ini sesuai dengan tingkat kemampuan anak saya					

Table 3.3 Questionnaire of Try out material

Note

1 : Strongly disagree
2 : Disagree
3 : Uncertain
4: Agree
5 : Strongly Agree

[3] Winarti,*Developing Supplementary Material (workbook) for I-tutor.net English Course*, (Malang. State University of Malang, 2012)

6. **Second Revision**

This is the second revision; it was the last revision that means the better final product from revision I. In this stage, Researchers are ready to provide and publicize their products to students and teachers.

7. **Final Product**

In this stage, the results of the product from the researcher begin to share with other people or give the media and material to the users, or on other hand, the media is ready to use.

C. Product Specification

E-Dictionary here has some utilities to support preschool in improving Vocabulary skills. I use “Animal vocabulary” to be the example of the prototype to develop this E-Dictionary. So, based on this subject, E-Dictionary here complete with a clear picture with a colorful background, and it makes a sound when we touch the picture. And this is also supported by some quizzes about the subject, and this E-Dictionary is also supported by a reminder to do the quizzes and study from this E-Dictionary continually.