

ASSURE MODEL IMPLEMENTATION IN DEVELOPMENT OF NATURAL SCIENCE LEARNING APPLICATION

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Abstract: The learning process nowadays is often experience disturbance and problem such as excessive number of students so that its development is difficult to monitor and lack of concentration from students in understanding the courses material as well as still using textbooks provided by school. The research objective was to implement ASSURE model in application development of natural science learning in order to support the learning process. Method used in this study was research and development for learning application that can be used in learning process of natural science subject. This research had produced the learning application for natural science subject. Software used in development and producing of learning application was Netbeans IDE 7.4, JDK 7 as Java interpreter and AppServ Version 2.5.9 as database. ASSURE model was used to develop learning application by using black box test method. It can be concluded that learning application for natural science subject had fulfill the stated criteria in term of display, operation and interaction aspects, respectively.

Keywords: *ASSURE, Black Box Test, Software*

1. INTRODUCTION

The learning media basically is a media to help the learning process. It is anything that can be used to stimulate thinking, feeling, attention and learning ability which push ahead the development of learning process on pupils. Learning media can ease teacher's task in transferring the subject matter to students. One of learning media is computer utilization at elementary school. Learning media is anything that can be used to send and deliver planned message from sources so that creates conducive learning atmosphere in which the receivers can do efficient and effective learning process (Munadi, 2008). The learning process nowadays is often experience disturbance and problem such as excessive number of students so that its development is difficult to monitor and lack of concentration from students in understanding the courses material as well as still using textbooks provided by school (Rahmatikan, 2012). This method offers less stimulation of thinking and attention from students. Students of 4th grade elementary school prefer something interactive, interesting and not boring. In addition, students at modern era are capable and very like in using computer in their daily live such as playing games or listening musics.

The subject of Natural Science is a science which related to the whole world which provide specific challenge for teachers in this field. Monotonous learning process has encourage teacher to develop their creativities in learning application means. In addition to application, learning model is one of very important role factor in learning process. Many learning models had been used by teachers in learning process. One of these models is Assure Model.

Model of Assure (Analyze learners, State standards and objectives, Select strategies, technologies, media and material, Utilize technologies, media and materials, Require participant learners, Evaluate and revise) is model formulation which is used in Learning Activity and also called as class oriented model with an objective to develop learning process (Sumiatun, 2013). Therefore, learning application of Natural Science is developed by using Assure model. The research objective was to

implement ASSURE model for learning application development of Natural Science in order to support the learning process.

2. THEORETICAL BACKGROUND

The previous study had produced interactive learning media of Natural Science for 5th grade elementary school containing the theories or exercise problems that could be used as an aid device for learning process of Natural Science. The multimedia used in developing this interactive learning media was Flash 8.0 (Iswahyudi and Urbani, 2013).

The previous study had used multimedia development method in forms of concept, design, material compilation, production, testing and distribution (Luther, 1994). The multimedia development was constructed by using "VISUALS" (Visible, Interesting, Simple, Useful, Accurate, Legitimate and Structured) approach. This study had produced software for interactive learning of Natural Science which had been tested by using alpha and beta methods involving the audiences participation and had fulfilled the expected concept by users (Permana et al., 2014).

According to Nyura study (2010), It had produced learning application of Tenses in English language which provide Tenses exercises and problems menu that can be operated at emulator provided in real mobile equipment and can display data", This study used programming language of J2ME (Java 2 Micro Edition).

According to Noviyanto (2008), The system testing in this study was conducted by using black box test and alfa test. Following the system testing, students had eager to learn the form identification by using interactive multimedia containing pictures and sound as well as games so that they did not bore in learning, This study had produced learning system related to form identification based on multimedia and interactive game.

According to Atmadji and Soeleman (2010), This study had produced learning multimedia for course of Management Information System by using experimental design method of pre-experimental by conducting post test within one group. This study used architectural design system of LTSA: IEEE 1484 as the national standard for learning system.

3. THE RESEARCH METHOD

This study using research and development method of learning application in Natural Science subject.

3.1. Research Procedure

The research stages done in development of learning application for students in term of Natural Science subject can be seen in Figure 1.

The development of learning application for Natural Science subject required media and data. Requirement analysis was consisted of three items including hardware, software as well as input and output. The required media were as follows:

- a. Hardware used in this study was computer having the following characteristics:
 - Prosesor Dual Core 2.60Ghz, RAM 2 Gb, Harddisk 250 Gb, VGA Card 1 Gb, Screen Monitor, Keyboard, Mouse and Speaker.
- b. Software used in this study was as follows:
 - The Operating System Windows 7 Ultimate, Netbeans IDE 7.4, JDK 7 as Java, AppServ Versi 2.5.9 and IBM Rational Rose.
- c. Requirement of input and output was as follows:
 1. Input

The Server program has provision for input of student account such as username and password, multiple choice problems such as problem picture and answer key equipped with feature to edit and update the materials and sound.

On Client program, the user should input his/her names and passwords for login process and can input the problem answer.

2. Output

The Server program had produced output of problem data, subject matter, sound, picture and animation as well as display of the student account and grade history.

The Client program had produced output of subject matter picture, animation figure, sound, problem answer as well as display of the attained grade.

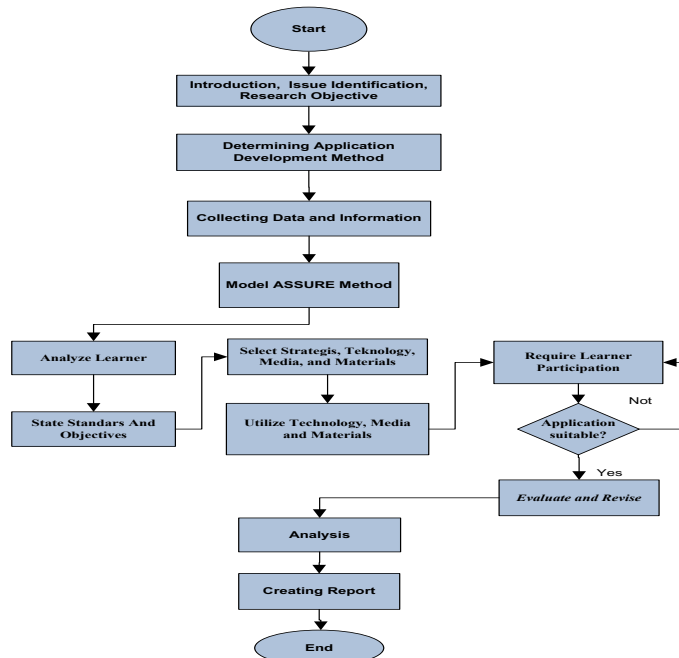


Figure 1 research procedure

Source: personal documentation

3.3. ASSURE Model

The ASSURE model was designed in effort to solve learning problems with programmed fashion having systematic activity stages which consisted six stages of learning design model as follows: Analyze Learner; State Standards and Objectives, Select Strategis, Technology, Media, and Materials; Utilize Technology, Media and Materials; Require Learner Participation; and Evaluate and Revise (Purwanti, 2015).

3.1.1 Fase Analyze Learners

During analyze learner phase, there are some items that should be done such as general characteristics of learners, initial competence as a basic capital, learning style of learners, psychological aspect of learners and others according to the need. Therefore, the writer had conducted direct observation toward elementary school students, especialy of 4th grade. The writer had observed general characteristics of students and learning design model as well as conducted interview with teachers in field of Natural Science subject, especialy at elementary school level. The results showed that students prefer the learning process of a subject matter which equipped with pictures and sound.

3.1.2 State Standards and Objectives

State objective or formulating the learning objective can be done by using ABCD model (Riszka and Mislani, 2013) as follows, A = audience, B = behavior, C = Condition, D = Degree.

For learning application development of Natural Science subject, the writer can formulate the items in detail as follows; Audience is students having different characteristics. Behaviour is characteristics or behaviour of learners in Natural Science subject. It can also be described as students ability that should be taken into account by the writer in development of learning application. Condition is situation that might provide good study environment for students. Degree is specific prerequisite formulated as basic standard of learning objective achievement. The learning objective can also be stated in form of basic competence and success indicator that should be achieved at the end of learning process.

3.1.3 Select Strategies, Technologies, Media and Materials

The choice of strategy is focused on teachers and students which will also determine the method to be used. In order to determine the used method, the writer had done directly data compiling related to the teachers need. In addition, the writer had also done data compiling of current learning system. Learning media used by teachers usually was books and pictures for each topic.

Based on the existing learning analysis, then the writer would combined pictures, sound and animation by using softwares of Netbeans IDE 7.4, JDK 7 as Java interpreter, AppServ Versi 2.5.9 as database because these softwares have supporting feature to develop the application of learning desktop by combining pictures, video, sound and animation into one application. The writer had obtained materials choice from several sources such as printed books, videos and materials from teachers in field of Natural Science subject.

3.1.4 Utilize Technologies, Media and Materials

Technology used by the writer in this research was multimedia, whereas media was the combination of pictures, sound and animation which was packed into interesting multimedia. Materials were obtained from sources which was appropriate to the current curriculum.

3.1.5 Require Learners Participation

The main objective in learning is availability of learners participation toward the presented materials and media. In this case, teacher should had capability and experience in applying, analyzing, synthesizing and evaluating rather than understanding and giving information to students. In development of learning application for Natural Science subject, the writer had produced teaching materials which stimulate the involvement of students.

3.1.6 Evaluate and Revise

Evaluation is important mean as feedback for learners and to determine how learners achievement in managing the stated objective. In addition, evaluation results can be used for curriculum development, can be used by individual learner to make decision as well as feedback for parents, teachers, curriculum developer and policy makers.

Evaluation and improvement can be based on learning evaluation results of learners and generally evaluation can be used as standard to conduct revision of strategy, technology and the used media.

3.2 Display Design

In display design process of learning application for students, the writer had developed display design of student login which will be used for login by students. Then, main menu design for students which consisted of four choices. Next, display design of materials content, quiz content and materials update tab. Black box testing is testing that is done just observe the results of execution through test data and functional check of software. The test was conducted at implementation process by using black box test method as the test of user interface (Musfiqon, 2012). This test was done after completion of system and it was implemented to students.

3.3. Test Phase

Implementation phase is consisted of installation and usage of the developed system. The application that had been developed was then implemented on computer according to the stated specification. Test was conducted during implementation stage by using black box test method as user interface testing by user. This test was done after completion of system and it was tested to students. The test was consisted two aspects of navigation and content.

3.4. Evaluation

Evaluation process in this study involved two elements as follows:

1. Evaluation by Experts
Evaluation conducted by experts has objective to give evaluation and feedback for improvement of learning application in natural science before it is published.
2. Test by teachers and students
Test by teachers and learners was conducted to make certain that the developed learning application had fulfilled the requirement for learning process.

Evaluation process involving of experts, teachers and students was done by using questioners with Likert scale. Results of questioner data was used to measure attitude, opinion and perception of individual or group (Suryo et al., 2011). Likerts scale has magnitude from 1 to 4, in which 1 represent Very Bad and 4 represent Very Good, respectively.

4. RESULT AND DISCUSSION

Results of this study was learning application for students to understand the given materials and to ease in solving of questions and excersises. This application has been provided with menu to choose materials and quiz as well as to see the grade obtained by students which in turn give information related to students development in learning process. This desktop application used Java software installed on computer.

4.1 Login Page

Login form will be displayed during the first run of program. Form fills IP and inputs username and password given by administrative staff or teacher.

4.2 Main Menu Page

There are 4 menus available on main menu page. The first menu is materials menu which has function to display materials menu. The second menu is quiz menu which has function to display quiz for all existing materials. The third menu is grade menu which has function to display grade history of students. The fourth menu is exit menu which has function to exit from application program.

4.3 Materials Menu Page, Materials Display, Quiz Display and Grade History Display

Materials menu page is consisted of 5 material choices; the first menu is consisted of chapter one materials, the second menu is consisted of chapter two materials and the third menu is consisted of chapter three materials wich respectively have function to display materials for each chapter. The fourth menu contain video which has function to display video menu. The fifth menu contain quiz which has function to display quiz menu (Figure 2a). Materials display has materials picture and can produce sound if the play button is pressed (Figure 2b). Students answer the quiz by choosing answer choice at quiz display followed by pressing the next button to answer the subsequent questions. After students finish doing problem exercise, the program will display the results or grades which is subsequently stored in database (Figure 2c). The grade history display will show grade history of students which login at this application (Figure 2d).

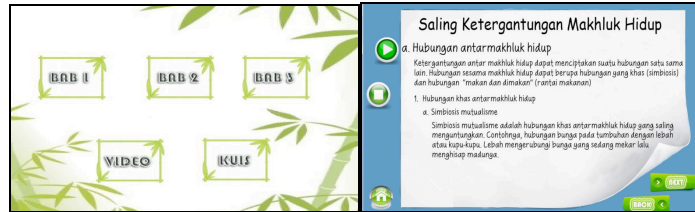


Figure 2a

Figure 2b



Figure 2c

Figure 2d

Figure 2a materials menu page, Figure 2b quiz display, Figure 2c material, Figure 2d grade history display
Source: personal documentation

4.4 Update Materials Tab and Quiz

Update materials tab has function to update materials data. Administrative staff chooses chapter and material page to be updated and subsequently seeks picture by pressing the find button followed by clicking the save button to store materials in database. Display of quiz update tab has function to update quiz. Administrative staff choose quiz and pages that will be updated, added or deleted and subsequently be saved.

This was done to make sure that all displays and materials content are appropriate and had been tested using the proper method. The following is results of black box test (Table 1).

Table 1 black box testing

No.	Test	The Expected Results	The Test Results
1	Links to each process	Display each page well	Valid
2	Process on every application page	Display nice and interesting text, images, sound and animation	Valid
3	Process on choice of question and answer	The answer match to the given question	Valid

Source: personal documentation

The test results showed that all process existed in learning application had fulfilled the criteria properly. All buttons available at learning application for natural science subject can be used according to the stated plan. Displays for each materials, quiz process and grade history had fulfilled the proposed criteria. The last stage in this research was evaluation toward application that would be developed.

Evaluation was used to produce good results which suitable for the need. Evaluation process had involved experts, teachers in field of natural science for Elementary School, teachers in field of teaching counseling and students who learn natural science subject. After using the learning application, then experts, teachers in field of natural science and teachers in field of teaching counseling were asked to fill questioners that had been prepared by the writer. These questioners were consisted of display, operational procedure, interaction and the use of application for stand alone study. The writer had prepared samples containing application to be delivered to sixty respondents during evaluation process. In addition to ask the students to fill the questioners, the writer also had conducted short interview to students in order to determine their responses to the use of learning application as learning method. Evaluation results of learning application of natural science subject for students were presented in Table 2.

Table 2 the evaluation result of the learning application

No.	Aspects Of Assessment	Average score	%
1	Display	3,30	73,10
	Interesting Application Display	3,1	72,00
	The display of the content is easily understood	3,64	82,80
2	Operation	3,67	83,40
	The choices of menu is easily understood	3,4	87,00
	Easy To Use Navigation Buttons	3,94	97,80
3	Interaction	3,61	82,20
	Application display is interactive	3,5	80
	Materials on the application is easy to use and attractive	3,72	84,40
	Sound on the material is clear	3,00	90,00
Total	3,55	81,00	

Source: personal documentation

Table 2 showed that evaluation results of questioners filling related to learning application was very good in term of display, operation and interaction. The benefit from this research results was the improved materials delivery in interesting and effective maners as well as to stimulate the attention and capability of students in learning proses.

5. CONCLUSION

After conducting the research and producing application of learning, it can be concluded that learning application for natural science subject had fulfilled very good criteria in term of display, operation and interaction aspects which consists of the menu display material and quiz.

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