The Development of Adobe Flash Media Integrated Problem Based Learning on Salt Hydrolysis

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***Abstract*—This research aims to determine the level of feasibility of Adobe Flash media integrated Problem Based Learning models on the subject of Salt Hydrolysis based on learning media feasibility criteria and to determine differences in learning outcomes of students. This research use the Development Research method with the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The study a population was all students class of XI Senior High School of 9 Medan who used 2013s curriculum. The sample was taken with purposive sampling technique, from students class of XI consist of 60 people from 2 classes. The instruments used were learning media eligibility criteria sheets and Objective test. Learning outcomes data were analyzed using the T - test using SPSS 16.0 for Windows and Objective test analyzed according to instrument standardization. The results showed: (1) Learning media that use Adobe Flash Integrated Problem Based Learning models are very feasible to use and according to the learning media feasibility criteria with average 4.42 (2) There was difference between student learning outcomes using Adobe Flash media Integrated PBL models and student learning outcomes using Flash media which existing on internet sourced from Pustekkom.**

Keywords— Adobe Flash, Development, Learning outcomes

I. INTRODUCTION

Indonesian educational system since 2001, has made it possible for Indonesian government to facilitate schools with internet facilities and introduced the new information and technology webs into educational system throughout the country in elementary and higher educational levels. [1]

That's why the learning environments will from hereon be designed to make use of technological tools. Such educational tools should be designed to serve pedagogical purposes. Designs must consider both a student's prior knowledge and the development of knowledge over the course of the student's learning process. Moreover, the design of technological tools should consider the advantages that will be made available to curriculum as well as respond to the needs of students. That is, if a teacher is to benefit from a technological tool (animation, simulation or video) in the transfer of knowledge, the information provided by means of that technological tool must be appropriate to the student's level of knowledge .[2]

Then the basis of the teacher in particular does not only refer to how in the learning process, but the activities that extend from technology-mediated learning [3].

Interaction between teachers and students in the classroom is created by the collaboration of the principal for teachers and parents to provide support for the use of digital technology [4].

Today, the curriculum in learning science has developed a package of teaching animation and multimedia, an indication that science and technology have gone beyond the conventional approach lies in the use of animated teaching in schools and higher education. Dynamic application of visualization such as animation has the potential to be suitable for learning content and easily affordable in class settings. Such teaching can be made real through multimedia in such a way that teaching will be simplified and valued. In an effort to curb the bad trend of students from middle school science failure, the use of animation allows students to take or remember previously studied subjects and thus increase their wealth in the teaching and learning process in science lessons [5].

Therefore animation that will be made in the form of Flash animation was originally developed for non-programming, easy to learn even for those who have no prior knowledge in programming languages. The most interesting Flash feature is its powerful graphics capabilities and not available in other standard programming languages [6].

In the implementation of the animation media used in the learning process it would be better to integrate the learning model as a supporting factor that can make the interaction of students and teachers more developed, then the model integrated in this animation medium is Problem Based Learning. This is due to PBL focusing on instructional teaching and, it is based on the fact that students are independent learners who can build their own knowledge if necessary directions are provided by their instructors. The role of teachers in PBL is very important; a good facilitator will guide students through different phases of the PBL process. Teachers in PBL encourage students to use logical thinking by

breaking down the given problem, thereby developing higher-order thinking skills. The teacher also urges students to take prior knowledge and discuss it with their group members by asking questions [7].

Chemistry teachers must strive to create an ideal environment for teaching and learning. Including technology tools in the classroom will require teachers to be employed by different teaching techniques. Instead of utilizing technological tools for short-term educational programs, however, students will benefit more from the longer learning period. Chemistry curriculum designers and chemistry teachers must be careful to plan and implement activities that include technological tools in accordance with the pedagogical objectives because the structure of these activities will be very effective in the students' learning process [2]. Because learning chemistry, especially the subject of Salt Hydrolysis includes material calculation and need to understand the material in the form of salt hydrolysis, various types of hydrolysis of salt and pH of hydrolyzed salt, so a different method or learning technique is needed in the form of flash animation to make it easier to understand the material delivered by the teacher .

This study aims to develop Adobe Flash media that integrated the Problem Based Learning (PBL) model on the subject of Salt Hydrolysis and to find out the differences in student learning outcomes after applying media developed with media existing on the internet sourced from pustekkom.

II. METHODE OF RESEARCH

This research is the development that using the ADDIE model by developing learning media and implementing it. Development of learning media using Adobe Flash implements the steps of ADDIE research, with the stages of development procedures carried out namely (1) Analysis, (2) Design, (3) Development, (4) Implementation and (5) Evaluation.

The research sample in the evaluation process was 60 senior high school students in Medan consisting of experimental classes I and II. The research instrument used was an objective standardized test in accordance with the standards for making test instruments. The procedure for ADDIE model research is explained in the following this fig. 1.

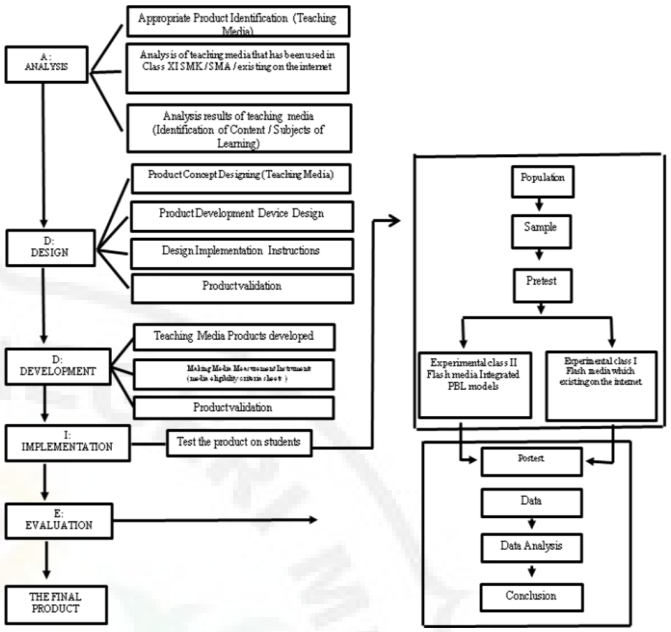

Fig. 1. Research stages of developing the ADDIE model

In the Figure above explains each stage in the development research using the ADDIE model.

III. RESULT AND DISSCUSION

Learning media that have been developed have been tested for display feasibility, integration with the subject and programming carried out by a team of experts, namely media experts (computers), lecturers and chemistry teachers. Then it was implemented in Senior High School at Science Class.

A. Analysis

Before developing instructional media, a prior analysis of chemical learning media that uses Adobe Flash programs that have been existing on the internet is sourced from Pustekkom.

TABLE I. DESCRIPTIVE ANALYSIS OF ASPECTS OF DISPLAY OF SOURCE FLASH MEDIA FROM PUSTEKKOM

Indicator	Information
Background	Plain white background media was less attractive
The proportion of colors	The use of colors is less varied
Display of images	The use of images had not seen only the animation used
Display instructions	Do not have instructions for use
Cover design and main menu	There is no cover on the media
Display animation on the media	- Animation in the illustration section of litmus paper inserted into a salt solution still causes a little confusion with the color of the solution that is not in accordance with the original.

	- Animation of decomposition when hydrolysis occurs The molecular form of H_2O does not form an inverted V according to the theory of experts
Display support / media supporters	Media advocates are still less specialized in growing student motivation

There was several criteria that still need to be revised such as the display aspects, namely background, color proportions, image display, display instructions, cover design and main menu, display animation on the media, display supporting / supporting media.

TABLE II. DESCRIPTIVE ANALYSIS INTEGRATION ASPECTS WITH FLASH MEDIA MATERIALS SOURCED FROM PUSTEKKOM

Indicator	Information
Suitability of material content in the media with competency standards, basic competencies, learning objectives and concept maps.	Competence is appropriate, but there are no core competencies, basic competencies, indicators, learning objectives, and concept maps
Suitability of the questions on the evaluation menu with learning material	The questions used are in accordance with the material but there are no questions regarding the sub-material of hydrolysis provisions
Giving examples in material presentation	Examples of questions do not yet exist in each submission
Media capabilities in improving the character of students	The media does not seem to bring out the character of students, one of them is student motivation
Integrated PBL model	The contents of the material or subject matter have not yet integrated the PBL model

There was parted of the integration aspect of the subject / material needed to revise the aspects of conformity to the content of the material in the media with competency standards, basic competencies , learning objectives and concept maps; Conformity to the questions on the evaluation menu with learning material; Giving examples in material presentation; Media ability in improving the character of students; and Integrated PBL models.

TABLE III. DESCRIPTIVE ANALYSIS OF ASPECTS OF FLASH MEDIA PROGRAMMING SOURCED FROM PUSTEKKOM

Indicator	Information
The quality of the navigation structure	The quality of the navigation structure is still lacking due to the hint of instructions / function instructions from the menu displayed

Aspects of programming, namely still needing a revision of the navigation quality indicator to facilitate users in operating the learning media.

B. Design

The design stage prepared the initial product with the initial design of making the media to describe usage instructions, core competencies, basic competencies, developing indicators, setting learning objectives, development integrated of Problem Based Learning models, concept maps, designing scenarios or teaching and learning activities, designing learning devices, designing learning material, designing learning outcome evaluation tools in the form of quizzes and essays in the Adobe Flash media to be interactive. The design of learning media was still conceptual and would underlied the process of further development..

C. Development

Chemical learning media that are developed and packaged in the form of CD (Compact Disc) or softcopy contained in the flasdisk, then inside it contains all the material, and quizzes in the form and multiple choice essays. The development phase of learning media results is improved by carrying out activities to prepare an application that will be used to make the design into a learning media product and the Software used is Adobe Flash or Macromedia Flash 8.

In developing product validation activities carried out by two lecturers as material experts, two media experts (computers), and two chemistry teachers. The standard assessment of learning media used media assessment criteria that can be seen in Figure 2.

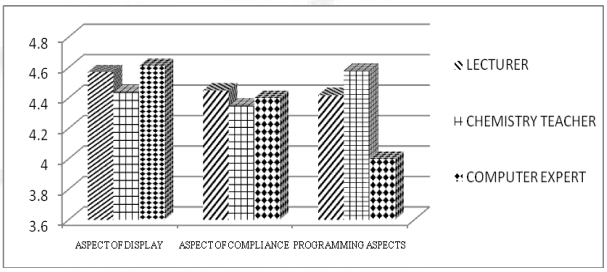

Fig. 2 . Average Media Rating by Media / Material Experts, Chemistry Lecturers and Teachers

Three aspects indicated that the results of the feasibility test in accordance with the assessment criteria of learning media are very feasible, with an average value of 4.42 which means that lecturers or material experts, media experts and chemistry teachers state that integrated learning media PBL models are very feasible to use . Test the eligibility criteria and this assessment is carried out by media / computer experts, material experts, and chemistry teachers. Based on the results of the feasibility standardization test and the assessment by media experts / computer the average value obtained: (1) display aspects 4.61, (2) aspects of cohesiveness with material amounting to 4.4, (3) programming aspects of 4; material

experts / lecturers on average the values obtained: (1) display aspects of 4.57; (2) integration aspects with material amounting to 4.45; (3) programming aspects of 4.42. And the average media assessment by chemistry teachers, namely: (1) display aspects of 4.44; (2) integration with material aspects of 4.35; (3) programming aspects of 4.58. Based on the results of the feasibility standardization test, the average value obtained is 4.42 which means that lecturers / material experts, media / computer experts and chemistry teachers state that learning media developed using Adobe Flash integrated PBL models are very feasible to use.

Thus, this products that have been developed were feasible to be used in the learning process, based on Thomas and Israel regarding the use of multimedia teaching through animation is an innovative approach to teaching science subjects [5]. This method enhances the teaching and learning process of science subjects in school because students in science subjects get poor results from their examinations. Leman's research confirms that PBL as an active learning approach has a positive effect on higher learning achievement, overcoming alternative conceptions, and developing social skills[8].

D. Implementation

This stage had done by starting used learning media developed using Adobe Flash in learning or the real environment, by looking back at the objectives of product development, interaction between students and the evaluation process. After the implementation of the media, an evaluation is then carried out. At this evaluation stage the final product was produced in the form of learning media in the form of softcopy with a capacity of 4.13 KB with exe file types. So that it can be accessed by student or teacher as users even though they do not have Adobe Flash software on a laptop.

E. Evaluation

This stage explained that the final product produced in the form of learning media in the form of softcopy with a capacity of 4.13 KB in the form of an exe file, which can be accessed even if the user does not have Adobe Flash software so that it is practical to used in the implementation process. Then learning media applied and competencies measured in the form of final tests. It could be seen at table below.

TABLE IV. STUDENT GAIN RESULT FOR EXPERIMENTS CLASS I AND II

Class	Gain	Category
Experiment I	0,58	Medium
Experiment II	0,71	High

From the table above it can be stated that the gain results in the experiment I had an average gain was 0.71 and the experiment II had an average gain was 0.58, which it indicated learning media that was Adobe Flash media integrating with PBL model higher than the learning media that had sourced from Pustekkom.

IV. CONCLUSION

1. Learning media that had developed using Adobe Flash media Integrated Problem Based Learning models for class XI senior high school second semester on the subject of Salt Hydrolysis are very feasible to used and in accordance with the assessment criteria of learning media.
2. There was difference between student learning outcomes using Adobe Flash media Integrated PBL models and student learning outcomes using Flash media which existing on internet sourced from Pustekkom.

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