

Development of Macromedia Flash helped Banner Game Snake in material subject of Acid Base

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Abstract— This research focused on research and development of learning devices using Macromedia Flash media assisted by Snake Ladder Banner. This study produced a product in the form of Interactive learning media Macromedia Flash assisted by Snake Ladder Banner on acid-base material in class XI which is expected to be suitable for use as a learning medium. The subjects in this study were divided into two stages, the first small group test was 15 students from Marangkayu 1 Public High School, the second field test (large group) in 88 students from 3 schools namely Marangkayu 1 Public High School, 27 students from Marangkayu 2 Public High School, and 31 students from Marangkayu State High School 3. The results showed that the validation of Macromedia Flash media experts was 98.50%, Banner media validation was 92.25%, material expert validation was 98.57%. The device validation shows that the RPP validation obtained 87.55%, the validation of the question obtained 94.50%. For the teacher response results obtained 93.33% which means that the development of Macromedia Flash assisted by Snake Banner Ladder is "very practical", the student response results get 89.96% which means that Macromedia Flash is assisted by Snake Ladder's Banner "Very Practical". As for the results of observations to increase student activity by 91.56% and for student learning outcomes from daily tests reached KKM with the percentage of student learning outcomes 84.85%.

Keywords— *development, learning tools, macromedia flash, banner, snakes and ladders*

I. INTRODUCTION

Education is an important factor for human life in determining the future. Education, especially schools, must have a learning system that is based on efforts to increase student's curiosity.

This is in line with the obligations of Educators in Law No. 20 of 2003 article 40a concerning the National Education System, which reads: "Education and education personnel are obliged to create a meaningful, pleasant, creative, dynamic and dialogical educational atmosphere". Educators should be able to present a fun, meaningful, and dynamic learning atmosphere. Every educator in this case is a teacher, has an obligation to present student-oriented learning, so students feel happy and enthusiastic in receiving new knowledge. Macromedia Flash is capable of presenting the appearance of text, images, videos, sound, logo animation, interactive CDs, movies, games, banners, interactive menus, animated cartoons, etc. [1]. The use of this media as a form of teacher can take advantage of

technology, it can also facilitate students to explore learning material, by providing alternative practice questions into the Macromedia Flash application so students can practice questions independently. Fun learning will always arouse students' curiosity towards something. Curiosity will make students active and feel the benefits of the knowledge they are looking for, especially in subjects that are considered difficult as in chemistry lessons about acid-base material. Students are expected to be enthusiastic in learning when they feel easy in understanding the material. Therefore, each chemistry subject teacher is expected to be able to present chemical material more interesting and innovative.

Based on observations at SMA 1 Marangkayu, students found problems lacking interest in acid-base material, because according to students this material was complicated, students were required to understand concepts, measure pH, and calculate concentration. Most learning activities still use book-based media, powerpoint slides and Microsoft Word. This makes students become saturated and not enthusiastic in carrying out the learning process in the classroom, has no motivation in working on the questions given, thus making learning boring and unpleasant. If students are bored with teaching and learning activities, students will become unproductive, which will result in low student learning outcomes.

Based on the description above, about the importance of an increase in learning achievement, the researchers were interested in conducting research on the Development of Macromedia Flash Assisted Banner snake ladder game on acid-base material in terms of Activity and Student Learning Outcomes.

II. METHODS

This research used research and development method with the research stages as depicted at Figure 1. The validity of learning media was obtained based on the results of the assessment from material expert and media expert. The validity of data was obtained using the formulae:

$$P = \frac{\text{score obtained}}{\text{maximum number score}} \times 100\%$$

The learning media was stated to be valid, if the value obtained is at least 80% with the criteria listed at Table 1.

Table 1. Validity level criteria (%) (Source: Depdikbud, 2017)

Percentage (%)	Category
0 – 54	Very invalid
55 – 64	Invalid
65 – 79	Valid enough
80 – 89	Valid
90 – 100	Very valid

Practicability of the learning media was assessed by using teacher response's questionnaire which was processed using the formulae:

$$P = \frac{\text{score obtained}}{\text{maximum number score}} \times 100\%$$

The learning media was stated to be practical, if the value obtained is at least 80% with the criteria listed at Table 2.

Table 2. Practicability level criteria (%) (Source: Purwanto, 2009)

Percentage (%)	Category
≤ 54	Very unpractical
55 – 59	Not practical
60 – 75	Practical enough
76 – 85	Practical
86 – 100	Very practical

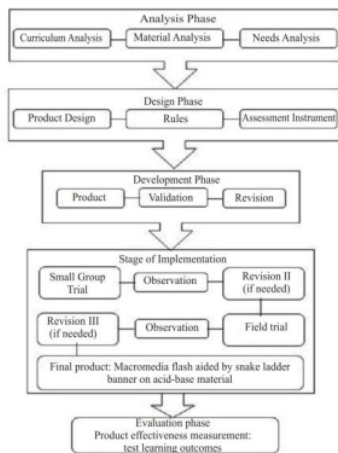


Figure 1. Design of research and development procedure

To know the response of students on the developed learning media, students filled the response's questionnaire after using the media in chemistry learning. Learning media was stated to be practical if the value obtained is at least 80% based on the criteria listed at Table 2.

The effectiveness of developed learning media was determined by student learning outcomes in the learning process. The effectiveness assessment of developed learning media in the learning process was conducted at several high schools in Marangkayu. The population in this study were 88 students of class X IPA of SMA 1, SMA 2, and SMA Negeri 3 in Marangkayu. The achievement of effectiveness is measured by cognitive aspects. The criteria for the effectiveness of learning media can be identified by looking at the minimum completeness criteria for chemistry subjects in school. Assessment of cognitive

aspects of students is obtained from the results obtained in learning activities, namely in terms of student learning outcomes in the form of daily tests in the form of multiple choice questions. The value of the student's daily end test is calculated by the following formula :

$$\text{Daily Value} = \frac{\text{the number of scores obtained}}{\text{maximum total score}} \times 100$$

The Minimum Completion Criteria (KKM) value in school in this study was 75. The frequency of student learning outcomes based on KKM values can be seen in the following Table 3:

Table 3. Frequency of student learning outcomes based on KKM value

Value Interval	Frequency
≥ 75	Complete number of students
≤ 75	The number of students who did not complete

Based on the percentage produced from classical completeness, learning media is stated to be effective if the percentage of students who complete at least 84% is in accordance with Table 4.

Table 4. Interval value and description of learning outcome (Source: Depdikbud, 2017)

Percentage (%)	Category
≤ 75	Less effective
75 – 83	Effective enough
84 – 92	Effective
93 – 100	Very effective

III. RESULT AND DISCUSSION

This research produces a product in the form of interactive learning media using Macromedia Flash Assisted Banner snake ladder game on acid-base material in class XI which is expected to be used as a learning medium. The concept built in this media is the combination or combination of Macromedia Flash and Banner snake ladder game.

Based on the research that has been done, obtained some research data. The data obtained from the research are through expert validation sheets, response questionnaires, observation activities, daily tests and teacher interviews. Expert validation is done to get Macromedia Flash Assisted Banner snake ladder game that is feasible and can be used in learning, giving a response questionnaire aims to determine student responses to Macromedia Flash Assisted Banner snake ladder game, observation activities are carried out to assess student activities in using Macromedia Flash Assisted Banner snake ladder game, while written tests are given to measure the level of success of learning. The following is a description of the results of data analysis that have been obtained.

a. Validation of the entire learning media

Media validation was carried out by media expert lecturers and two chemistry teachers from 5 Public High Schools and Marangkayu 2 Public High School. Material validation was carried out by material expert lecturers and two chemistry teachers from State Senior High School 5

and Marangkayu Aliyah Negeri 2 Madrasah Media Validation, Material, lesson plans, questionnaires, observation sheets, and questions conducted by material expert lecturers and media experts and two chemistry teachers from State High School 5 and Marangkayu State 2 Madrasah Aliyah. The results of the assessment are presented in the following Figure 2.

Based on Figure 2, it can be seen that Banner media gets the highest average reaching 100% because Banner according to the validators is quite interesting. While RPP has the lowest average value because before it is used, the RPP has many revisions and suggestions from the validator. But overall all the validity values of learning media have a value of more than 80% so that all learning media according to the results of the validation of the four validators get the criteria "very valid" so that it is feasible to be tested.

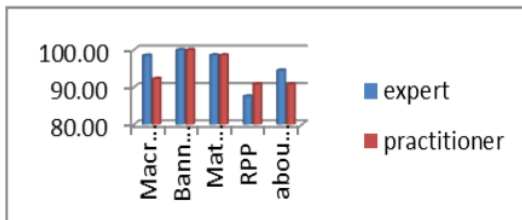


Figure 2. Percentage of media validation results

b. Observation of student activities

This research was held twice. The first meeting on "Theory of acids and bases according to Arrhenius, Bronsted Lowry and Lewis". The second meeting was about "Calculating the concentration and pH of acid-base solutions". In Macromedia Flash assisted by Banner snake ladder game, evaluation of questions is divided into two Macromedia Flash 1 for meetings 1 (first) and Macromedia Flash 2 for meetings 2 (second). The results of observations of student activities are as following Figure 3.

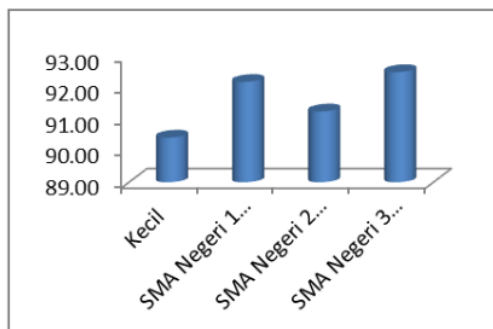


Figure 3. Percentage of student activity observation results

In Figure 3 the results of observations obtained by the activity of students in the development of Macromedia Flash assisted Banner snake ladder game in acid-base material. Data obtained from the small class activeness of 15 students from Marangkayu 1 Public High School

twelve aspects observed gained an average of 90.42% so it can be concluded that student activities in the school included the category of "Very Good", 88 students from 3 schools namely 30 students from Marangkayu State Senior High School 1, 27 students from Marangkayu State Aliyah Madrasah 2, and 31 students from Marangkayu State High School 5, twelve aspects were observed obtaining an average of more than 91.98% so that the activities of 88 students from 3 schools included a category "Very high" It can be concluded, in the small group test and in the field test (expanded) with 3 schools the student activities are also included in the criteria of "very good". The conclusion was drawn that the development of Banner-assisted Macromedia Flash could increase student activity and the activity was included in the "very good" category. According to Nachiappan et. al. [2], game-based learning is able to attract students with learning difficulties because it provides a pleasant learning environment

Fun and not boring learning can be done by adopting some simple games that exist in everyday life that can be used as learning media, one of which is the snake ladder game. There are several previous studies that have proven that snakes and ladders can affect learning activities and student learning outcomes for the better. The snake ladder game helps students connect abstract theories with concrete experiences. Learning flash-based snakes and ladders games motivates students to become active learners while offering alternative ways to interact and communicate with the system. The results of other studies concluded that snakes and ladders can increase student involvement; concept introduction; introduction of problem solving skills and critical analysis

c. Questionnaire for teacher and student responses

1. Student response

Student responses are obtained from the response questionnaire given to students after the trial. In the statement, the student response questionnaire has 15 statements. field tests were conducted to expand the sample with 88 students from 3 schools, namely 20 students from Marangkayu 1 Public High School, 36 students from Marangkayu State Aliyah Madrasah 2, and 36 students from Marangkayu State Senior High School 5. The results of the student response questionnaire are as the following Figure 4.

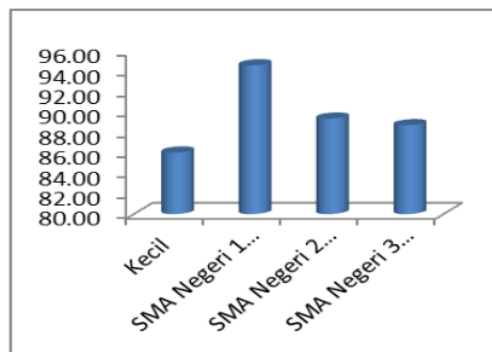


Figure 4. Percentage of student response results

Based on figure 4, the response of students to the small group trial at Marangkayu 1 Public High School obtained a value of 82.04% in the very practical category. Whereas, the response of students in field trials in three schools, namely in Marangkayu 1 Public High School obtained a score of 91.57% included in the very practical category, the response of students at Marangkayu 2 Public High School obtained a value of 80.05% included in the very practical category. The response of students at Marangkayu Public High School 3 obtained a value of 88.73% in the very practical category. The average value of student responses to the small group trials and field trials is 85.60% classified as very practical categories. Overall in the field test (expanded) the response of 88 students from 3 schools to the development of Macromedia Flash assisted Banner snake ladder game in acid-base material was "very good", which was included in the positive category. The results of this study are in line with Sardiman [3] where it was revealed that the use of media in learning can increase activity, in addition to motivation. The activity in question is the activity of students in understanding the material with different conditions, where students not only read but also can see the images displayed in learning. Learning activities with game media designed for students may learn more relaxed and encourage collaboration in learning. In line with the research Retails [4] explained in his journal entitled "Creating Adaptive e-Learning Board Games for School Settings Using the ELG Environment" that snake ladder media is one of the learning techniques that can make students active in learning activities.

2. Teacher response

Teacher responses are obtained from teacher response questionnaires given to teachers after being tested. In the statement, the student response questionnaire has 15 statements. Based on the results of the teacher's response questionnaire, the teacher's response to the macromedia flash assisted by the snake ladder game banner is presented in the following Figure 5.

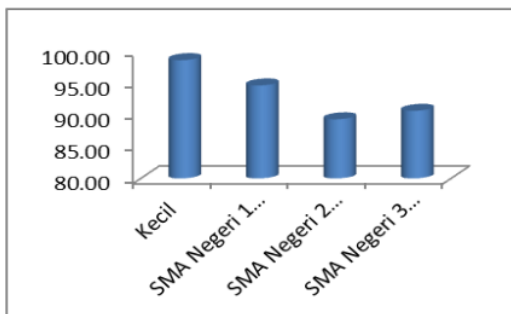


Figure 5. Percentage of teacher response results

The XI IPA class teacher at Marangkayu 1 Public High School in a small group trial namely Mr. Wahono, S. Pd commented that macromedia flash assisted by a snake ladder game banner made very interesting for students to

be used as a companion to teaching and learning activities, and with snakes and ladders this student is more active in learning on acid-base material so that it is effectively used.

Teachers at the field trials conducted in two schools, namely in Marangkayu 1 Public High School with Mr. Wahono, S. Pd and at Marangkayu State High School 2 with Ms. Suriyati, S. Pd. Comments from chemistry subject teachers at SMA Negeri 1 Marangkayu are fun, fun, creative learning media so that when used in teaching and learning activities arouse children's enthusiasm for learning. Comments or suggestions from chemistry subject teachers at Marangkayu 2 High School are macromedia flash assisted by the snake ladder game banner which is very good to use because all students are actively involved in learning, fun and not boring. Whereas the comments from chemistry subject teachers at Marangkayu Public High School are that macromedia flash with the help of the snake ladder banner is very good to use, students feel they are getting a new learning method, but to do this, they have to spend more time preparing to use media, so use time should be used as effectively as possible. This is in line with Rahmadani [5] entitled "The Use of Snakes and Ladders Game Media to Improve Student Learning Achievement in Hydrocarbon Subjects in Class XI As-Shofa Pekan Baru High School" that the use of snake ladder game media can increase student learning achievement by 16, 84%, because in this game students are required to be fast and swift in answering questions correctly so they can be winners. The response of chemistry teacher in class XI IPA in Marangkayu 1 Public High School in a small group trial obtained a value of 98.67% included in the very practical category. Meanwhile, the teacher's response to the field trials in three schools namely the response of chemistry teacher class XI IPA in Marangkayu 1 Public High School 94.67%, the response of chemistry teacher class XI IPA in Marangkayu 2 Public High School obtained a value of 90.67% included in the very practical category, and the response of the chemistry teacher in class XI IPA in Marangkayu State High School 3 obtained a value of 93.34% in the very practical category. The average value of the teacher's response to the small group trials and field trials is 94.33% classified as very practical categories.

d. Student learning outcome

Daily tests were conducted in class XI to see student learning outcomes after the application of learning media to the method of playing through Banner-assisted Macromedia Flash game snake ladder game on acid-base material. Learning media can be said to be useful if student learning outcomes meet the KKM (Minimum Completion Criteria) 75 and more or equal to achieving class completeness requirements with 70% of students completing. The following daily test results on the class can be seen in Figure 6.

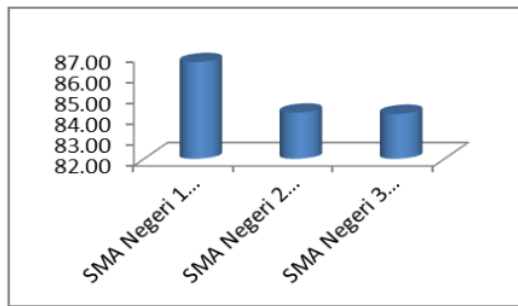


Figure 6. Learning outcome percentage through deuteronomy daily

Based on Figure 5 it appears that in the field test (expanded) the percentage is said to be that the learning outcomes are in a high category. The percentage of students following a daily test is 84.85%, which means that this daily test of students completes with KKM 75 and is included in the criteria of "effective". This is supported by Nachiappan et.al. [2] that the use of snakes and ladders games improves cognitive development of students with difficulty learning mathematics.

e. Results of teacher response interviews

The overall result of the interview is the development of Macromedia Flash assisted Banner snake ladder game can help students understand acidic base material. This aspect of student media activity greatly increases student activity because the development of Macromedia Flash assisted Banner snake ladder game in acid-base material requires students in playing, working in groups, and critically. In the development of learning devices using media snakes and ladders have several advantages, but there are a few shortcomings according to respondents in order to be suggestions and inputs, this media can be used in materials other than acid-base material. According to Sani [6], the success rate of teachers in teaching is seen from the success of their students. The quality of learning is seen from the activities of students when learning and creativity can be done by students after learning. Macromedia Flash assisted Banner snakes and ladders game is very interesting for teachers, the three teachers were eager to use learning devices using Macromedia Flash assisted Banner snake ladder game in acid-base material to be used in further learning.

IV. CONCLUSION

Based on the data from the research and data analysis, it can be said that in general the development of Macromedia Flash assisted by Banner snake ladder game on acid-base material in terms of activities and learning outcomes of Class XI High School students is well implemented. The statement is based on conclusions:

1. The validity of the macromedia flash assisted by the snake ladder game in the acid-base material developed has excellent quality.

2. The practicality of macromedia flash assisted by the snake ladder game banner in acid-base material developed has excellent practicality
3. The effectiveness of macromedia flash assisted by the snake ladder game banner in the acid-base material developed has very good effectiveness.
4. Based on the results of validity, practicality, and effectiveness, it can be concluded that macromedia flash assisted by the snake ladder game in acid-base material is worthy of being used as a learning medium.

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