

Developing Interactive Multimedia to Improve Language Literacy in Early Childhood

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Abstract: The development research aims to produce interactive multimedia products that recognize animated letters in Kindergarten are valid, practical, and have effectiveness to learners' learning outcomes. The research is conducted at TK Negeri Tanjung Lago Banyuasin, South Sumatera. The Allesi and Trollip Model, consist of learning, planning design, and development steps, was chosen to develop the multimedia. Three tests, alpha test, beta test, and effectiveness test, are administered to assess the validity, practicality and effectiveness of the multimedia. The average result of the expert's assessment is 0.81 from the design expert of the learning, 0.94 from the material expert and 0.94 from the media expert so that the interactive multimedia of the material recognizes the developed letters is stated very high. The result of practicality is obtained through the Betha Test using guided interviews average V is the high category of practicality. Field test results showed that the learning outcome increased 38.6 with an average pretest score of 42, while the post test score was 80.6 with N-gain score of 0.70 in the moderate category. Interactive multimedia products recognize letters that use animations that are interesting to provide information that will be delivered more easily understood, attractive appearance certainly does not make users become bored quickly, and can facilitate the user in learning the content and materials so that it can be used in the field of education such as interactive learning.

1 INTRODUCTION

Kindergarten age (4-6 years old) is a sensitive period for children. The sensitive period begins to mature their physical and psychological functions that are ready to respond the stimulation provided by the environment. This period is the first time for developing all the basic abilities of cognitive, effective, psycho motor, social emotional, moral and artistic language of children.

According to Montessori, there are 6 (six) integrated development aspects which include: religious and moral, physical, cognitive, language, social emotional and artistic values. Standard level of achievement of child development covered language development for children aged 4-6 years old on basic competencies 3.12 concepts of early literacy such as recognizing and mentioning letter symbols, spelling letters, connecting sounds and letters, reading their own names, but that are still basic concepts such as introduction simple letters. Based on preliminary observations to students of Tanjung Lago Banyuasin State Kindergarten on the development report of the

students in the even semester of 2016-2017 school year on aspects of language development, the students have difficulty in showing and mentioning the letters of the alphabet such as distinguishing letters b and d, connecting images with words, mention the initial letter of the image name. This is reflected in the results of the child development assessment report with only 23.5% developing very well.

After conducting an interview with one of the teachers, it shows that the learning media which was used only in the form of textbooks for kindergarten children learning, monthly magazines, letter cards and one-way learning delivery, from teachers to students through the blackboard. The use of textbooks, magazines is less effective and varied therefore students are bored, less active in learning, and less attention in learning. Other causes are some teachers who are not in accordance with the teacher competencies for kindergarten children, therefore teachers have not been able to develop learning media that can make students more active in the learning process. The rapid development of the times and

technological advancements provides convenience for someone in packaging and presenting information which later on it will continue to be an integral part of classrooms and everyday life. Based on Keengwe's study (2009) entitled A Technology Interaction Professional Development Model for Practicing Teacher shows that using technology can help early childhood to communicate, practice the life skills and get better understanding concepts. One technology product that can be used as an innovation in learning is computers. Computer-assisted learning can improve cognitive, emotional linguistic skills and literacy skills in preschool children. In line with that, Vernadakis (2005) states that computer programs might never be able to replace books and blackboards, but people must realize that computer programs are more accessible to children who can learn better by using pictures and sounds, and the proper use of the right programs can make a big difference.

Multimedia today is one of the alternative learning media for early childhood that can stimulate some children's intelligence. One of them is language intelligence, especially the introduction of early literacy. Multimedia can make the students learn more deeply about the materials that they want to learn (Mayer, 2003). Multimedia is expected to deliver more enjoyable learning materials, therefore the material presented can be well-received. The appearance of colorful images can move together with sound effects from audio devices and it will make the children get meaningful and enjoyable experiences. According to Argawal (2015), multimedia which is used in the right direction also can succeed the development of psycho motor and strengthen the visual process of the users. Multimedia is chosen as media that can help children recognize the initial literacy/letters, because it can unite several elements of the media to convey the material and attract students' attention. The use of interactive multimedia for early childhood can improve children's learning interest and it has been explained that children in the 21st century are familiar with computer technology Liu Min (2009).

2 METHOD

This study referred to the development Model of Alessi and Trollip. Researchers used this development model because this model was specifically devoted to developing learning multimedia. The stages carried out of this study including: planning, designing, and developing (Alessi & Trollip, 2001). Research used planning, design and development. Testing in this

study was used to assess the feasibility of products consisting of alpha and beta tests. In collecting data of interactive multimedia aspects of language development, the researchers used questionnaire techniques, interviews, and observations. The questionnaire was carried out at the time of the alpha test which included material experts, learning to design experts, and media experts directly. Researchers' questionnaire was validated by the experts. Interactive multimedia validation was carried out to experts based on material aspects, learning design, and media aspects by providing input in the form of suggestions and comments to be used as references in revising the product to be developed. Interviews were conducted to six students at the trial level. Interviews were conducted to gather and know the students' responses to the use of interactive multimedia. The questions included habits in learning, students' responses to the appearance of interactive media and students' feelings during the learning process. Observation techniques allowed researchers to study more deeply about the subject of the study because they directly observe what the samples of the study were doing. Observations were done during the planning and testing. At the planning stage, researchers observed school facilities and infrastructure in the form of existing learning media. The observer which was used as many as two people observed the learning activities of the students seen by the observer and assessed on the prepared observation sheet. Data collection and analysis techniques that had been carried out in developing and creating valid, practical and effective interactive multimedia-based teaching materials, there are: (1) walk through; (2) interviews; (3) questionnaire; (4) test of learning outcomes; and (5) observation.

In the Alpha Test and Beta Test, beside comments and suggestions from experts and respondents, quantitative assessments of interactive multimedia based teaching materials were developed too. Alternative assessments on questionnaire instruments developed in The Likert Scale of 5 levels of assessment which can be seen in Table 1.

Table 1: Alternative assessment of interactive multimedia in questionnaire instruments

| Score | Category |
|-------|-----------|
| 5 | Very Good |
| 4 | Good |
| 3 | Average |
| 2 | Poor |
| 1 | Very poor |

Quantitative assessment is the score calculated by its mean then categorized as the level of validity and practicality. The results of the validation and respondent was searched using the following Aiken's V formula $V = \sum s / [n (c-1)]$ Categories of level of validity and practicality of interactive multimedia are seen in Table 2

Table 2: Categories of levels of validity and practicality of interactive multimedia

| Average Interval | Category |
|------------------|-----------|
| 0,8 – 1,000 | Very High |
| 0,6 – 0,799 | High |
| 0,4 – 0,599 | Average |
| 0,2 – 0,399 | Low |
| <0,200 | Very Low |

In try out, the students' learning outcomes were tested to test the effectiveness of interactive multimedia-based teaching materials on student learning outcomes.

Table 3: N-Gain score category

| Criteria for Ngain values | Category |
|---------------------------|----------|
| $N_{gain} \geq 0,7$ | High |
| $0,7 > N_{gain} \geq 0,3$ | Average |
| $N_{gain} < 0,3$ | Low |

Observation was used to see the activities of students during the learning process. The activeness of students during the learning process were observed by looking at the percentage of activity in each descriptor that was visible to students. The determination of the observation value of student learning activities expressed in the activeness assessment category that can be seen in Table 4.

Table 4: Students' activism category

| Average | Category |
|-----------|-----------|
| 85 - 100% | Very Good |
| 65 - 84% | Good |
| 55 - 64% | Enough |
| 0 - 54% | Deficient |

3 RESULT AND DISCUSSION

Interactive multimedia applications recognized animation-based letters developed using Adobe Flash Professional CS6. The material presented in this multimedia was recognized letters A to Z with various instructions, namely material recognizing letters A to Z, video, and animation. In addition, here are also puzzles as letter and game exercises as

evaluation tools. Interactive CD is used in this research where it provides two options of the activities using animal as the theme. The first activity is to introduce the alphabets A to Z and fill the words in Indonesian using the alphabets provided. In this activity, it provides a picture of animals on the desktop, for example a picture of a cow. Whenever the kids click that picture, so automatically the sound of cow will come out. After that, children must fill in blank word under the picture of the cow, for example S A I. On the left side of the desktop, it provides the chosen alphabets like (K, M, N, R, and P) which can be used by the children to fill the word. After they click the alphabet, they will get a feedback to make sure whether they can fill it rights or wrong. In this case, if they can fill the word using the right alphabet, they will get smile animation and the word "next" will come out which means they can continue to fill other words. In contrast, if they can't, they will get sad animation and the word "try again" will come out.



Figure 1: Screen shoot of fill in blank games activity

The second activity is puzzling. In this game, a picture of alphabet A will be on the desktop and the kids will be asked to click the pieces of puzzle pictures to unite the picture. The second activity is really essential for the kids to enhance their language ability.



Figure 2: Screen shoot of puzzle games

The interactive multimedia developed was validated by media, material and learning designs to determine the level of feasibility before beta testing was done to users. Expert validation was alpha testing. Media expert validation was done to determine the feasibility level of applications developed in terms of media. From the results of the validation of the Learning design experts, a total score was 0.819 that categorize as Very High score. The total rating of media experts was 0.944 with a Very High assessment category. Validation of material experts was conducted to determine the feasibility level of applications developed in terms of content. The validation of material was conducted by two material experts, the total score was 0.944 categorize as very high level.

In Betha observation with 6 (six) respondents, there were 3 levels of practicality categories, namely very high, average, and high. The highest validation coefficient was in the high category with score 1 for very high criteria and the lowest validation coefficient was in average category with 0.58. The indications which included in the category of very high practicality were interested in music and animation. After the learning application was revised, it was done to the sample. The study was conducted at Tanjung Lago State Kindergarten with 6 students. The observation was beta testing. From the result, the average student who answered yes was 93% which means that the feasibility of the learning media application is close to 100% and is very feasible. Results was shown that interactive multimedia with a basis provides benefits to the student learning process and it can also be used, this can be seen from the unique 100% participant learning outcomes. This result is supported by the opinion that interactive media allows contingent responses to children's actions and thus facilitates more retention of instructional materials (Radesky, Schumacher, and Zuckerman, 2014).

The importance of these findings is to improve the learning outcomes of students on aspects of language development, especially material recognizing animation-based letters, it also gave influences to educators in displaying interactive multimedia recognize letters easily and that has been more quickly understood by students. Interactive multimedia recognized animation based letters that researchers develop was given a pleasant impression, it can help the learning process and remember the form of letters. Relevant parts and contemporaries for the community. Many different roles of a teacher and the importance of each one; each role serves as a

means to achieve learning outcomes (Strauch and Omar, 2014).

Test instrument like alphabet cards which are given to the kids where they are asked to guess ten alphabet cards. In this case, each right answers will be scored 10. In the end of the game, we can get the comparisons of the children from pretest and post test. Based on the result, 33% are categories high, 25% are categories moderate, and 42% are categories low. The descriptions can be seen in the figure below:

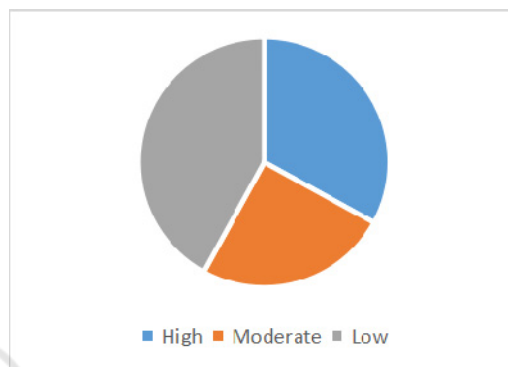


Figure 3: The diagram of students' assessment comparison regarding to n-gain criteria

Based on the research, there was a significant increased in learning outcomes. The interactive multimedia that was developed also shows the activeness of students in learning and makes a teaching approach used in the learning process so that learning becomes creative, innovative, creative, effective and fun. The meaning of Interactive meaning is learning process for students to control the learning environment. In this context, the learning environment in question is learning to use computers. He interactive classification in the scope of multimedia learning is not located in the hardware system, but rather refers to the characteristics of students in responding to the stimulus delivered on the computer monitor screen. The development of a planned and structured multimedia learning projects can meet the needs of students and change students from before by changing the method used so that it becomes effective therefore it becomes one of the solutions in solving problems in learning. In addition, the learning process looks fun with real media and active students, enthusiastic who want to always try until it works. Thus, learning through play can be used by teachers to improve children's intelligence in kindergarten. The development of interactive multimedia can be an alternative in helping early childhood in understanding material recognizing letters and being an educational tool for teachers and

parents, development. The final result was a product in interactive multimedia form.

Then it can be concluded that learning used attractive media, such as: color, design, shape, sound, music and started with moving drawing techniques, can develop aspects of early childhood abilities especially language aspects. Some advantages of interactive multimedia have developed, such as: (1) Interactive multimedia developed through many steps of processes and it also has been tested for validity, accuracy and effectiveness. (2) Interactive learning multimedia have been packaged in CD form therefore students can use them at school and home. (3) Interactive multimedia that have been developed and it consists of material recognizing letters A to Z, games and puzzle. (4) In interactive multimedia such as: animation, moving pictures, music, and videos that motivated and provoked students' activeness in the learning process, therefore it produced interactive and enjoyable learning processes. (5) Learners can replay multimedia until they understood without feel bored with it. Surely, interactive multimedia learning have disadvantages, such as: (1) Interactive multimedia has been developed only one theme, animal theme (2) Preschooler needed a long time to understand how using media. (3) Preschooler needed teacher guidance (4) Limitations of supporting resources when developed interactive multimedia learning.

Other research was tested the reading intervention module (MIM) among preschoolers in Malaysia. The MIM was developed based upon module development approaches (Majzub & Buang, 2010). Certainly the product of that research like module while product of this research was Cd's form. More over, language ability was developed of that research like reading comprehension, while language ability of this research was focused about recognized alphabets from A until Z. Although both of research was different, but they have developed same aspect which appropriate language characteristic of early childhood. As revealed by Burger (2010) states that early childhood language development, especially kindergarten children has their own characteristics, there are: (1) Children can already express more than 2500 vocabulary words. (2) Scope of vocabulary that can be spoken by a child such as: color, size, shape, taste, smell, beauty, speed, temperature, difference, ratio of distance and surface (rough-smooth). (3) Children aged 5-6 years can perform a good listener role. (4) The child can participate in a conversation, the child can listen to other people speaking and respond to the conversation. (5) Conversations conducted by children aged 5-6 years have involved

various comments on what is done by themselves and others, and what they see. Children at the age of 5-6 years can already do self expression, writing, reading and even poetry.

Other study combined gesture-based computing technology and a game-based learning model to develop a gesture interactive game-based learning (GIGL) approach that was suitable for preschool children. The goal of the study was to implement the GIGL approach to improve the learning performance and motor skills of the participants. (Hsiao & Chen, 2016). The prominent difference from these research is the dependent variable. If the research has focused on physical and motor aspects, while this study has focused on language aspects.

Based on other research, several advantages and disadvantages of interactive multimedia have been developed, are expected as reference for other researchers which other interactive multimedia developed, therefore it could produce better and quality interactive multimedia.

4 CONCLUSION

Based on the results of research conducted on the development of interactive multimedia on aspects of the development of material language recognizing animation-based letters can be summarized as follows: (1) The process of developing Interactive Multimedia so that it can produce material learning media material recognizes animated letters based on three stages, namely (a) the planning stage, (b) the learning design stage, and (c) the learning application development stage. In these applications there are introductory videos of letters A through Z through songs and three main menus, namely ABC material to introduce alphabet letters A to Z that are equipped with animated images of animals and their letters, puzzle games as a letter recognition exercise and its form, and Games as an assessment or training for measuring the ability of learners to use interactive multimedia products to recognize letters.

(2) The alpha test results from the experts are in the form of comments and suggestions that the researchers make reference to revise the interactive multimedia products developed. Quantitative study of interactive multimedia that was developed that is obtained through the mean of the assessment results of the experts obtained a number of 0.94 from media experts, 0.94 from material experts, and 0.81 from the expert learning design, with a very high category of validity level, so Interactive multimedia developed is declared valid and can be tested in terms of range.

The results of the Beta test were obtained from comments and suggestions from respondents regarding interactive multimedia from students. In the Beta test, there were 6 (six) students. The average results of the quantitative respondents' assessment of interactive multimedia recognize the letters developed by 0.61 and categorized as high practicality for using in research. (3) Interactive multimedia developed has the effectiveness of learning outcomes of participants. This can be seen from the post test results of students on product testing in the field. The average learning outcomes of students at pretest amounted to 42 while the average learning outcomes of students at the time of post test was 80.6 and an N-gain score of 0.61 was obtained which included the medium category.

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