

The Making of Interactive Applications of Beginning Counting with Montessori Method for Kindergarten Students

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Abstract:

This study aims to create an interactive application of beginning counting with the Montessori method that appropriate to apply as a learning media in Kindergarten. And also to find out the appropriateness of interactive application. The research method used in this research is Research and Development (R&D) and using the ADDIE development model (Lee & Owens, 2000). The development model is divided into 5 stages : (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation. In the development stage, the RAD (Rapid Application Development) method is used. The interview method, literature method, and instrument method are used in collecting data. Further, interactive application validated or assessed by media expert and material expert. The results showed that the interactive application of beginning counting with the Montessori method successfully created. The application divided into 3 parts : (1) Knowing numbers, (2) Sorting numbers, and (3) Counting with numbers. Based on the results of the validation of the interactive application, the percentage of interactive application appropriateness were obtained 96.6% by material expert, and 94.7% by media expert. This shows that the interactive application that has been developed can be used as learning resources or learning media of beginning counting.

Keywords : Interactive Application, Beginning Counting, Montessori Method.

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1. Introduction

In the indicators of achievement on competence of Early Childhood Education curriculum 2013, there are KD 3.12 and 4.12. KD 3.12 is about early literacy through play. KD 4.12 demonstrates early literacy skills in various forms of work. In this study, KD 4.12 for ages 2 to 6 years will be used. There is some competence included. Calling the sequence of numbers 1 to 3 randomly, spelled out 1-5 in sequence, sorting in 1-10, connecting concrete objects with the symbols of numbers 1-10, and mentioning the numbers when shown the number symbol.

The Montessori method is a method that helps educators communicate with children with dynamic teaching methods. Techniques, exercises, and easy-to-create system teaching materials of Montessori can arouse the desire to create and arouse the awareness of the child. Also, it is useful as an important foundation for learning at the next stage. By focusing on the pre-school stage from the age of two to five, the lessons focused on writing skills, arithmetic, sensory training, and the skills of other practitioners (Montessori, 2013).

This research was conducted in Pustaka Arridho Kindergarten. One of the materials taught to the students there is the skill of beginning counting. And it is taught with the Montessori method. The Montessori method has abundant materials for this purpose, allowing the child to become very familiar with the numbers in the early years when they are very responsive to this type of experience (Montessori, 2013).

However, in practice, the lessons learned by the Montessori method underwent several obstacles. The first is the lack of media, the delivery of lessons using the Montessori method needs to use number beams, cards, spindles, sandpaper numbers where the media is sometimes not available in Kindergarten. The second problem is if using media from the internet, sometimes the material inside it is incomplete.

Certainly, interactive media is very effective to be implemented in beginning counting activities. Interactive application will be implemented to be a medium of learning. By creating their own interactive applications and create it specifically for Kindergarten from the beginning, it is expected that the resultant product is more appropriate and in accordance with the needs of Kindergarten. as well as setting it as the title of this research "**The Making of Interactive Applications of Beginning Counting with Montessori Method for Kindergarten Students**".

2. Literature Review

Educational technology has an important role in education (Ouyang & Stanley, 2014). The demand for technology in education increases the development of multimedia in education. Multimedia interactive applications must have a combination of text, images and sound (Frey & Sutton, 2010). Games are very different from general applications where games are very popular and fun because they provide challenges for the players. (Korhonen & Koivisto, 2006). The purpose of learning media is as follows: (1) Improve learning experience, (2) Gives a new way of motivating new learners, (3) Support learning activity by offering differentiated learning, (4) Provides individualized learning experience, while increasing the potential audience (Jethro, Grace, & Thomas, 2012).

3. Research Method

The research method used in this research is Research and Development (RnD) by using ADDIE model (Lee & Owens, 2000). The development model is divided into 5 stages: Analysis, Design, Development, Implementation, and Evaluation.

In this research, interactive application validation is performed by material experts and media experts. The role of a material expert is a teacher and principal of Pustaka Arridho Kindergarten, and as a media expert is one of the competent lecturers in Early Childhood Education. Material assessment is viewed from the aspect of introduction, content, and evaluation. Media research is viewed from the aspect of content quality and objectives, instructional quality, and technical quality. Meanwhile, the technique of data analysis using descriptive analysis technique analysis (Riduwan, 2008). The formula used is:

$$\text{Percentage (\%)} = \frac{F}{B} \times 100$$

Keterangan :

F = Result of validation

B = Total summary result

Table 1 is the following criteria have been changed from the overall score that has been obtained.

Table 1. Appropriateness Criteria of Application

Appropriateness Criteria	Percentage
Very Appropriate	81% - 100%
Appropriate	61% - 80%
Less Appropriate	41% - 60%
Not Appropriate	21% - 40%
Very Unappropriate	0% - 20%

4. Discussion

This research results is an interactive application of beginning counting for Kindergarten students and testing whether the application is appropriate to be used in Kindergarten in teaching beginning counting with the Montessori method. This instructional application was made to answer the difficulty of maintaining the availability of teaching aids by the Montessori method. This application can be used as a media of learning in the classroom, can also be used by learners to study at home.

With the data obtained at the previous stage. Generated interactive applications of beginning counting to answer the existing problems in Kindergarten. After the application is completed, the next step is evaluation. In this stage, evaluation is done by media experts and material experts. The evaluation of the media expert is as in table 2.

Table 2. Media Expert Evaluation

Number	Comment	Follow Up
1	Don't associate the knowing number with the concrete form such as monument, swan neck and so on	The association of knowing number changed to be associated with an object expressed in a number
2	When opened, application must full screen directly	The addition of full-screen auto script so the application will directly full screen when opened

After the evaluation, then got suggestions that further serve as an improvement application.

Next is the evaluation of the material expert. Evaluation of the material expert is as in table 3.

Table 3. Material Expert Evaluation

Number	Comment	Follow Up
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1	The image used in recognizing the numbers should be one theme (if one fruit, then all image must be fruits)	The pictures in the game of knowing the numbers changed to one theme
2	Dubbing in the annotation section of counting with the numbers must be fixed	Improvements in dubbing annotations of counting with numbers
3	The numbers in the spindle box game must be fixed	Fixing numbers in the spindle box game

After the evaluation, then suggestions used for further application improvements. Then after the evaluation is done, the next step is the appropriateness test. Appropriateness testing is done by material experts and media experts by filling out a questionnaire. The explanation is as follows.

4.1. Material Appropriateness Test

Assessment of material experts in this study was given by expert competent in the field of Early Childhood Education. She is the principal of kindergarten and teacher in Pustaka Arridho Kindergarten.

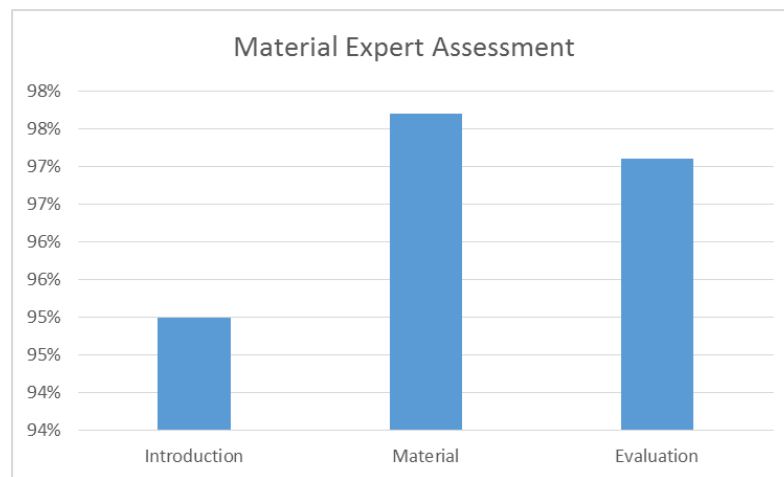
Assessment of material experts in this study serves to determine the percentage of appropriateness of the application in terms of three aspects of the introduction, content, and evaluation. Assessment in terms of introduction using 4 questions points. Material assessment using 9 question points. Assessment in terms of evaluation using 7 question points. The summary of test results can be seen in table 4.

Table 4. Material Appropriateness Test Results

Number	Aspect of Assessment	Percentage	Category
1	Introduction	95 %	Very Appropriate
2	Material	97,7 %	Very Appropriate
3	Evaluation	97,1 %	Very Appropriate
Overall		96,6 %	Very Appropriate

From the results in table 4, it is found that from the introduction aspect, the percentage of 95% appropriateness is categorized as very appropriate. Likewise in the aspect of the content of the material produces 97.7% percentage that falls into the category very appropriate. And the last is the evaluation aspect that falls into the category very feasible. From these results, it can be concluded that according to the material experts, applications fall into the category very appropriate. Which is the percentage result between 81% to 100% included in the category is very appropriate (Riduwan, 2008). The result of the appropriateness by the material expert can be expressed in the form of a diagram as shown in Picture 1.

Picture 1. Material Expert Assessment



Picture 2 found that this application got the lowest score of 95% in the introduction aspect. This value is obtained from obtaining a value of 19 from a maximum score of 20. This is due to the lack of proper dubbing in one of the game explanation in the application. And the opening animation is a bit too fast.

4.2. Media Appropriateness Test

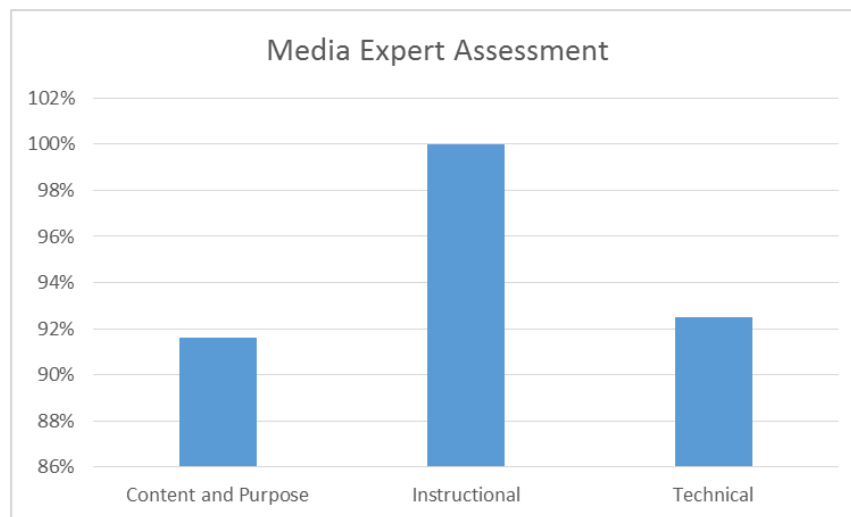
Assessment of media experts is given by a person competent in the field of Early Childhood Education. The assessment of media experts aims to determine the feasibility of the application of 3 aspects. The first aspect is the quality of content and purpose with 12 question points. The second aspect is instructional quality with 5 question points. The third aspect is technical quality with 8 question points. The results of the test by the media expert are as in Table 5.

Table 5. Media Appropriateness Test Results

Number	Aspect of Assesment	Percentage	Category
1	Quality of content and purpose	91,6%	Very Appropriate
2	Instructional quality	100%	Very Appropriate
3	Technical quality	92,5%	Very Appropriate
Overall		94,7%	Very Appropriate

From the test results in table 5, obtained the quality of content and objectives of 91.6% are included in the category is very appropriate. 100% Instructional quality aspect included in the category is very appropriate. And the technical quality aspect of 92.5% also falls into the very appropriate category. The above three aspects resulted in an average of all aspects in the figure of 94.7%. From these results can be concluded that according to media experts, this application is included in the category very appropriate (Riduwan, 2008). The results of application testing by media experts can be expressed in the form of diagrams in Picture 3 as follows.

Picture 3. Media Expert Assesment



Based on the data on the picture 3 aspects of content quality and goal get the lowest value. The quality aspect of contents and objectives scores 55 out of a maximum score of 60. The way to teach recognize numbers by associating the shape of numbers with concrete objects of a similar shape is considered an improper way and causes the quality aspect of content and gets the lowest score.

5. Conclusion

The results showed that successfully created interactive application of beginning counting with Montessori method that in outline has 3 games in it. Based on the results of the validation of interactive applications, obtained the percentage of learning video worthiness of 96.6% by material experts and 94.7% by media experts. This shows that the interactive applications that have been developed can be used as learning resources or learning media to know beginning counting.

The need for the development of material presented in interactive applications more broadly in addition to beginning counting materials in Early Childhood Education. Also, application development is recommended to produce more complex animations and better audio quality.

This interactive application has advantages of the research results are as follows: (1) complete and clear voice instructions so that the role of teachers can be helped. (2) can guarantee the availability of props as an interactive application can be reproduced (3) have a game based on the Montessori method as used in Pustaka Arridho Kindergarten (4) has a child-friendly back sound that is interesting for learners. While the weakness of this interactive application is as follows: (1) many other competencies can be developed with this interactive application (2) dubbing sound is still less than maximum (3) animation in the game can still be developed for the better.

6. References

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