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# Development Of Flash Card Applications Based On Ngada Local Culture To Improve Understanding Of Geometry Concepts For Children Aged 4-5

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**Abstract**

The research aims to: 1) to know the description of the needs analysis of the media to improve the Understanding of Geometry Concepts of Early Childhood, 2) to produce a Flash Card Application Based on Ngada Culture to Improve Understanding of Geometry Concepts of Early Childhood. The development of flash card applications based on Ngada local culture was developed using a development research model with a teaching material development model, namely the Rowntree model. The Rowntree development model consists of 3 stages, namely the planning stage, the development stage, and the evaluation stage. The subjects of this study were teachers and 15 children at Citra Bakti Integrated PAUD. The results of the Ngada culture-based Flash Card Application development research for expert trials and students as product users are as follows: (1) the quality of flash card applications based on Adobe Flash ver.6 media for the feasibility of material content based on material expert trials is in the 'valid' category, (2) the quality of applications based on the results of learning design expert trials is in the 'valid' category, (3) the quality of flash card applications based on the results of language expert trials is in the 'valid' category (4) the quality of flah card applications based on the results of individual trials is in the 'valid' category (5) the quality of flash card applications based on the results of small group trials is in the 'valid' criteria. Based on the results of the application validation test, it is declared feasible to use.

**Keywords**: early childhood; flash card application; geometry concept; ngada culture.

## INTRODUCTION

Early childhood during the golden age has various abilities that are stimulated from the child's environment. Efforts to provide stimulus to children are provided through the level of education both from the family or outside the child's environment from birth to six years of age to help the physical and spiritual growth and development of children, as well as develop cognitive, language, physical motor, social emotional, religious and moral values, and art aspects so that children will develop optimally and have readiness to enter further education. At this age children develop all aspects of development, one of which is the aspect of cognitive development which includes an understanding of the concept of early childhood mathematics.

According to the opinion of Suyadi and Masnipal in (Kurniawan, Dzikri, Widyastuti, Sembiring, & Manurung, 2019), cognitive abilities including early mathematical concepts can be introduced early, namely from the age of 4-5 years, which consists of several things, namely the concepts of colour, shape, size, pattern, and space. Also reinforced by The National Council Teachers of Mathematics (NCTM) there are five concepts of early mathematics that can be introduced to children, namely: number and number operations,

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algebra, geometry, measurement, data analysis and probability (Hapsari, Ilhami, & Agustina, 2019). Learning early maths concepts for early childhood is an effort to stimulate children's thinking skills so that they are ready to learn at the education level.

According to the study above, early childhood beginner mathematics skills are still low, this is in accordance with a survey conducted by PISA. PISA (Programme for International Student Assessment) is a programme to measure achievement for children aged 15 years in the fields of mathematics, science and reading literacy (Hewi & Shaleh, 2020). The cause is the focus of learning experienced by early childhood, namely the provision of stimulation on the aspects of development that exist in early childhood is not holistic integrative. Not holistic integrative in this case is not integrating the concept of learning with local wisdom around the child.

Based on the data above, the reality experienced by early childhood aged 4-5 years in PAUD Citra Bakti that children still do not understand the concept of geometry if it does not use media that is effective and fun by children. Therefore the need for teachers to create creative media. The introduction of mathematical concepts in early childhood can be done by using interesting media and in accordance with the development of children's age. Learning media is an important thing to use in implementing the learning process in early childhood. One of the media that can be used to introduce early mathematics in children after 4-5 years is by using flash card application media based on Ngada local culture which is focused on the Ngada Culture theme with the Sa'o sub-theme. The development of learning media using Flash Card applications in this study will be carried out by including elements of Ngada local culture, namely by including images of parts of the Sa'o (Bajawa traditional house). The parts of Sa'o are used to introduce children to the concept of geometry. The purpose of this research is to produce a flash card application to improve understanding of the concept of geometry in early childhood based on local Ngada culture. That way children can learn geometry from the culture around the child.

This research is related to research that has been conducted by previous researchers, namely on the Use of Flash card Media to Introduce Early Maths in Early Childhood. This research was developed from previous research with some differences that became the basis of the author's thinking. The uniqueness of this research is to develop a flash card learning media application by utilising technology so that it is easily accessible to early childhood. Another uniqueness of this research is that the Flash card application developed is an application based on Ngada local culture by displaying images of parts of the Sa'o (Bajawa traditional house) that are played with certain levels. The parts of the Sa'o that are applied for understanding the concept of geometry are the roof, didning, floor and pole of the Sa'o. Images of parts of the Sa'o displayed on the flash card application can introduce the elements of flat geometry, namely the triangle, trapezoid, square, rectangle and circle.

Products developed in the form of flash card applications make it easier for children to get to know the concept of geometry by utilising technology that is growing rapidly today. Flash card products developed utilising local cultural wisdom so that early childhood can improve the concept of geometry with a local cultural base. In this application, will be combined with a game with the rules of the game described at the beginning of the opening of the application.

## METHOD

The type of research used is development research that aims to produce Ngada culture-based flash card applications. This development research uses the Rowntree model to produce and test products in developing learning media. The flow of this research is: In stage I, researchers made observations to find out the characteristics of early childhood in Citra Bakti Integrated PAUD, conducted interviews with teachers of Citra Bakti Integrated PAUD, and analysed the 2013 curriculum. This activity was carried out to formulate general and specific learning objectives, as well as to outline the contents of the Ngada Culture-based flash card application.

Phase II in this study, researchers compiled materials and images used in the development of culture-based flash card applications, as well as determining the equipment and software to be used during the design process of Ngada culture-based flash card applications with a focus on geometry concepts. Researchers have begun to create and design observing, questioning, trying, analysing and communicating activities carried out by children in Ngada culture-based flash card applications.

Stage III in the research is the evaluation stage, testing the validity and learner responses of the products produced. At this stage, the evaluation was carried out based on Tessmer's evaluation, namely selfevaluation, expert review, one to one evaluation, small group evaluation, and field test evaluation (Tessmer, 1998) a) Self Evaluation: at this stage the researcher evaluates the media that has been made before being validated by experts. At this stage, researchers asked for suggestions from peers and supervisors to improve the product design that had been made. The result of this preparation stage is prototype 1; b) Expert Review: In this step, the development of the Ngada culture-based flah card application on the theme of culture with the Sa'o sub-theme (prototype I) was validated. Validation was carried out to determine the accuracy of the application development designed for children aged 4-5 years at Citra Bakti Integrated PAUD. Validation was conducted by design experts, pedagogical experts, and material experts. The product was validated through discussions with the three experts, so that the weaknesses of the product could be identified. The weaknesses are then reduced by fixing the shortcomings; c) One to One Evaluation: The one to one test was conducted by researchers on three children. The students chosen were students who had high, medium and low ability levels. The one to one test aims to identify and reduce the errors contained in the developed product. At this stage the children were also asked to provide feedback or comments on the prototype I used by filling out a questionnaire sheet.

After making revisions according to children's comments, prototype II was produced; d) Property II was then tested on a small group evaluation consisting of eight children, excluding the three children who had participated in the one to one evaluation. At this stage the children were also asked to provide feedback or comments on the prototype II used by filling in the questionnaire sheet. After revising according to the students' comments, prototype III was produced. The techniques used in this study used qualitative data collection techniques including: observation, interviews, and documentation.

## RESULTS AND DISCUSSION

To be able to improve the concept of understanding geometry in children aged 4-5 years, researchers developed a flash application based on Ngada local culture. The Ngada local culture contained in the flash card application for the geometry concept of the parts of

the Ngada traditional house (Sa'o). The parts of the traditional house are models of square, rectangle, triangle, circle, and trapezoid shapes. The parts of the traditional house include: Sa'o roof, Sa'o pillars, Sa'o floor, Sa'o windows, Sa'o doors, Sa'o stairs, and Sa'o walls. In order for children to easily understand the concept of geometry, this material is adapted to the culture of the local environment. At this stage of development, an evaluation tool was also prepared to assess the Ngada local culture-based flash card application for children aged 4-5 years that had been made in terms of material and flash card application design. Evaluation tools in the form of material validation sheets, and application design to assess the validity and practicality of the use of flash card applications are called prototype 1.

In prototype 1, the self-evaluation stage is carried out then with an expert review stage consisting of design and material experts. After the production of teaching materials, it was tested one to one evaluation on three children aged 4-5 years where the three children had different abilities, namely low, high and medium, then carried out with a small group evaluation on seven children aged (4-5) years. The results of each evaluation stage are in accordance with the formative evaluation model. At this stage of self-evaluation of the material on the flash card application that has been developed then self-corrected on the material about the concept of geometry for cognitive development of children according to the shapes of story-based geometry for children aged 4-5 years. After the correction is made, it is continued at the next evaluation stage, namely Expert Review. This Expert Review stage aims to get the validity of the Ngada local culture-based geometry shapes flash card application. This validation was carried out by material experts and design experts. The following is a picture of the application design results before and after being revised by material expert validators and design expert validators.

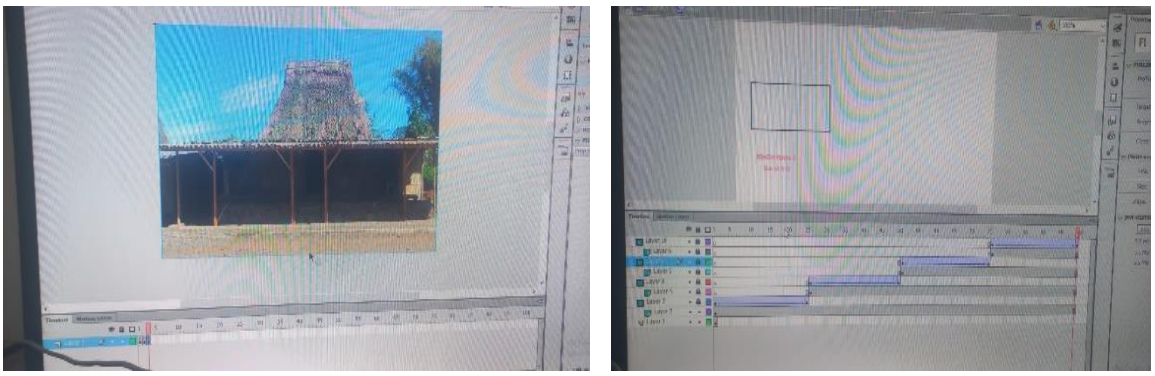

Figure 1. Flash Card App Draft

The picture above is the result of flash card application development activities using adobe flas cs.6 and power point systems. After designing the application design by looking at the results of observations and analysing the needs of students and the curriculum used at the school institution that is the subject of the research. After validation from design and material experts, the application design design design was revised as follows:


Figure 2. Activity Level 1 & 2

The picture Figure 2 is a picture of the revised application design that has been validated by the validation team. So that the material expert's average score is 3.50 which is included in the very valid category. Then the results of prototype 1 can be trialled with suggestions according to the revision of the material expert. Furthermore, the design validation stage consists of 4 indicators, namely a) display design gets a score of 15 on the descriptor of the material page arrangement in order, the descriptor of the images and text is clearly located, the descriptor of the writing layout is easy to read and not too narrow, the descriptor of the shape and size of the teaching material is appropriate, b) the use of fonts gets a score of 15 (type and size of letters) descriptor of the size of the letters used is not too small, the descriptor of the font size is not too large, the descriptor of the font in the application has a level of readability, the descriptor of the structure of the use of sentences is clear c) image illustrations get a score of 16 on the descriptor of image illustrations according to the incident, the image looks clear when used by the teacher to explain to the child, the application image is interesting, the clarity of the illustration with the material, d) the packaging of teaching materials gets a score of 16 on the descriptor of safe materials having good colours. The average score obtained at the design evaluation stage is 3, 60 with a valid category. Then it is feasible to be tested according to suggestions.

The results of the research that has been conducted by researchers on the development of Ngada Local Culture-Based flash card applications to Improve Geometry Concepts in 4-5 year old children can be concluded as follows. Flash card applications developed by researchers are declared very valid, this is seen from the results of expert validation (expert review). The results of the average obtained at the expert review stage of 3.60 are included in the valid category. The valid category means that it has been developed with adequate theory according to the curriculum, focused on aspects of cognitive development of children aged 4-5 years, appearance design, packaging, font use and product components between one another are consistently related. To test the practicality of

the flash card application, the results of the one-to-one evaluation stage obtained an average of 80.86% including in the very practical category and the small group evaluation stage obtained an average of 83.66% in the very practical category. Practical category here means that the teaching materials developed are easily used by users both teachers and children, meaning that children easily understand the concept of geometry

## CONCLUSION

Based on the development of flash card applications based on Ngada local culture to improve understanding of geometry concepts in children aged 4-5 years, several things can be concluded and the following suggestions are given: (1) Local Culture Effectiveness that the flash card application using Ngada local culture content proved to be effective in attracting children's interest and attention, and local culture can be well integrated in the context of geometry learning, enriching children's learning experience; (2) Improving Concept Understanding that the use of flash card apps helps in understanding geometry concepts such as shape, space, size, and the interactivity and visuals of the app can strengthen the connection of geometry concepts in children's minds: (3) Parent and Teacher Involvement that: the importance of the role of parents and teachers in accompanying the use of this application, both in the learning process at home and at school, and good collaboration between parents, teachers, and application technology is the key to success in improving children's understanding of geometry.

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