

Gebox Media to Facilitate the Cognitive Development of Children Aged 5-6 Years on Geometry Concepts

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Abstract

This study aims to determine the feasibility obtained from Gebox Learning Media. In the process, the Educational Design Research (EDR) method was used, with the McKenney and Reeves models, resulting in a three-dimensional learning media called Gebox. In the stages the steps taken in this study consist of 7 parts, namely; (1) Preliminary study and field study, (2) Determine competence and learning indicators, (3) Formulate learning objectives. (4) Outline the media, (5) Create products, (6) Product validation, (7) Product trials. This Gebox learning media is considered suitable for use by experts, and gets a good response when used in learning. Gebox media is believed to have a good contribution in helping to facilitate cognitive development for children aged 5-6 years on the concept of geometry. With the Gebox media, it is hoped that learning about the introduction of geometry concepts can run actively, meaningfully, and interestingly.

Keywords: Gebox, Geometry, Early Childhood.



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INTRODUCTION

Mathematics learning in Early Childhood Education basically refers to the achievement of cognitive competence. Its activities do not only refer to mastery of the material alone, but mathematics is positioned as a tool or means for students to achieve the expected cognitive competence. In the process, achieving cognitive competence depends on the learning process designed by the teacher. The purpose of introducing mathematics to early childhood is that early childhood can develop moral, physical, and emotional aspects that can be developed thoroughly and optimally by means of proper introduction. Introduction to mathematics for early childhood includes arithmetic, geometry, fractions, measurements, and data processing. The basic mathematical abilities of preschoolers are pre-operational, in which children are able to think symbolically. This ability can be seen when children are able to imagine the objects around them. This means that the child is able to think concretely and fantasize with the object even though the original object is not there.

Teachers should be able to create conditions for learning mathematics that allow students to actively form, discover, and develop their knowledge. Then it is recommended that students can form the meaning of the lesson material through the teaching and learning process. The purpose of introducing mathematics to early childhood is that early childhood can develop moral, physical, and emotional aspects that can be developed thoroughly and optimally by means of proper introduction. Introduction to mathematics for early childhood includes arithmetic, geometry, fractions, measurements, and data processing. The basic mathematical abilities of preschoolers are pre-operational, in which children are able to think symbolically. This ability can be seen when children are able to imagine the objects around them. This means that the child is able to think concretely and fantasize with the object even though the original object is not there.

As one example of the difficulties experienced by teachers when teaching mathematics, namely when introducing the concept of geometry to early childhood. Such as introducing flat shapes, introducing spatial shapes, grouping between geometric shapes and flat shapes. Geometry is already familiar to students, because they have known and used it for a long time in everyday life, even when they are toddlers they already know it, but this is still limited to the concept of flat shape, but it is rarely applied in the form of students' real life. . Formal geometry recognition begins to be taught from the start of early childhood education. The main difficulty experienced by the teacher is how to first introduce geometric shapes. The teachers had difficulty presenting the concept of 3D or 3D shapes with a concrete approach. The general approach used by teachers today, such as using origami paper by making various shapes and shapes, using dots to make planes and shapes, playing with blocks and drawing, has not been able to make children understand the meaning of flat shapes and shapes. build a real space. This is because there is a discrepancy between the abstract material properties and the child's condition seen from a concrete way of thinking. When this condition occurs, students do not get an understanding of the meaning of flat shapes and spatial shapes.

Looking at the gaps in the problems above, in order to realize active, meaningful, and interesting learning of geometric concepts, strategies are needed that can stimulate this, one of which is with the help of learning media. The learning strategy is a teacher's effort or activity in teaching that is used in applying various learning methods to achieve competency goals. Playing and learning are something that cannot be separated, both are related and complement each other. Playing makes children happy, while learning through play children can master more challenging material. Educational media are very diverse so as to provide variations for use. Therefore, an activity is needed to develop educational media specifically for the concept of geometry, so that these media can be used as they should. This means that the media is developed based on the needs in the field, so as to avoid inaccuracies because it is designed based on the needs, atmosphere and conditions of the area.

According to Novan (2014) geometric abilities have to do with the concept of shape and size, so that the ability to recognize these geometric shapes must be developed for the benefit of children's knowledge. Developments that can be developed are: (1) Adjusting geometric shapes based on their type; (2) Customize geometry by color; (3) Pointing and mentioning geometric shapes (triangles, rectangles, and circles); (4) Name the objects around them according to geometric shapes (triangles, rectangles and circles); (5) Grouping geometric shapes; (6) Give examples of geometric shapes. Early childhood according to Jean Piaget (in Agung Triharso, 2013) is in the intellectual stage of the pre-operational period, where this period is more dominant in thinking that develops in a better order and begins to involve symbols in interpreting an object, and begins to understand meaning. and concepts by using abstract objects based on the child's imagination and reasoning, even though they have not been completely separated from the concrete objects closest to the child. In this study, researchers were interested in learning more about the ability to recognize geometric shapes in early childhood.

To start fun learning, a fun environment and games are also needed, so that learning is carried out in an interesting way and the meaning of learning is properly fulfilled. Mayke (in Agung Triharso, 2013) states that learning activities while playing can provide opportunities for children to manipulate, repeat, discover for themselves, explore, practice, and gain countless concepts and understandings for children. When the learning process takes place, children can directly or indirectly make decisions, choose, determine, create, install, disassemble, return, try, express opinions, solve problems, work thoroughly, work together with friends, and understand various forms. feelings for himself and others. The ability to recognize geometric

concepts can be developed through Gebox learning media that are adapted to children's needs. Of course, the purpose of this Gebox learning media is to make the teaching and learning process effective, efficient and meaningful.

RESEARCH METHODS

The method used in this study uses the Mixed Method approach. In Creswell & Clark (in Creswell, 2015, p. 1088) mixed methods research design is a procedure for collecting, analyzing and mixing qualitative and quantitative methods in a study to solve problems. The type of method used in this study is Educational Design Research (EDR). Researchers use this method because this method is in accordance with the researchers' objectives, namely to develop and produce a learning media product. According to Baarab and Squire (in Marogi, 2016, p. 31) EDR is: 'a set of approaches with the intention of producing new theories, products, and practical models that explain and have the potential to impact learning in natural settings'.

In the stages the steps taken in this study consist of 7 parts, namely; (1) Preliminary study and field study, (2) Determine competence and learning indicators, (3) Formulate learning objectives. (4) Outline the media, (5) Create products, (6) Product validation, (7) Product trials. Data collection techniques used in this study were interviews, field studies, and questionnaires/questions. The instruments used included material expert assessment instruments, media expert assessments, and teacher response questionnaires. The assessment sheet contains multimedia eligibility criteria from the appearance and material aspects, while the response questionnaire contains statements as users of learning media from the point of view of media use.

In this study a closed questionnaire was used with a scale of 0-3, for the media validation questionnaire the criteria were very good, good, poor, and very poor. Whereas for the teacher's response questionnaire using the answer choices strongly agree, agree, disagree, and disagree. Expert validation is done through the Delphi technique. The Delphi technique is a way to gain consensus among experts through an intuitive approach. Data from expert validation results, and teacher responses were analyzed using the following formula;

$$P = \frac{F}{N} \times 100\%$$

Information

P = Percentage

F = Many Respondents Chose

N = Total Number of Respondents

After the percentage results were obtained from the responses of teachers and experts, the percentages were confirmed in the table.

Table 1. Expert Evaluation Criteria and Teacher Response Results

Percentage	Criteria
75-100	Very worth it
50-75	Worthy
25-50	Pretty decent
0-25	Not feasible

Data obtained from observing the effectiveness of learning media when used by children during trials, were then analyzed using quantitative data analysis. For data analysis of children's cognitive abilities in using Gebox media, it consists of pretest and posttest data. After obtaining the data, the researcher then analyzed the scores obtained. The researcher calculates from each aspect that has been achieved and has not been achieved and then percentages it.

RESEARCH RESULTS AND DISCUSSION

Research Result

The research carried out aims to produce a product in the world of education which contains gebox learning media to facilitate the cognitive development of children aged 5-6 years in the concept of geometry. The preliminary study was carried out by conducting interviews with TAAM Mathlauh Khairiyah teachers and analyzing the learning media used in learning the introduction of the concept of geometry. Following up on the results of the analysis of learning media, the results of interviews, and the results of media assessments, it is therefore necessary to develop learning media, one of which is by developing three-dimensional learning media. The availability of adequate media, but unfortunately the media is rarely used only for children to play. Existing media, only briefly introduces the geometric shapes of media, or just flat shapes, and even that is not optimal in introducing them further to children. Due to the lack of optimal media available for learning, the researchers developed media that is able to stimulate children's cognitive development about geometry material, whether it introduces geometric shapes or shapes, and children are able to classify types of geometry.

This prompted researchers to develop a mixed media between chess and block media into a learning media called Gebox Learning Media (geometry box). This media is designed to make it easier for teachers to introduce geometry to children. After the media is designed and made, the researcher validates it with the experts. The feasibility test of gebox learning media was carried out using a questionnaire validation sheet of gebox learning media to facilitate the cognitive development of children aged 5-6 years on the concept of geometry. This validation was carried out by experts, consisting of media experts and material experts. The experts in this study were Drs. Edi Hendri Mulyana, M.Pd. as a media expert and Mr. Dindin Abdul Muiz Lidinillah, S. Si., S. E., M.Pd as a material expert.

Media Validation

Media validation serves to assess the results of products that have been made, and functions to find out the shortcomings of these media products. Media validation obtained from media experts is shown in the table below:

Table 2. Gebox Media Validation Results on Geometry Concept Material by Media Expert Drs. Edi Hendri Mulyana, M.Pd.

No	Rated Aspect	Score Obtained	Ideal Score
1.	Ease of use	2	3
2.	Made of economical materials	3	3
3.	Safe for children	2	3
4.	Color selection	2	3
5.	Miniature form	3	3
6.	According to the developmental level of the child	3	3
7.	Increase children's imagination	3	3
8.	Creative	2	3
9.	Ease of use	3	3
10.	Simple	3	3
11.	aesthetic	2	3
Score		28	33
Percentage		84,8%	100%
Criteria		Very Worth it	

Material Validation

Material validation serves to assess the material contained in the product that has been made, and serves to find out the shortcomings of the media product. Material validation obtained from material experts is shown in the table below:

Table 3. Gebox Media Validation Results on Geometry Concept Material for Material Experts Mr. Dindin Abdul Muiz Lidinillah, S. Si., S. E., M.Pd.

No	Rated Aspect	Score Obtained	Ideal Score
1	Suitability of the material with the core competencies (KI)	2	3
2	Suitability of the material with basic competence (KD)	3	3
3	Material suitability with learning indicators	3	3
4	The suitability of the material with the learning objectives	3	3
5	Systematic presentation of material	2	3
6	Ease to understand	2	3
7	Neatness	3	3
8	Interesting media display	2	3
9	Interesting color selection	2	3
10	Structured presentation of the material	3	3
Score		25	30
Percentage		83,3%	100
Criteria		Very Worth it	

From the two tables above, the percentage given by Drs. Edi Hendri Mulyana, M.Pd for gebox learning media to facilitate cognitive development for children aged 5-6 years on the concept of geometry, namely 84.8% of the percentage given by Mr. Dindin Abdul Muiz Lidinillah, S. Si., S. E., M.Pd . that is equal to 83.3% If the average result of the validation of the two experts is 84.05% Included in the very feasible criteria. After the Gebox media has been produced and validated, the product will be evaluated by using it with children in learning activities. after being used in the learning process, the teacher is given a response questionnaire, this response questionnaire aims to see how the teacher's response to the media being developed. The trial was conducted at SPS TAAM Mathlaul Khairiyah group B which consisted of 17 children, the first trial consisted of 16 children and the second trial consisted of 16 children.

In the product trials conducted by the teacher, the teacher provided feedback and an assessment of the media designed by the researcher by providing a questionnaire. The teacher's response questionnaire consisted of 9 aspects. The group B teacher, Ms. Ani Aryani, gave a positive response to the media developed with a score of 88.8%, followed by Mr. Yahya Muhsisin. S.Pd, as the head of the TAAM Mathlaul Khairiyah school also gave a positive response with a score of 77.7%, from the results of the teacher's response value an average of 83.25% was included in the very decent category.

Discussion

Based on the needs analysis and preliminary studies that have been carried out, it can be explained that the learning media used have not fully met the needs, the material has not been complete, and the results have not been optimal. Basically teachers introducing the concept of geometry tend to only use the lecture method, building block media, origami paper and children's magazines as learning resources, which causes students to have difficulty and are passive in understanding the true meaning of geometric concepts. Learning is not solely carried out conventionally, using only the lecture method, it is considered to be very unfulfilling the needs of student learning experiences, as Edger Dale (in Asyhar, 2011, p.22) said that hearing

only fulfills 20% of memory retention. . On the other hand, the use of 3-dimensional media allows students to capture material content optimally, so that they are able to retain memory for a long time. This statement is supported by research conducted by Jacobs and Schade (in Munir, 2007, p.232) which shows that memory is increasing in the use of 3-dimensional media up to 60%.

Gebox learning media is designed into 3 components, namely material, play, and LKA. Geometry concept material consists of 5 concepts, namely children can mention geometric shapes, children can mention geometric features, children mention types of geometry, children are able to name geometric shapes and apply them to real forms, and children are able to classify geometric shapes. The delivery of the concept of learning material is presented in the form of media images, LKA, 3-dimensional media, and objects around. Based on the results of the 1st and 2nd validation and trials that have been carried out, it can be concluded that the use of Gebox Learning Media to Facilitate the Cognitive Development of Children Aged 5-6 Years in Geometry Concept Material is categorized as feasible for use in the learning process in PAUD. This is indicated by the good response of teachers and children to Gebox learning media. The results of observations on gebox learning media to facilitate the cognitive development of children aged 5-6 years in geometry concept material show that children gain increased developmental achievements which are dominated by achievements (developing very well) BSB.



Figure 1. Miniature Geometry



Figure 2. Media Gebox

CONCLUSION

The learning media created in this study is Gebox media where this media aims to make it easier for teachers to introduce the concept of geometry to early childhood so that learning is interesting, effective and meaningful. The results of the assessment Gebox learning media are very feasible and well used in the child's learning process. The results of the development of this research are the learning media gebox material on the concept of geometry. Products are packaged in 3-dimensional media.

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