

## Practicality And Effectiveness Of Diorama Media Of Flood Simulation To Increase Science And Linguistic Abilities To Early Childhood

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**Abstract:** This study aims to develop and test the feasibility, practicality and effectiveness of diorama media of flood simulation to introduce science concepts and retelling ability to Group B kindergarten children. This development study uses the ADDIE model approach. The feasibility of diorama media from media experts is 90.53% and from material experts is 92.67%. The practicality of science concepts is 91.03% and the practicality of retelling is 89.27%. The effectiveness was carried out with a quasi-experimental nonequivalent control group design pretest-posttest, score of ability to recognize science concepts is  $t_{count} > t_{table}$   $2.62 > 2.101$  and score of retelling ability is  $t_{count} > t_{table}$   $2.59 > 2.101$ . The results of the study showed that the developed diorama media was categorized as very valid, had an attractive design, safe, easy-to-understand material, and contained logical, concrete and consistent learning messages. This diorama media is practically used by teachers and effectively enhances science concepts and retelling ability of Group B Kindergarten children. Based on the data analysis it was concluded that the diorama media of flood simulation is very feasible to use because it has fulfilled the requirements as a valid, practical, and effective learning media to improve science concepts and retelling ability.

**Keywords:** Kindergarten Children, Science Concepts, Diorama Media, Retelling, Development

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### I. Introduction

The aim of national education in the National Education System Law No. 20 year 2003 article 3 is to educate the nation's life, the implementation of national education is expected to be able to make the Indonesian nation a dignified nation. Early childhood education is done by providing directed stimulation to optimize the growth and the development of children aged 3-6 years including the introduction of moral and religion, controlling emotional social behavior, developing language, thinking / cognitive, motoric physical maturity and art, with the aim of preparing children to face future life.

Early childhood are actually tough scientists and adventurers, their lives are close to the world of science, creativity and play activities. Science familiarizes children to use their five senses to be able to recognize various objects, the natural environment and the symptoms that occur. Sensing carried out by children in the surrounding environment will obtain new knowledge which becomes further thinking capital. The authors in [1], states that the best learning for early childhood is through discoveries that they get independently.

The authors in [2] states that "science education is a process of conceptual change in which children reorganize their exciting knowledge in order to understand concept and process more completely". The point is that learning science concepts can improve children's understanding and knowledge more fully in more interesting ways. Swedish curriculum, National Agency for Education [3], states that Children are to develop their understanding of science and relationship in nature as well as knowledge of plans, animals and also simple chemical processes and physical phenomena". in the Swedish Curriculum it is stipulated that children should develop scientific knowledge about plants, animals, simple chemical processes and physical phenomena.

The authors in [4], The development of the language of early childhood should get the full attention of the teacher or parents, because with language the child can interact with other people in order to fulfill the interests in their lives. language is the center of social life. Talk and language development are the cornerstones of the success of the child's life in the future [5].

From the questionnaire data distributed to 52 educators of early childhood education program, the educators, on average, understand the importance of introducing science concepts to early childhood learning,

but 36 educators rarely do so because various constraints, one of which is the limited means of supporting scientific learning media. [4] the task of educators is not only to pour or inform all knowledge into the minds of children, but teachers should be able to encourage children to understand important concepts more real, according to the stages of child development, so that children are able to find their own knowledge.

Based on the background of the above problems, it is necessary to develop visual media that can introduce science concepts to early childhood, so this study will develop a diorama media for flood simulation to introduce science concepts and the retelling ability to early childhood.

## **II. Literature review**

### **2.1. The feasibility of Diorama Media**

According to Daryanto [5], dioramas can be presented in classroom learning to show an event process that is considered difficult and dangerous if presented or studied directly with the real situation or object. Daryanto [5] also mentions several advantages in the use of three-dimensional diorama media, namely: providing a logical learning experience directly, dealing with the difficulty of presenting learning resources whose objects are too large and dangerous, presenting learning resources that have occurred in the past, giving the real picture resembles the real condition, showing in its entirety the constructs of an abstract object, clearly describing the structure, clearly showing the flow of a process.

The principles of developing a simulation model including the following: (1) Simulation means imitation of the actual conditions and situations, the more imitation approaches the original, the better the simulation, (2) The simulation model requires the accuracy of the concept and size of the original object, (3) Simulation learning material is material that is difficult to do with the original object / condition, (4) Simulation learning encourages the child's active attitude to observe and carry out learning activities [5].

Anitah [1], mentions there are three things which are elements that can add to the attractiveness of a media are; surprises, textures and interactions. Beauty is one of the conditions that should be fulfilled in the media so that the media can attract children's attention. One of the things that should be considered in making media is the fulfillment of truth in size, the parts of the media should be proportional, the media should be interesting, fun and not boring, the media should have elements of beauty in terms of color, shape and combination and neat in its making.

Mentions a number of things that should be considered in making diorama media, namely: (1) Dioramas should not have many objects, but have clearly targets and objectives and attract attention, (2) Dioramas should be associated with learning objectives that will be achieved [8].

### **2.2. Science Concept**

Nugraha [10] also explains the purpose of science learning for early childhood is to improve the formation of sharing science concepts to explain natural phenomena, foster children's interest in knowing and studying the natural environment, facilitating and developing curiosity, critical, and to be responsible.

States that there are four main objectives in providing science learning experiences to kindergarten children, among others: (1) Children have the ability to solve existing problems through logical / scientific thinking, (2) Develop a child's perspective / thinking. Children will be more observant, and calm in acting, (3) Obtain information and knowledge of their own through sensing done (4) Increase the interest of children to love their environment [10].

Brewer [11] mentions more details about the science skills developed for children is experimenting. "Experimentation is not a new process for young children. They have been experimenting since they first picked up a rattle or threw a cereal bowl off the high chair tray. In scientific process, experimenting means controlling one or more variables and manipulating conditions. Science is an activity that is close to the daily lives of children, by trying new things in environment they have begun to recognize the science process.

States that to develop science skills in children there are several skills that should be accustomed to children including: observing skills, comparing skills, explaining skills, predicting skills, communicating skills, classifying skills, and measuring skills [12].

Curriculum of Early Childhood Education Program year 2013 formulates the introduction of children's science concepts through observation of learning resources, deepens information by asking questions, gathering information, reasoning and communicating learning experiences, further stated in Basic Competencies as follows:

**Table 2.1** Competency and Science Concept Indicators in Children Aged 5-6 Years

Cognitive Aspects	Basic Competences	Development Achievement Indicators
Logical thinking	3.8 Knowing the natural environment (animals, plants, weather, soil, water, rocks, etc.) 4.8 Presenting various works in the form of images, storytelling, singing, gestures, etc. about the natural environment (animals, plants, weather, soil, water, rocks, etc.)	Tells natural events with simple scientific experiments Reveal the results of the work he made completely related to objects that exist in the natural environment

regulation of the minister of education and culture [15]

Macdonald and Rafferty [13], stated that basically science learning is related to mathematical skills, connecting skills, argumentation skills, observing skills, guessing skills, concluding skills and predicting skills.

### 2.3. Retelling

Bachri [14] states that retelling activities are feedback about the picture of how much response or acceptance children get after listening to information. According to Mustakim [16], retelling activities in children can increase reasoning and expand children's communication, retelling ability is part of the development of children's language aspects that involve listening and speaking skills. explains that in the context of early childhood learning, retelling ability is the result of developing the abilities of children's language aspects, which are carried out through activities to develop listening / listening skills and then recite them through speaking skills.

In detail the aspects of children's language development according to regulation of the minister of education and culture [15] are in the following table:

**Table 2.2** Basic Competencies in Language Ability for Children Aged 5-6 Years

Development Aspects	Basic Competences	Indicators
Language	3.10 Understanding receptive language (listening and reading) 4.10 Demonstrate receptive language skills (listening and reading)	Retelling what is heard with more vocabulary

regulation of the minister of education and culture [15]

Lestari [17], five criteria in seeing retelling ability, namely: suitability of story content, coherent of storyline, grooves in Indonesian, pronunciation and fluency in storytelling. Mutiah [4] mentions "there are five things that should be considered in retelling namely: read / listen to the message carefully and thoroughly, understand the essence of the message, get information in a coherent manner, determine the important part of information, re-reveal the contents of the information in sequence and complete.

Musfiroh [118], explains that retelling activities require memory power and a good analysis power of story content or information. Musfiroh also emphasizes that the more coherent and systematic the results of retelling ability, the better the way a child thinks. Retelling activities require the ability to listen carefully to the content of information or stories.

### III. Method

This research is a research development. This is a research method used to produce certain products, and test the effectiveness of these products [19]. Research on the development of diorama media of flood simulation to introduce science concepts and retelling ability to group B kindergarten children in Jambangan District can be categorized in development research type because it produces a product in the form of practical tools and learning materials that can solve existing problems.

The ADDIE model (Analyze, Design, Development, Implementation, Evaluations) is an interactive learning design, the basic stages in learning are very dynamic, effective, and efficient. ADDIE model learning design is used as product development such as media, teaching aids, strategies and methods in learning. The ADDIE model learning design is used in an educational environment to facilitate the development of students' knowledge and skills in the planned timeframe, based on Input-Process-Output.

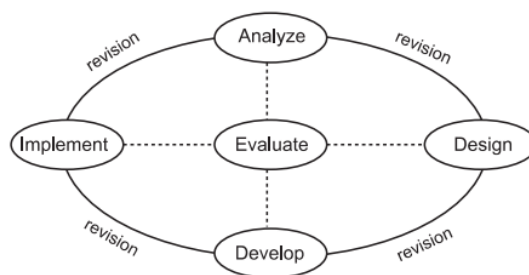


Figure 3.1 ADDIE Model Chart [20]

In more detail the stages of ADDIE model research in developing diorama media of flood simulation can be referred from the following table:

Table 3.1 Stages of Development of Diorama Media of Flood Simulation

No.	Stages	Description
1	Analysis	The results of the analysis phase occur gaps in the ability of children to recognize science concepts and retelling ability on the group B kindergarten children in Jambangan District. In KD 3.8 and 4.8, and KD 3.10 and 4.10 the ability of children is still at the stage of "starting to develop". Gaps also occur in the rare implementation of learning with the aims of learning that is introduction of science concepts and retelling ability.
2	Design	Media development design is done by designing media by selecting materials to be used, designing forms and concepts of media, specifying media, determining the contents of the guidebook, the paper to be used, fonts that will be used in writing the media guidebook.
3	Development	Development is done by making media according to the design and printing a media guidebook.
4	Implementation	Using diorama media of flood simulation for children aged 5-6 years. At this stage a quasi-experimental nonequivalent control group was evaluated to determine the effectiveness of the media.
5	Evaluation	Evaluation to find out the feasibility of diorama media of flood simulation was carried out by validation of media experts and material experts, based on practicality of the teachers/users and effectiveness of learning outcomes for students.

The data collection technique was done by validator questionnaire of media experts, validator questionnaire of material experts, practicality questionnaire of teachers/users, observation of science skills and performance of retelling ability. Data analysis technique on media effectiveness was carried out with a quasi-pretest-posttest experiment.

#### IV. Results

This development research is to produce diorama media of flood simulation for group B kindergarten children. The developed diorama media is learning media used to conduct flood experiments, the presented learning material is how flood natural disasters occur, what causes and how to prevent them. There are two dioramas developed, the one is diorama of beautiful and clean natural environment, the second is diorama of barren and dirty natural environment.

The feasibility of diorama media of flood simulation is referred based on the validation sheet, media experts show very valid interpretation (worthy of being used without repairs). Media experts suggest that the assessment rubric on the flood process learning is more detailed in accordance with the results of development. Then revisions are made by detailing the details of the assessment contained in the guidebook, and obtaining a very valid interpretation, so that it is worth to be used without revision. The results of the validation of media experts and material experts can be explained as follows:

Table 4.1 The results of the validation of media experts and material experts

Validation	Score	Criteria
Media experts	90.53 %	Very Valid
Material experts	92.67 %	Very Valid

Source : the secondary data processed by the writer, 2019

he practicality of the learning of diorama media of flood simulation can be referred from the teacher questionnaire. There are 13 practicality indicators of diorama media of flood simulation in introducing science

concepts with very valid results. 5 practicality indicators of diorama media of flood simulation in retelling ability also show a very valid interpretation.

**Table 4.2** Data of practicality of teachers/users

Validation	Score	Criteria
Science concepts	91.03 %	Very Valid
Retelling	89.27 %	Very Valid

Source : the secondary data processed by the writer, 2019

The effectiveness of media is referred by the development of science concepts ability and retelling ability of the children who are the subject of research. Field trials were conducted on 5 children of group B of Perwanida Kindergarten with the following results:

**Table 4.3** Trial Data of Small Groups of Media Use

Validation	Average score	
	Pretest	Posttest
Science concepts	2	3.8
Retelling	2	3.5

Source : observation on children's ability, 2019

The retrieval of media effectiveness data is done by looking at the comparison of the development of children's abilities in the control class and the experimental class and making hypotheses. Because of the number of sample members and the homogeneous variants, the t-test was carried out with a short formula t-test. Furthermore by comparing the results of t table and t count, the results of the calculation of t table with  $df = 18$  and  $\alpha = 5\%$  were obtained as follows:

**Table 4.4** Pretest-Posttest Calculation Data

Validation	score	
	t <sub>table</sub>	t <sub>count</sub>
Science concepts	2.101	2.62
Retelling	2.101	2.59

Source : the secondary data processed by the writer, 2019

On the ability of recognizing science concepts, t count of 2.62 is greater than t table of 2.101. The results of the effectiveness of the retelling ability of group B kindergarten children B, t count of 2.59 is greater than t table of 2,101.

## V. Discussion

From the results of validation of media experts of 90.53% it is stated that the media is very feasible, the media can be used without revision. Diorama media of flood simulation is stated to have a form which is similar to the original condition, has an attractive design and color, is made of safe material, the form and the color does not change easily, the construction is strong, durable, has the right size, suitable to the needs of the learning model, can presenting information that is consistent and repeatable, can provide uniformity of information, stimulation, and perception on children, can replace objects that are difficult to present, easy to use and store. Diorama media is also equipped with a guidebook that makes it easy for users.

The Material Experts scored it 92.67%. It means diorama media of flood simulation is very feasible to use because the material is easily understood by children, can provide a logical and concrete learning experience about the process of floods, causes of floods and ways to prevent floods to group B kindergarten children.

The diorama media of flood simulation is also practically used by teachers in learning to introduce science concepts based on the calculation of teacher questionnaire results of 91.03% with excellent categories, it can be used as experimental tools to study natural phenomena, it stimulates children to conduct investigations, it develops children's scientific attitudes, it fosters interest in knowing the natural environment, it develops curiosity, critical attitudes and responsibility of children, it improves children's cognitive abilities, it provides a fun learning experience. The percentage of practicality of diorama media of simulation flood in retelling ability is 89.27%. The diorama media of flood simulation can develop listening and asking skills, increasing reasoning skills and forming perceptions, and can provide feedback on how much the response or acceptance the child receives after listening to information.

The diorama media of flood simulation is effective too in improving the ability of science concepts, the results of the t-test stated  $t_{count} > t_{table}$  ( $2.62 > 2.101$ ) so that it can be stated that  $H_0$  is rejected and  $H_1$  is accepted. It means the average ability of children using diorama media of flood simulation is higher than the average ability of children using media images, so diorama media of flood simulation is effective to be used in

developing science skills in Group B kindergarten children. In the experimental group the average ability of children's science concepts develop very well, children are able to do observing, reasoning, predicting, classifying and comparing skills.

The effectiveness of diorama media of flood simulation is also evident in the retelling ability of group B kindergarten children, the t-test results also state  $t_{count} > t_{table}$  ( $2.59 > 2.101$ ), then  $H_0$  is rejected and  $H_1$  is accepted. It means the average retelling ability of children using diorama media of flood simulation is higher than the average retelling ability of children who use media images. The retelling ability of children in the experimental group develops very well, the children are able to retell information obtained smoothly and coherently in accordance with the learning messages, with clear intonation, and good use of language.

## VI. Conclusion

Based on the results of the research and the discussion, it can be concluded that the diorama media can be categorized as very valid, has attractive and safe designs, the material is easy to understand, the learning messages are logic, concrete and consistent. It is practical to be used by teachers as an experimental tool to study natural phenomena, stimulate children to conduct investigations, develop scientific attitudes of children, foster interest in knowing the natural environment, develop curiosity, critical attitudes and responsibility of children, develop skills of listening and asking questions, improve reasoning power and develop perceptions, and can provide feedback about the picture of how much the response or acceptance obtained by the children after listening to information, providing a pleasant learning experience. Diorama media of flood simulation effectively improve the ability of science concepts and retelling ability of group B kindergarten children. The flood diorama media is very feasible to use because it has fulfilled the requirements as a valid, practical and effective learning media to improve science concepts and retelling.

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