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Developing Educative Snake and Ladder Learning Media to Improve Understanding on Living Creature Concept

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Abstract

Purpose of this research is to develop educative snake and ladder learning media to improve the understanding on concept of living creature on early childhood. The research was conducted in Bekasi municipality with R&D method. The results indicate that in aspects of (1) availability of learning media: 75% of teachers used the learning media optimally and 67% of teachers perceived that the learning media made available by the school was less supportive to the learning: (2) requirement: only 25% of teachers who used the game media in learning and 83% of teachers recognized that the learning material in theme books was very supportive to use the media; (3) process: 83% of teachers had difficulty to present the learning material due to children characteristics which are active and aggressive and 75% of teachers recognized that the children's understanding level regarding the media presented was still low; expectation: 92% of teachers supported the making of educative snake and ladder learning media. Tests administered to the students regarding the living creative concept obtained average score 53,44, which means "insufficient."

Keywords: *snake and ladder game, understanding, living creatures, early childhood.*

1. Introduction

Science has a dynamic knowledge nature that is developing continuously along with various efforts and exploration from time to time to find the essence. For children, science is everything that is amazing, found and considered interesting therefore stimulates them to curiosity to investigate it. Based on the fundamental factors, science learning has a great influence on the development of early childhood.

Barbara et al (2016, p. 83) explains that science experiences can take advantage of children's curiosity and facilitate the development of their reasoning skills. This makes the development of science learning in children has an important role in laying the foundation of expected understanding, competence, and construction of human resources. Thus, science learning is expected to be given as early as possible.

Elementary school grade (SD) children are children in early age range which is 6-8 years old. By the stage, elementary school-aged children are at a concrete operational stage, in which children learn from what is seen, heard, smelled, touched, and tinkered with emphasis on the use of the environment as the source of learning. This is in line with research conducted by Shukla Sikder and Marilyn Fleer (2015, p.446), ie *"it can be argued that if children learn scientific concepts from an early age through everyday practices . . .."*. Thus, the construction of the concept of science can begin from daily activities close to the children's environment.

A research by Haley A. Vlach and Nigel Noll (2016, p.317) explains, *". . . that adults in children's environment, such as parents, teachers, and caregivers, play an instrumental role in guiding children's learning and thinking"*. The explanation becomes one way in realizing the expected appropriate generation. Children need coaching and fertilization from adults or teachers who are considered mature enough to help develop and provide a fun learning experience.

Coaching by adults or teachers to a child should also be appropriate to the content of the science. Mesut Sackes (2014, p.171) describes the scientific content of his research, "*there are three, common content areas across the state science content standards developed for early years: physical science, earth and space science, and life science"*. These three content can be the base in constructing children's understanding.

According to Trend in International Mathematics and Science Study (TIMSS) (2015, pp. 2-3) data on elementary students in science, Indonesia ranks 45th out of 48 countries with 397 points. Based on cognitive content aspect in the field of science, Indonesian students are also diagnosed as weak in all aspects of the content.

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Image 1 Science Achievement Per Content and Per Cognitive Level, TIMSS 2015

The survey proves that science learning is still experiencing difficulties. Therefore, it is necessary to provide ideal science learning and teach it as early as possible.

Researchers were interested in using board game media snake and ladder modified into 'Jumping Frog' to improve understanding of science and has been adapted to the development of the child's age. According to Agus (2011, p. 106), the snake and ladder game is a board game played by two or more people. The board game consisted of small blocks and in some blocks drawn a number of stairs and snakes that connect it to other blocks.

The distinction of these media is that in jumping frog there is interactive content that is adapted to science education national standard, and it also considers Permendiknas no. 22 of 2006, the NYS Science Standard syllabus, and several theories about the concept of living things. Based on the idea, it comes to the conclusion that the content of the concept of living things are (1) the characteristics of living things, consisting of classification, basic needs, structure, and function of living things; (2) the reproduction of living things; (3) the habitat of living things, consisting of living organisms and ecosystems; (4) the adaptation of living things, consisting of dependence on each other and on the environment; (5) the cycle of living things.

In addition there is audio and visual to support the understanding of children, and there are challenges, key answers, and pockets of activities behind the educative instructional media of snake and ladders 'Jumping Frog' board game which increases the motivation of children where they unknowingly do learning activities while playing.

2. Research Methods

This research belongs to the type of Research & Development (R & D) which aims to make the product through certain procedures or steps. Researchers in Research and Development use Borg & Gall model which divides development process in 10 stages, they are (1) *Research and information collection, (2) Planning, (3) Development of preliminary form of product, (4) Preliminary field evaluation, (5) Main product revision, (6) Main field evaluation, (7) Operational product revision, (8) Operational field evaluation, (9) Final product revision, (10) Dissemination and implementation*.

The subjects of data collection are teachers and students of grade 1 of elementary school in Bekasi city. The instrument of data collection in development of the educative board game snake and ladders 'Jumping Frog' comes in the form of validation sheet, observation sheet, and questionnaire.

3. Results and Discussion

In the process of developing educational media, the stage was to review various literature studies that come from books and journals related to the educative learning media snake and ladder. Furthermore, an observation was conducted at three elementary schools in Bekasi City. The results of this study found that the media used in learning is less varied, the learning method used is lecturing method, and it does not involve learners in learning when most students tend to be active. The steps taken in this observation are (a) observing the classroom environment, whether physically, socially, or interactional; (b) observing the learners' learning outcomes during the learning activities, in which case researchers record important things about the events experienced and done by the learners; (c) discussing the results of the observation to teachers and principals, to seek approval of the need for diagnosis; The following instructional media used by SDN Arenjaya XVIII, SDN Arenjaya XIV, and SDN Arenjaya II:

Image 2 Origami Paper Media and *White* Board in SDN Arenjaya XVIII

Image 3 *White Board* in SDN Arenjaya XIV

Image 4 Story Book Media in SDN Arenjaya II

Researchers also conducted interviews with 12 teachers to find out the availability of learning media, process needs, and expectations of teachers on learning media.

The interviews resulted on obtaining data that on aspects (1) the availability of learning media: 75% of teachers still seem to not use the media learning maximally and 67% of teachers feel the learning media provided in school is not very suitable to support the learning process; (2) needs: 25% of teachers use game media in learning process and 83% of teachers admitted learning materials in the theme book encourage the use of the media; (3) process: 83% of teachers find it difficult to deliver learning materials because the characteristics of most children are active and aggressive and 75% of teachers admit that the level of children's understanding of the materials presented is still low; (4) expectations: 92% of teachers support the production of the educative instructional media of snake and ladders 'Jumping Frog'.
Observations were also conducted by researchers using evaluation. The aim was to collect information of students' understanding on the concept of living things. The data were obtained through evaluation given through questions and answers to the students about the concept of living things. The learners got the average of 53.33. The average result is then converted in the score conversion table. Below is score conversion table, numeric values, and letters (Arikunto, 2009, p.255):

Based on the conversion table of academic values, the level of children's understanding on the concept of living things is in the category of "less".

Furthermore, the researchers did analysis, resulting as follows:

1) Science still serves only as a reading material;
2) Due to the less varied learning media and the absence of media that can measure the level of children's understanding on the concept of living things;
3) It takes learning media in form of games to fulfil the needs of children's understanding on the concept of living things in grade 1 elementary school in the form of a jumping frog game.

Based on the description, the researchers developed educative snake and ladder learning media which was later named 'Jumping Frog'. Educative snake and ladder learning media 'jumping frog' is a board game innovation that we usually know as snake and ladder game where the main components are blocks of images, pawns, and dice. According to Nurjatmika (2012, p.103), the design of the landing board does not have a standard, so everyone can make their own snake and ladder board to be very interesting and likable for children.

This underlies the developers' decision to design a Jumping Frog board game that is suitable for the needs of early childhood. There are 20 blocks in this media. This is based on the consideration of mathematical recognition for numbers according to the standards of Basic Competencies and Learning Objectives of Mathematics in compliance with the Regulation of the Ministry of National Education ("Permendiknas") number 22 in 2006. In addition, it is based on the opinion of Richard D. Kellough (1996, p.196) that teachers in initial class can introduce numbers from 1 to 10 and 11 to 20. The board games contain information on the concept of living things which is presented in each block; there are challenges, answer keys, and pockets of activity behind the Jumping Frog blocks.

Other than information on concepts of living things, the instructional media of Jumping Frog is also tailored for the development of 6-8 years old child, whereas according to Yuliani (2009, pp.161-162) the development of a child's motoric skill at such age includes jumping off a 20 meters high, drawing according to their vision, and imitating sentences using handwriting. Based on the explanation, the instructional media of Jumping Frog is played by jumping from one block to another, as well as figuring out pockets of activity to train children's motoric soft skill.

In addition, Yuliani (2009, p.162) explains that the cognitive ability of 6-8 years old children includes recognizing the value of places, differentiating closely similar words, being able to comprehend the concept of geometry, and playing puzzles.

In the case of language and social skill, Yuliani (2009, pp. 162-163) explains that 6-8 years old children are able to master more or less 14.000 words, tell many things, understand that words have meaning and function, make up a story based on a self-drawn picture, recite loudly, and answer to questions. This has become the basis for developers to design the game rules.

Provided below are several innovations of the educative learning game of snake and ladders 'Jumping Frog' in terms of game design, playing requirements, and game rules:

(1) Jumping Frog Equipment

The board game contains pictures and blocks printed on a banner material in the size of 2.5 x 3.5m^2. Inside the blocks, there is some information that needs to be recited loudly by the players or a picture of speakers that should be pushed in order to listen to the audio information by the players.

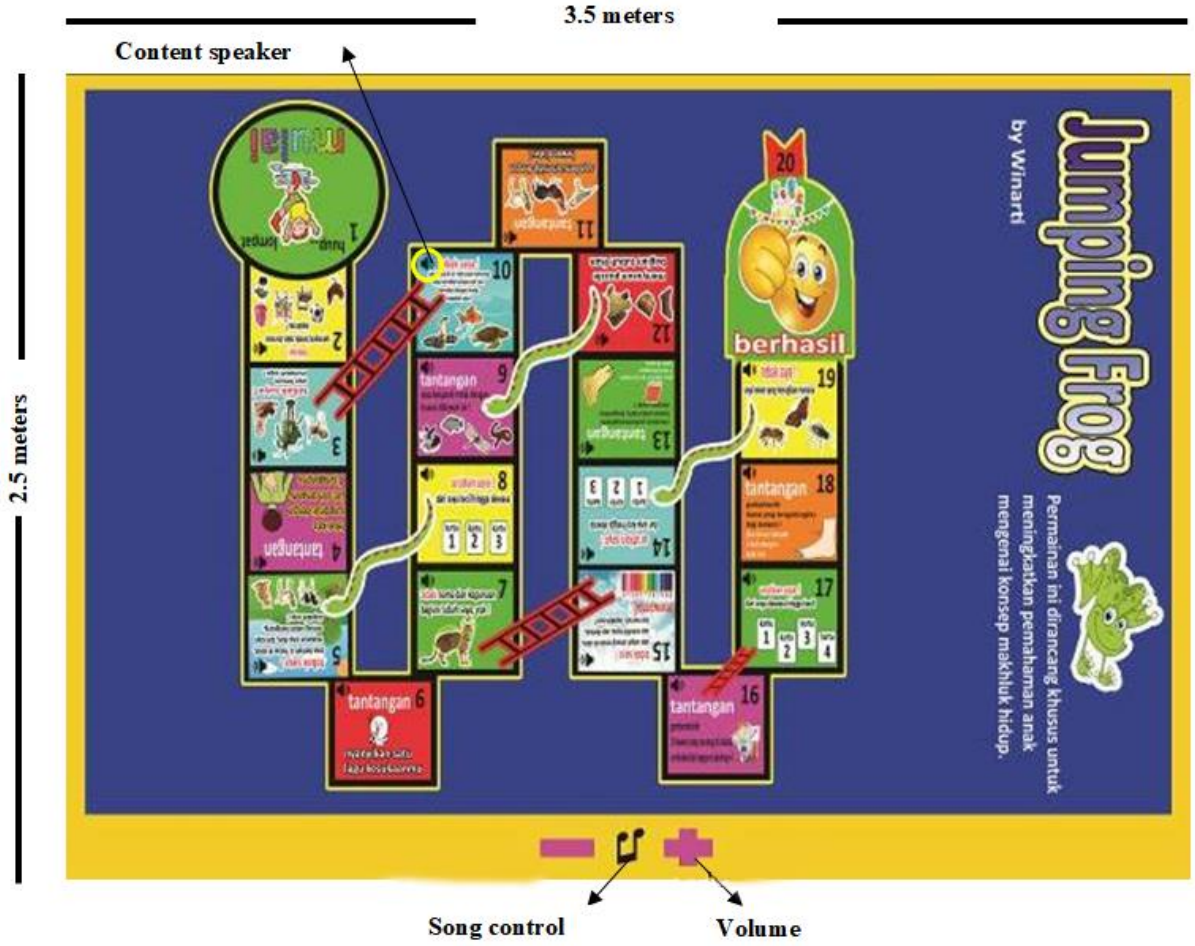

Image 5 The Board of Jumping Frog Instructional Media

Other than a block containing information, there are also blocks with challenges which the players should give answers to. The answers lie on the back of the blocks. If the player answers correctly, they have the right to obtain 1 point. However, if they answer incorrectly, they will fail to obtain a point. The pawns in this game are the players. The dice are made of flannel-based material with geometrical shapes (circles, squares, and triangles) printed on the dies.

On blocks number 2, 3, 5, 7, 10, 15, and 19 there are answer keys that can be opened and closed using adhesive tapes.

Image 6 Block number 5 of *Jumping Frog* Instructional Media

On blocks number 8, 12, 13, 14, 15, 16, 17, and 18 there are cards, puzzles, and activity sheets in the form of coloring papers which are located in the Jumping Frog pattern and can be opened and closed using adhesive tapes.

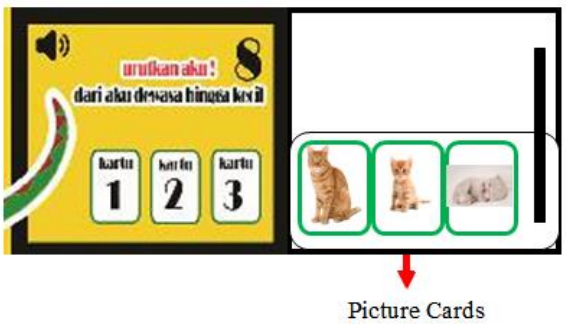

Image 7 Block no. 8 in the Jumping Frog Instructional Media

The pawns in this game are the playing children.

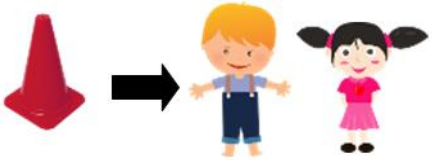

Image 8 Pawns in the Jumping Frog Instructional Media

The dice in this game is made of flannel. The dyes are geometric-shaped: circles; squares; and triangles. It is 30x30cm in size.

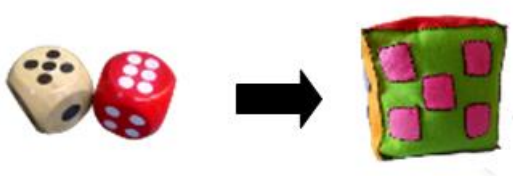

Image 9 Dice in the Jumping Frog Instructional Media

(2) Requirements

There are several requirements to be considered in this game, they are:

a. The Jumping Frog is carried out in the material that covers the concept of living things;
b. The game is played in groups, with every group consists of four to five children;
c. The player is not allowed to seek answers in the student handbook or such;
d. Teacher only acts as a facilitator, so that children are free to explore their knowledge.

(3) Game Rules

There are several things to be understood first by the teachers before the game is applied as an instructional media for the students. They are:

a. Each player is given one chance to throw the dice to determine the playing order. The player who gets the highest number of dyes among others will be the first to play.
b. In this game, there are three different parts that the players have to go through. They are:

    1) The players act as the pawn, thus they are required to always hop like a frog from one block to another;
    2) When players stop in an information block, they are required to loudly recite the information within. However, if they have difficulties in doing so, they are allowed to push the speaker button within the block in order to produce audio information. Then, if the players are in the challenge block, they are required to perform or answer to the challenges. If they succeed, they get one point. Otherwise, they get no points. Next, the players in a block of pocket activity will have to do the activities as ordered in the block. The result will be submitted to teachers for assessment.
    3) When players stop in a block with a picture of snakes, they have to go down according to the picture. The players who have stepped in a block will also have to follow the description in that block. If the challenge requires the group to sing a song, they have to sing a song.

The criteria for winners in the Jumping Frog will be handed to the group with the most correct answers and gets to the finish line first in a certain period of time. If there hasn't been any group that reaches the finish line within the time limit, the decision for winner lies on the final position of the players in the block. Players who step on the biggest block number will be declared as the winner. The score for the challenge category is 1 point for correct answers and 0 point for incorrect answers. The score for pocket activities category will be based on a performance assessment.

Conclusion

Based on the problems, researches, and discussions, it can be concluded that the educative instructional media of snake and ladders 'Jumping Frog' can be applied as an alternative media for early childhood in enhancing the comprehension of concept of living things. The media can be implemented in the 2013 curriculum themed "Objects, Animals, and Plants around me" with 2 subthemes of "Animals around me". Other than contents about the concept of living things, this media also has game rules and is tailored for early childhood so that it motivates children in comprehending the learning.

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