Developing educative snake and ladder learning media to improve understanding on living creature concept

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Abstract

The objective of this research was 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 indicated 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 52,44, which means insufficient.

Keywords: snake and ladder game; jumping frog; living creatures; early childhood

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. Science experiences can take advantage of children's curiosity and facilitate the development of their reasoning skills (Barbara et al., 2016). Therefore, the development of science learning in children has an important role in laying the foundation of understanding, competence, and construction of human resources. Thus, science learning should be given as early as possible.

Vlach and Noll (2016) explained that adults in children's environment, such as parents, teachers, and caregivers, played an instrumental role in guiding children's learning and thinking. To prepare the next expected generation, children need intervention from adults or teachers who are considered mature enough to develop and provide a fun learning experience.

Coaching by adults or teachers should also be appropriated to the content of the science. Sackes (2014) described that there were three common content areas in science

developed for early years, i.e. physical science, earth and space science, and life science. Those three contents can be the basic in constructing children's understanding.

According to Trend in International Mathematics and Science Study (TIMSS) (2015) data on elementary students in science, Indonesia ranked 45th out of 48 countries. Based on cognitive content aspect in the field of science, Indonesian students were also diagnosed weak in all aspects of the content.

The survey proved that science learning was still experiencing difficulties. It is necessary to provide ideal science learning and teach it as early as possible using suitable media. Therefore, this research aimed at developing media to improve the understanding on concept of living creature on early childhood.

Materials and Methods

This research & development (R & D) study followed that of Borg & Gall model which divided development process into 10 stages, i.e. (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 were teachers and students of grade 1 of elementary school in Bekasi city. The instrument of data collection was a board game snake and ladders 'Jumping Frog' in the form of validation sheet, observation sheet, and questionnaire.

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. We observed that SDN Arenjaya XVIII used origami paper media and white board

(Fig. 1), SDN Arenjaya XIV used white board (Fig. 2), and SDN Arenjaya II used storybook (Fig. 3).

Figure 1. Origami Paper Media and *White* Board in SDN Arenjaya XVIII

Figure 2. *White Board* in SDN Arenjaya XIV

Figure 3. Story Book Media in SDN Arenjaya II

We 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 did not use the media learning maximally and 67% of teachers felt the learning

media provided in school was not suitable to support the learning process; (2) needs: 25% of teachers used 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 found it difficult to deliver learning materials because the characteristics of most children are active and 75% of teachers admitted that the level of children's understanding of the materials presented was still low; (4) expectations: 92% of teachers supported the production of the educative instructional media of snake and ladders 'Jumping Frog'.

Observations were also conducted by 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. Based on the conversion table of academic values, the level of children's understanding on the concept of living things was in the category of "less".

We then analysed the data and found:

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.

Based on the analysis, we developed educative snake and ladder learning media called 'Jumping Frog'. Educative snake and ladder learning media 'jumping frog' was a board game innovation that we usually knew as snake and ladder game where the main components were blocks of images, pawns, and dice. According to Nurjatmika (2012), the design of the landing board did not have any standard, thus everyone could make their own snake and ladder board. There were 20 blocks in this media based on the consideration of mathematical recognition for numbers according to the standards of Basic Competencies and Learning Objectives of Mathematics. According to Kellough (1996) that teachers in initial class can introduce numbers from 1 to 10 and 11 to 20. Each block presented the concept of living things in the form of challenge, answer key, and pocket of activity.

Other than information on concepts of living things, the instructional media of Jumping Frog was also tailored for the development of 6-8 years old child, whereas according to Yuliani (2009) 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 was played by jumping from one block to another, as well as figuring out pockets of activity to

train children's motoric soft skill. She also explained that the cognitive ability of 6-8 years old children included recognizing the value of places, differentiating closely similar words, being able to comprehend the concept of geometry, and playing puzzles. Related to language and social skill, 6-8 years old children were able to master more or less 14.000 words, told many things, understood that words have meaning and function, made up a story based on a self-drawn picture, recited loudly, and answered to questions. These abilities became the basis for developers to design the game rules.

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 (Fig. 4). 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.
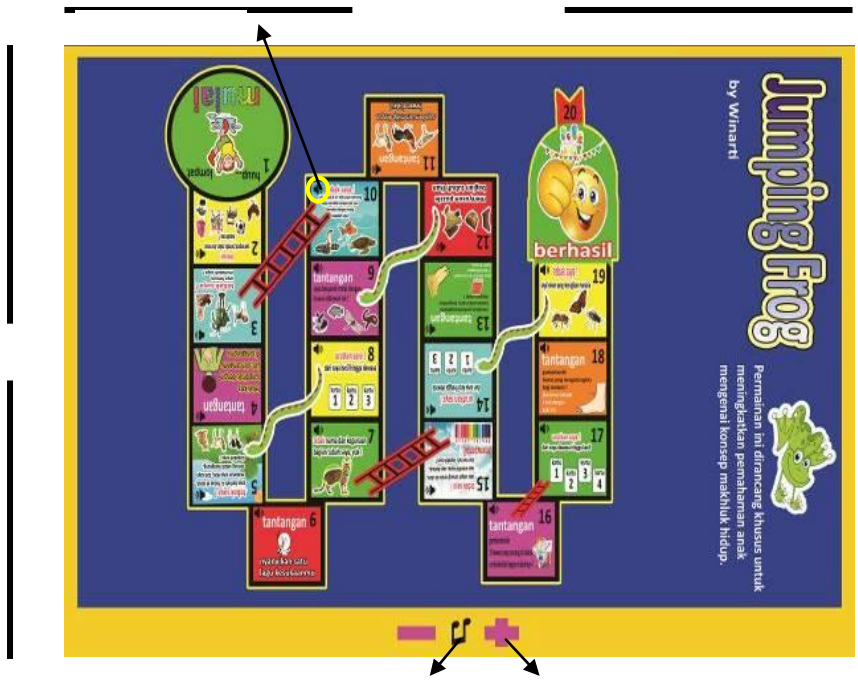

Figure 4. The Board of Jumping Frog Instructional Media

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

Adhesive Tape

Figure 5. 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 (Fig. 6).
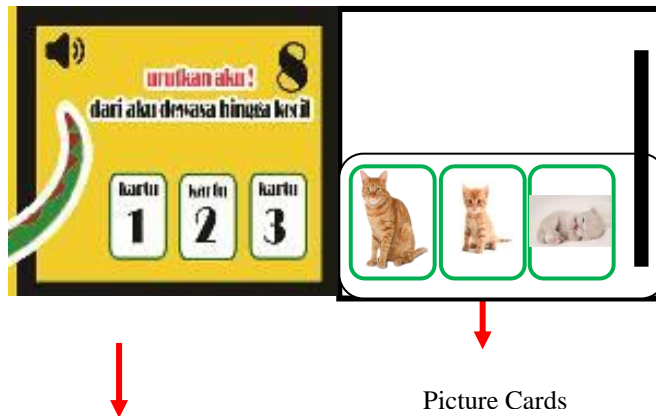

Picture Cards

Figure 6. Block no. 8 in the Jumping Frog Instructional Media

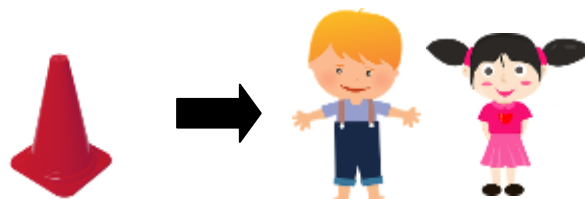The pawns in this game are the playing children (Fig. 7).

Figure 7. 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 (Fig. 8).
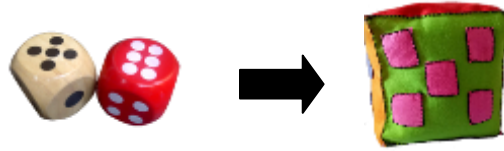

Figure 8. Dice in the Jumping Frog Instructional Media

(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.

Acknowledgments

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