

Developing the Educational Game Tool to Improve Reading Ability of Early Childhood

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Abstract

This research aims to developing the educational game tool (word tree) to improve reading ability of early childhood. This is research used Borg & Gall model and has been modified with six steps, they are potential and problem, data collection, product design, design validation, resign revision, and usage trial. The subject is 5-6 years old children in RA Babul Ilmi Rantauparapat. The instrument used is validation questionnaire sheet. Data analysis technique is formulation of mean score percentage and gain score. The research result showed that: (1) the development of educational game too (word tree) is very worthy to be used to improve reading children of 5-6 years old children; and (2) educational game tool (word tree) developed has high level of effectiveness in improving reading ability of 5-6 years old children. This research suggest to the readers, teachers and other researchers to be creative and innovative in designing learning activity, which one of them is developing the product giving real contribution for their students' ability. This research developed educational game tool in form of word tree that did not only improve children's reading ability but also create happiness to learn.

Keywords: Educational game; language development aspect; media; reading ability

Introduction

Learning language for Early Childhood is focused on communication ability, both oral and writing (symbolic). To understand symbolic language, children need to learn reading and writing.

Therefore, language learning is often differentiated into two, they are learning language to communicate and learning literacy, such as reading and writing. According to Susanto (2017) reading learning ability needs time, patience and readiness. Children who like pictures or letters in their beginning development will have desire to read, to open new door, to accept information and to have fun. According to Sari, et al (2017) reading is a necessity for children to carry out study. Reading also makes the child's knowledge grows. Therefore, reading ability is very important for early childhood, so they get information and knowledge easily from various source or media that have words in it.

However, in RA Babul Ilmi many children that had reading ability had not developed yet. The problem happened because learning activity conducted by teacher was less interesting, it seems when learning of development of children's reading ability was conducted by using reading book and singing activity to know letter and children had not been able to differentiate some letter forms. Researcher found some cases which there were no educational game tool to improve reading ability. RA Babul Ilmi had had some educational game tool, such as hand puppet, number box, forms of space and some educational game tools. However no educational game tool that could improve children's reading ability based on development level of early childhood. Before researcher wanted to observe to RA Babul Ilmi, one of teachers wanted researcher made educational game tool that developed children's reading ability. Therefore, researcher developed educational game tool, like word tree to improve reading ability of 5-6 years old children.

Children are given manipulative material in their school, for example movement of the game in the process of teaching and training. Children collaborate to play these games to gain better literary, cognitive, math, motor and communication skills. Learning activity in the kindergarten or on early childhood is conducted while playing because they find it easier to understand the material and learning is more fun. So fun learning for children is by using play tools or by playing activities. (Kokkalia et al., 2017; Putri et al., 2018; 2018; Setyaningrum et al., 2018; Yuliarti, 2018). Many research was suggests developing media or educational game that are in accordance with characteristics of students and subject matter, especially about language education (Maisarah et al., 2021).

According to Kickmeier-Rust et al (2011) one of the crucial factors that make educational games successful is their ability to maintain student motivation and interest, by adapting learning and getting experiences in playing based on the needs, preferences, goals and abilities of each student. Game have a positive impact for users because they provide the opportunity to modify many things, can attract the user's curiosity, and provide simple knowledge through a pleasant experince (Noemí & Máximo, 2014; Wijayanto & Siradj, 2016). However, Noemi and Maximo use a serious games, while Wijayanto and Siradj apply educational games such as the games developed in this study. This can enrich the students' way in understanding the nature of learning through playing, and expanding children's literacy.

Some previous research results dicussed about the use of educative game in the field, and no specific research develops educational game tool to improve reading ability of early childhood. Meanwhile, early childhood education is applied to equip children to have formal educational institutions that require various abilities. One of them is reading ability. Therefore, the research that aims to develop educational game tool is conducted to improve reading abilityof early childhood.

Literature review

Educational game tool

Educational game tool is games deliberately designed specifically for the benefit of education. Children have fun learning activities and gain simple knowledge if they use educational games. The research results from Astini et al (2017) prove that educational game tools are game tools for early childhood that can optimize children's development, which are adapted to their use based on the child's age and level of development. Some of these definitions indicate that an educational game tool is a game tool specifically designed to be used in the learning process and its benefits are felt by educators and students. The benefit of educational game tool for early childhood, according to Syamsuardi (2012) is to train motor ability, to train concentration, to develop the concept of cause and effect, to train language and knowledge as well as to introduce color and form. Thus, educational game tools does not only create a sense of joy to learn, but also develop children's language and insight so that they can solve any of the problems encountered regarding reading ability in early childhood.

The design and development of educational game tools must be adapted to the characteristics of the subjects who will use them, so certain features are found on the educational game tool. According to Mursid (2018) there are several characteristics that must be had in educational games tool for early childhood, they are (1) Game tool is referred to early childhood; (2) functioned to develop various aspects of development; (3) used with various ways, forms, and for various purposes of developmental aspects or multipurpose useful; (4) safe or harmless for children; (5) designed to encourage children's activity and creativity; (6) constructive or there is something produced; and (7) having educational value. According to Hasanah (2019) educational game tool has some features, they are (1) able to be used various ways; (2) referred especially for pre-school children and serves to develop various aspects of children's intelligence and motoric development; (3) in terms of security is very concerned both in terms of form and use of cat; and (4) involving children actively. These characteristics are used as a benchmark for designing educational game tools in the form of word trees to improve reading skills in early childhood.

Reading ability of early childhood

Basuki (2015) explains that children's reading ability is begun from concrete writing that is often found on children. This ability develops into a wider reading world for children. From the definition, reading ability is potential children to find information from the writing. The writing is from word or sentence around the children, and or is given directly by educator to be introduced to the children. Reading is an activity or cognitive process that efforts to find various information in the writing (Hadini, 2017; Meliyawati, 2016).

According to Dalman (2013) there are some indicators of reading ability, they are phonemic understanding, knowledge of letters, and understanding of printed letters. However, according to Regulation of the Minister of Education and Culture No. 146 of 2014 concerning the Curriculum 2013 for Early Childhood Education, there are indicators of achievement of language development by paying attention at the reading ability of early childhood from birth to 6 years old, on basic competencies: showing receptive language skills (listening and reading), and recognizing early literacy through playing.

Research method

This research was conducted in RA Babul Ilmi in Kampung Baru Street Number. 24 Rantauprapat. The method of this research is research and development method. Research and

development method is a research method that produces products and tests the effectiveness of product use through research trials. Thus, in this research a product was developed, namely an educational game tool in the form of a word tree, then tested the feasibility and effectiveness of the product. The research design is Borg & Gall model with six steps, they are: potential and problem, data collection, product design, design validation, resign revision, and usage trial. Research activity will be explained in detail on part of research result.

The participants of this study is expert validator and early childhood (5-6 years old). Expert validator in this study that consisted of media design and language material of early childhood. The research instrument used was questionnaire sheet, and observation sheet. Object of this research is product developed of educational game tool in form of word tree, and reading ability. Form and way of development of educational game tool of word tree would be explained on research part, while reading ability of 5-6 years old children would be measured based on the indicator presented on the table 1. Indicator of reading ability on the table 1 was measured using research instrument.

Table 1. Indicator of readng ability

Level of Developmental Attainment	Indicators
Demonstrate receptive language skills	<ol style="list-style-type: none"> 1. Reading word in the word tree 2. Choosing word based on teacher's orders 3. Matching the letters to word 4. Pointing the word based on the orders
Know early literacy through playing	<ol style="list-style-type: none"> 1. Mentioning letters A-Z 2. Mentioning letters on the word 3. Mentioning letters based on words 4. knowing letter

Data analysis technique used was product variability test using mean score percentage, and product effectiveness test using gain score and n-gain. If mean percentage of all expert validator got 62,50% or more, the product developed educational game tool of tree word was considered valid or worthy to be used for reading bility of 5-6 years old children. Gain score was used to see the number of increase in the mean score, while N-gain was used to see the increase category. If N-gain got more score or equal to 0,67 or had high criteria.

Results

The development procedure of educational game tool in the form of word tree followes steps as follows:

Potential and problem

In the beginning step, research was conducted by interviewing and observing the development of 5-6 years old children to indentify problem in RA Babul Ilmi in Kampung Baru Street Number 24 Rantauprapat. This aimed to determine the product that would be developed and contribution toward children development. From the result of preliminary interview and observation, children's reading ability had not developed yet, leaning activity was not interesting and educational game tool had not supported children's reading ability yet because educational game tool is available at school such as hand puppet, number box, and beam. For example, educational game tool supporting children's reading ability is word tree. Thus potential and

problem in this research were that reading ability of 5-6 years old children had not developed yet, and educational game tool formed word tree.

Data collection

From potential and problem above, product developed in this research was educational game tool forming word tree to improve reading ability of 5-6 years old children. In data collection step, the finding and the reference material collection and supporting data for research product. The reference material was as literature on literature review research report. In the data collection was also arranged research instrument such as validation questionnaire sheet and observation sheet for product effectiveness.

Product design

Next step is designing the product by making educational game tool in form of word tree based on improving reading ability of 5-6 years old children. Here are steps in making educational game tool in form of word tree, they are: (1) Providing tool and material needed such as dry tree having whole twigs, soil, pot, color paper, laminated plastic, stationery, dye paint, perforator, scissor, etc; (2) Cleaning the tip of twig; (3) Painting the tree and the twig, so they looked interesting; (4) planting the dry tree into pot that had been filled soil; (5) the soil was covered by flannel, so it looked interesting and tidy; (6) making alphabet letters and names of animal on the designed paper; (7) The paper was laminated so it could not break easily and last longer; (8) making hole using perforator; (9) to tie the yarn up on the hole on each letter and words; and (10) last part, product development is hanging the paper that has been tied up on each twig of the tree. After conducting 10 steps, educational game tool of word tree will be the beginning product.

Design validation

Design Validation was conducted by meeting expert validation, giving questionnaire and telling the way of using educational game tool in form of word tree. The goal of design validation was to get the development critic and suggestion, as well as getting assessment about product eligibility.

Table 2. Assessment data of expert validator

No	Expert Validator	Validation Score	Maximum Score	Percentage
1	Media Design 1	26	28	92,85 %
2	Media Design 2	25	28	89,28 %
3	Media Design 3	25	28	89,28 %
4	Language Material of Early Childhood 1	18	20	90,00 %
5	Language Material of Early Childhood 2	18	20	90,00 %
Total		112	124	100 %
Mean Percentage		90,32 %		
Explanation		Very valid/ Very worthy		

Table 2 shows that score form validator about product eligibility developed of educational game tool of word tree, mean percentage from validator is 90,32% and categorized very valid and very worthy to be used for reading ability of 5-6 years old children. On validation, expert validator gave some suggestion and critics to be design revision.

Resign revision

Resign Revision of educational game tool of word tree was conducted after validator filled assessment questionnaire sheet and gave some development suggestion to get the product that was not only valid but also effective to increase children's reading ability. Suggestion from some expert validators was summarized into some notes as follows: to be more interesting product, each letter and word were made colourful, letter was made in various geometry form based on children's development level, vowels were made in five copies, consonants were made in three copies, the tree was painted so the children were interested, and yarn on the tree to hang the letters were also colourful.

Usage trial

After product was revised based on validator's suggestion and had been stated as product that was minimally viable to be used, so next step is to test the product to 5-6 years old children in RA Babul Ilmi Rantauprapat to know the effectiveness in improving reading ability. This trial was conducted two steps, and each step of trial, children's reading ability was observed that the result presented on the table 3.

Table 3. Trial data of product usage

Level of Children's Reading Ability	Percentage (%)	
	Trial I	Trial II
Develop very well	15,79 %	73,68 %
Develop as expected	26,32 %	26,32 %
Begin to develop	57,89 %	0 %
Not develop	0 %	0 %

Table 3 shows trial result of product usage is conducted twice in the class and in the same subject, but in different time. On first trial result, 3 of 19 children (15,79%) get reading ability level of developing very well, 5 of 19 children (26,32%) get reading ability level of developing as expected, 11 of 19 children (57,89%) get reading ability level of beginning to develop, and no children have reading ability in not developing. Next, second trial is found that 14 of 19 children (73,68%) get reading ability level in developing very well, 5 of 19 children (26,32%) get reading ability level in developing as expected, and no children have reading ability level in beginning to develop or not develop. From trial result of first and second product usage, there is an increase in reading ability. On the first trial, children who have reading ability of beginning to develop are 57,89% or can be considered this level dominates reading ability. After the product is used twice, there is the increase in reading ability, so there is no children who have level of beginning to develop or not develop, and the highest ability level is developing very well that dominate the class with 73,68%. This implies that product usage of educational game tool of word tree can increase children's reading ability. However this conclusion is more accurate if it uses the right test to increase mean score which is gain score test. The result test of gain score is presented on the table 4.

Table 4. Result of product effectiveness test

Explanation	Total Score	Mean	Criteria
Trial I	341	17,95	Begin to develop
Trial II	519	27,3	Develop very Well
Gain Score	178	9,35	-

N-Gain	0,67	0,67	High
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Table 4 shows that mean of trial result of first and second product usage, as well as trial result of gain score of both mean. Mean of first trial is 17,95 lower than second trial 27,3. From criteria of reading ability level, mean has difference, which is on the first trial, mean of beginning to develop is lower twice than second trial that gets mean in developing very well, this is supported by gain score test that get 9,35, it means there is increase from first trial to second trial. Then result of N-gain test in score total and mean is 0,67 or has high criteria. Result of N-gain test proves that educational game tool of word tree as product developed in this research has effective criteria to increase reading ability of 5-6 years old children in RA Babul Ilmi. From trial level of product usage, there is no obstacle of improvement note, so product revision is eliminated. In this research, there is no mass production, so research step stops in trial result of product usage that summarize that educational game tool of word tree is effective to increase reading ability of 5-6 years old children.

Discussion

This research resulted a product that was developed that is Educational Game Tool in form of word tree, it has goal to improve reading ability of 5-6 years old children. From research result, educational game tool in word tree is very worth to be used to train reading ability of children. It was based on mean from expert validator 90,32% or categorized very valid with some improvement notes. Improvement notes given by validator generally related to product attractiveness considered could influence product effectiveness. Therefore, product design was revised first as figure 1, then the newest product was tested to 5-6 years old children in RA Babul Ilmi.

Usage trial of product was conducted twice on 5-6 years old children in RA Babul Ilmi. Trial result was analyzed using formula of gain score, so it got conclusion that children's reading ability on second trial got the increase 9,35. From criteria of reading ability level, it could be described that there was increase, most of children's reading ability on first trial categorized begin developing was lower two levels than second trial categorized develop very well. From result of N-gain test got score 0,67 or high criteria that proved that educational game tool of word tree was effective to increase reading ability of 5-6 years old children in RA Babul Ilmi. From the trial or product effectivity could be concluded that reading ability of 5-6 years old children could be increased using educational game tool supporting development goal.

Educational game tool really support the process and learning result on early childhood because children's characteristics that like playing and still think concrete or real, so media or tool are needed to give abstract concept in real and fun form. According to Yuliarti (2018) learning activity is as learning way based on age development and student ability, such as gradually developed while playing and learning (playing more) to be learning while playing (learning more). Children are given manipulative material in their school, for example movement of the game in the process of teaching and training. Children collaborate to play these games to gain better literary, cognitive, math, motor and communication skills. Learning activity in the kindergarten or on early childhood is conducted while playing because they find it easier to understand the material and learning is more fun. So fun learning for children is by using play tools or by playing activities (Kokkalia et al., 2017; Putri et al., 2018; 2018; Setyaningrum et al., 2018; Yuliarti, 2018). Finding imply of Lai et al. (2018) research that non-digital games can stimulate the cognitive development

of preschool age children. Thus, playing activity or game tool can support learning activity on early childhood by aiming to train various development aspects at once.

Developing the educational game tool also succeeded to affected all aspects of language. This can be seen from using the product, especially starting from the sixth step. In the first to fifth steps, the product is made by the teacher. In the sixth step, children looks word on the blackboard, sounds of word, then writes that word on paper. This activity trains early childhood reading ability, writing ability, and to understand the meaning of words. In the seventh to the last step, children will follow the teacher's instructions to make a hole in paper, tie a rope to hole, and hang paper on the word tree provided. This activity trains listen ability and understand the words conveyed by teacher. Children do all these activities with feelings of pleasure, enthusiasm, and there are even children who can't wait for their turn to read, write, and hang the word paper on the word tree. From the description of the use of educational game tools in the form of a word tree, it can be seen that researchers pay attention to the critical points of children and support teachers to optimize them. Early childhood has several critical points that educators or parents must know, namely: (1) needing a sense of security, rest, and good food; (2) come into a world programmed to imitate; (3) requires practice and routine; (4) have a need to ask questions and get answers; (5) children's way of thinking is different from that of adults; (6) requires hands-on experience; (7) trial and error is the main thing in learning; and (8) playing is the world (Maisarah, 2019). Thus, play activities or the existence of game tools can support learning activities in early childhood with the aim of training various aspects of development simultaneously.

The opinion above is also supported from relevant research result in various countries, like research result from Schuurs (2012) shows that there is the increase of vocabulary and positive interaction significantly between game and children's vocabulary in the experiment class. Wijayanto & Siradj (2017) states among all kinds of games, there is specific category called by educational game which is game having the aim to be entertainment and learning. Educational game can be applied with student's characteristics especially students in kindergarten that like playing and learning, as well as high imagination. Research form Akhadiyah & Mulyani (2017) proves that utilization of educational game has been developed in this research very effective to improve reading readiness on early childhood. That game has some superiority for learning environment. One of them is integrating entertainment in learning process and creating interesting learning atmosphere without forcing student to break the material abstractly. (Barzilai & Blau, 2014; Prahmana et al., 2012; Shabalina et al., 2015)

Learning activity or educational game use does not only become suggestion to educator in the school but also recommended to all parents or adult who often interact to the children. This is because according to Jung (2017), early childhood educator and other family practitioner can support parent to participate in house activity with their children such as playing, reading and conducting educationa activity. This is because the activity supports the important language interaction for children's literacy development. However educational game must be designed as good as possible, so it stays on target. According to Huang et al. (2019) in his research that suggest to educators to design educational game with various activity to create interesting playing experience. According Kartika et al. (2019) tells that reading ability can be only developed through reading ability continually, having culture or hobby for reading. Thus, the use of educational game tool is hoped to be often used, so it gives better function, especially reading skill of early childhood. So, playing activity or educational game use was not only as suggestion for all educators in the schools but also it was recommended to all parents or adults who often interact to the children

Conclusion

Based on result of expert validation and children's development on step I and II, there are some conclusions: (1) From the research "The development of Educational Game Tool of Word Tree" was categorized very worth to be used to improve reading ability of early childhood. It is from score result of media expert 91,065% and material expert 90%, it could be concluded that the media design expert validation step and material expert on educational game tool product of word tree developed from aspect of product eligibility was categorized "very worthy". (2) From the research "The development of Educational Game Tool of Word Tree" was conducted II steps, step I the increase of reading ability of 5-6 years old children got mean 17,3 from 19 children, 11 children began to develop (57,9%), 6 children developed based on hope (31,6%) and 2 children developed very good (10,5%). This condition showed that children's reading ability had not developed yet. On step II the increase of reading ability of 5-6 years old children got mean 27,3 from 19 children, 5 children developed based on hope (26,3%) and 14 children developed very good (73,7%). This condition showed that children's reading ability had been effective to increase with mean of gain score 82 with very high clarification. Based on the research and development, educational game tool of word tree to improve children's reading ability is still imperfect. Therefore, some suggestions of further product utilization and development needed are: (1) it is better for the teachers to develop the media that can attract the children, so learning result and children's understanding can improve. (2) it is better to conduct further research that the development is equal to the different and better material to improve the insight into the world of Indonesian education.

Declaration of conflicting interest

The authors declare that there is no potential conflict of interest in this study.

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