



Development of Mathematics Educational Games Through PowerPoint for Early Childhood

Lisa Rosalina

Muthiah Islamic School Kindergarten, Kayuagung
lisarosalina03@gmail.com

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Abstract

Learning media is very influential on children's learning motivation to actively participate in learning, especially in mathematics learning. This research has entitled the development of mathematics educational games in the form of power points for children aged 5-6 years to produce learning media that attract children's interest in mathematics learning at Muthiah Islamic School Kindergarten, Kayuagung. This development uses a combination of the Alessi & Trollip model and formative evaluation from Tessmer. Data collection techniques use expert reviews, interviews, and observations. The results showed that the one-to-one evaluation stage obtained an average of 86% of children's observation results on eight themes with very good categories, so the product was declared practical and easy to use for children. Meanwhile, in the small group evaluation stage, the average results of children's observations on eight themes were obtained by 92% with excellent categories. From all the stages that have been carried out, it can be concluded that mathematical educational games in the form of power points are declared valid and practical for children. Therefore, game media uses powerpoints as an alternative learning media that can attract children's interest so that children can actively participate and can be motivated in mathematics learning.

Keyword: Mathematics, Educational Games, PowerPoint, Early Childhood

Introduction

Early childhood is the most fundamental early period since, at this age, it becomes the most strategic starting point for engraving the quality of the child in the future. The period that characterizes an early age is the golden age. At an early age, all the potential of the child develops very quickly (Suyadi & Selvi, 2019). Early childhood cannot be separated from play activities because children know the world through the activities of playing. So children and play are an inseparable whole; therefore, one of the principles of early childhood education is learning while playing. This requires a teacher as a facilitator and motivator of learning to be creative in teaching and learning activities in children so that learning becomes fun and interesting, because basically, the teacher is one of the components in education, making a big contribution to improving the quality of education (K. M. Sari & Setiawan, 2020).

Related to the characteristics of children who learn through play activities, teachers can take advantage of computer-based learning media with the development of computer technology in Indonesia (Kara & Cagiltay, 2020). Computer-based learning media has many advantages,, including providing interesting and dynamic visual effects, animations, and sounds. With attractive visuals, the child will be more happy and interested in learning the learning presented. One of the services that children with computer devices usually favor is games (Suhendro,

2020). In this case, games are not only used to entertain but are also used as a medium that provides learning, which can be called educational games or games that contain education. Educational games are designed or created to stimulate thinking power,, including improving concentration and solving problems (Ezkanandyta et al., 2019).

Educational games developed as appropriate and interesting learning media for early childhood are not only adapted to the characteristics of the child but must also be adapted to the characteristics of the material being taught so that they become learning media that can help develop aspects of child development (Dewi et al., 2019). One aspect of child development is cognitive (Suyadi & Selvi, 2022). Cognitive is a very important aspect to develop from an early age the brain's nerve cells become more mature (Anggraini & Darma Putri, 2019). One of the cognitive developments that needs to be developed and trained from an early age is children's mathematical abilities (Selvi & Saraswati, 2021). Children are not very interested in mathematics, because for children mathematics is learning full of difficult and scary numbers, even though the mathematics given to children is still in a simple stage (Ibda, 2015). Therefore, educational and interesting games are made in learning mathematics so that it adds interest in learning and makes it easier to learn mathematics.

Based on observations and interviews conducted at Muthiah Islamic School in Kayuagung for approximately 2 weeks, it was obtained from the results of an interview from one of the class B teachers, namely Desy Aryani, S.Pd, that in this kindergarten some children were less motivated during mathematics learning activities, such as children not paying attention to their teachers when explaining the material, children were busy playing and telling stories with their friends. In addition, from the results of observations that the media used by teachers so far are only visual media and children's activity books, so the learning atmosphere is less arousing for children to actively participate in the learning process. Learning media greatly affects children's learning motivation to actively participate in learning (Setiawan, 2018).

Therefore, it is necessary to use media that can attract children's interest so that children can actively participate and can be motivated in mathematics learning, such as by utilizing one of the software on computer technology, namely Microsoft powerpoint, because this is in accordance with the results of research proposed by Hasjihandito, Wulan and Wantoro in the 2016 Journal of Educational Research entitled Effectiveness of PowerPoint-Based Learning Media on Religious Themes in Kindergarten Assalamah Ungaran Semarang Regency. The conclusion from the results of the study that powerpoint-based learning media is valid for use in learning activities of Assalamah Ungaran Kindergarten. It is obtained from the results of media expert validators and material experts. Therefore, the use of powerpoint-based learning media can be used in learning activities (Hasjiandito & Adiarti, 2016).

Based on the results of preliminary studies using interviews with the principal, namely Hj. Sri Suharti, S.Pd., M.Pd and teachers at Muthiah Islamic School Kindergarten in Kayuagung, that the kindergarten needs supporting media in mathematics learning in order to make mathematics learning interesting and fun so that children are motivated in learning mathematics. So most of the teachers in the kindergarten are interested in using computer-based

learning media, such as the product that researchers will develop, namely mathematics educational games in the form of power points for children aged 5-6 years.

This development research aims to produce a mathematical educational game product in the form of a power point for children aged 5-6 years. In this study, there are eight themes that are in accordance with the 2013 curriculum, namely as follows. (1) Family; (2) Myself; (3) Environment; (4) Animals; (5) Plants; (6) Vehicles; (7) The Universe; (8) My Country.

Literature Review

Education Game

The word game comes from the English language which means game. A game is something that can be played with certain rules that can be played in a group way as well as alone (Singh et al., 2021). A game is a form of artwork in which a participant, called a player, makes the decision to manage the resources he has through objects in the game in order to achieve the goal (N. M. Sari & Yetti, 2020). While educational games are a very fun activity and can be done in an educational way or tool that is educational, so that educational games are useful for strengthening and developing personality, bringing the relationship between caregivers and students closer, and channeling children's activities (Kafai & Burke, 2015). Educational games are games that are designed to learn, but can still offer play and fun. Educational games are a combination of educational content, learning principles, and computer games (Utami, 2017).

From the explanation above, it can be concluded that educational games are a form of play designed for learning that is fun and can help children's development and stimulate children's thinking power including increasing concentration and solving problems that can be used in the teaching and learning process. This educational game is commonly used to invite users to learn while playing. Through this learning process, users can gain knowledge, so that educational games can be used in the world of education (Okdiantari & Komalasari, 2019). Apart from the fact that this type of game combines the sides of learning and playing, this type of game can also be used to attract children's attention to learning.

In a game there are several elements that make up the game. There are three elements in the game, namely: (1) Characters, in the game there are characters that are made to move so that players become more interested and feel more alive. (2) Movement/Animation, with good animation, the character's movements are not broken and look more alive. (3) Sound, sound elements/music are very important in a game so that the feel of the game is more pronounced (Selvi & Wulantaka, 2020).

The basic components of a game are as follows: (1) The plot, usually containing information about the things that the player will do in the game and in detail, commands about what to achieve in the game. (2) Thema, in the game there is usually a moral message that the

Character will convey. (3) User Interface, are features that communicate users with games. Interface is all the appearance in a game. A good interface is an interface that is not boring and makes it easier for game players. (4) Rules, rules are rules of command, how to run, functions of objects and characters in the game world. (5) Animation, this is always attached to the game world, specifically for the movement of the characters present in the game, the properties of the objects. (6) Objects are important and are usually used by players to solve problems, and knowledge to be able to play them. (7) Text, graphics and sound, games are usually a combination of text, graphic or sound media, although it does not have to be all in the game play (Maryani, 2019).

Early Childhood Mathematics

Mathematics is a logical way of thinking presented in numbers, spaces and forms with existing rules that cannot be separated from the human being. Mathematics is an abstract science that studies quantities, concepts, shapes, symbols or symbols, additions, arrangements or sequences, sizes and quantities divided into several fields, namely algebra, analysis and geometry (Selvi, 2019).

According to the Ministry of National Education through the Directorate of Early Childhood Education, the cognitive characteristics of mathematics for children aged 5-6 years are (1) numbering many objects one to ten, (2) knowing the concept of numbers, (3) knowing the symbol of numbers, (4) mentioning the symbol of numbers 1-10, (5) using the symbol of numbers to calculate, and (6) matching numbers with symbols of numbers, From some of these opinions it can be concluded that the mathematical characteristics of children aged 5-6 years is to recognize the symbol of numbers, to number/to mention numbers 1-10, to know various geometric shapes, to sort numbers, and to understand the concept of many more or less (Busril et al., 2020).

The content of mathematics standards for early childhood according to NCTM (National Council of Teachers of Mathematics) is as follows:

1. Numbers and their operation. Numbers are one of the mathematical abilities that children use in the concept of numbers or the understanding of numbers, which makes the relationship between their operation and the numbers characterized by summation. Teaching the concept of numbers to children is carried out through two stages. First, introduce the concept of numbers in children aged 0-3 years. Secondly, develop the concept of numbers in children aged 3-6 years. After the child recognizes the numbers, it is necessary to develop the child's understanding. The concept of numbers is developed through 3 stages, namely: (1) Counting, the initial stage of children can calculate through memorization or numbering. (2) One-on-one relationship, connecting numbers with related objects. (3) Summing, comparing, and symbol numbers.
2. Patterns and relationships. Patterns are arrangements of objects consisting of colors, shapes, numbers and events. The child begins to see the same and different attributes

in the image and objects. Children love to make patterns in their environment. Example: arrangement of patterns based on large-small sizes.

3. Algebra is one of the mathematical abilities used by children in the systematics of numbers that have patterns in a natural and structured way.
4. Geometry is a child recognizing the same geometric shapes (triangles, quadrangles, squares, circles) and their position in a space. Knowing geometric shapes in early childhood is the ability of children to know, point, mention and collect objects around based on geometric shapes.
5. Measurement is one of the mathematical abilities used by children, which involves numbers to find out the size of an object (Yosepina Handarini, 2019).

Microsoft PowerPoint

Power Point or often referred to as Microsoft Office Power Point is one of the application or software programs specifically designed to be able to display multimedia programs attractively, easily made, easy to use, and relatively cheap. This application is very popular and widely used by various groups, both professionals, academics, practitioners and beginners for presentation activities. Microsoft Power Point is a software created to handle the design of graphic presentations easily and quickly (Wirajaya et al., 2019). Power points can be used to convey material with an attractive appearance. Microsoft power point is a software created and developed by the Microsoft company, and is one of the multimedia-based programs. While the power point is a percentage tool that is used only to help the presenter convey what he will present to the audience (Budasi et al., 2020).

Based on this opinion, it can be concluded that power point is software on a specially designed computer and is one of the applications from Microsoft Office that can help presenters in greeting material attractively to the audience (Febrinatasia, 2019). Power points do have many advantages and provide many conveniences. However, in its use, it is also necessary to have policies and abilities from a teacher to use and operate all the features on the power point optimally (Pratiwi & Siswanto, 2020).

Power points are used as a learning medium for early childhood, one of which is a mathematics educational game with a power point shape. In making the game, there are several steps that need to be considered, including namely, namely:

- 1) Before we make an educational game in the form of a power point as well as we prepare an image or animation and audio that we want to put in the game
- 2) Prepare mathematics materials that you want to put into the game that are in accordance with the curriculum and mathematics abilities of Early Childhood
- 3) Open the Microsoft Power Point program on the computer
- 4) Choose the slide design that is desired and set the slide size, the researcher chooses the slide size in the game which is 16:9

- 5) On the first slide make a cover game for the intro of the game, in the intro the front cover using a pentagon shape as shown below the first one is placed on the bottom left and copy paste as in the attachment
- 6) Then block all the shapes at the bottom then right-click select the group and give a rather light wood color texture to distinguish the two, after finishing being colored we decorate the fence using grass and flowers.
- 7) Still in the intro we give motion animation on the wooden fence that is upside down with the animation fly out to the top so that it opens and looks back background in the intro then we give the intro audio with the title song "seven song number for kids"
- 8) To edit on the back background we can open or remove the top fence by clicking on the inverted bagar image then click the format menu and select the selection pane and click on the eyeball image splash box in group 56 so that it opens and looks the hidden back background in the intro. In the first background, there is a "start" menu and the title "Early Childhood Mathematics Educational Games"
- 9) In the next slide, there are learning themes that children can play. Here the researchers took 8 learning themes in educational games that were in accordance with the 2013 curricula. This slide uses a hyperlink so that when clicked the animal theme will appear on the hkusus slide of the animal theme.
- 10) Before entering the game slide the researcher makes a "Play" slide of each theme as in the game and is added with the numbers "1,2,3,4,5..." and geometric shapes as symbols of mathematical games as well as drawing buttons and images according to the theme.
- 11) To give color to numbers and words, click or block the numbers or words that you want to color such as the number 2 and hover over the home toolbar and click the font color
- 12) Then create a specific background to make the slides more attractive. Click the design toolbar section, click background styles, then there is a background format display and click picture and texture fill as in the 2.6 image display contained in the attachment
- 13) Then click the file and select an interesting image to be used as a background click insert and after selecting click close
- 14) Making the animation move on the background of the word "Play", block the word Play by pressing the Ctrl key do not release and hover and click on the letter "P, L, A, Y" so that the letters merge into the word Play so that they move together. Then click the animations toolbar and select motion animation for the word "play", the researcher chooses the teeter animation.
- 15) Add sound or music click the insert toolbar, click audio. If you want to add music or sounds that have been saved in the file, click audio from file, if you want to record sound click record audio. If you want to set the sound/music click the format and playback toolbar.
- 16) The next slide begins to design a game about mathematics that is interesting and fits the theme and character of early childhood. In this game there are 5 questions in 1 theme that contain additions, getting to know the symbol of numbers, sorting numbers, geometry, and measurements.

- 17) In the game there are rewards and symbols of right and wrong if the child chooses with the correct answer, a sign will appear right (\checkmark) and the audio "tring- tring " waw you are great" and if it is wrong, a sign (X) will appear with the sound "try again, yes"
- 18) In making this educational game, we use various animations, hyperlinks and triggers. An example in making slides the first question about summation on the theme of myself is that we insert pictures and animations according to the design that has been designed on the story board. As the researcher designed on the appendix
- 19) Then we click on the red "X" symbol on the wrong answer such as the "2 finger" answer before we go to the trigger we give animation to the image of the "x" symbol that the researcher uses, namely "fade". then click on the animation pane and klick on the timing as found in the attachment
- 20) Then it will display an image like below and click on the triggers section and click start effect on click of we select on the image that we have determined the wrong answer.
- 21) If the answer is correct in the 5 finger choice image then we click on the green \checkmark symbol image and we do the same procedure as in the "X" symbol earlier.
- 22) On the back and next keys we use hyperlinks to return to the previous slide and after it

How to use a mathematics educational game in the form of a power point for children of dina age, namely:

1. Because early childhood cannot read, researchers include voices of commands in power point educational games, so children only listen to commands and answer questions in mathematics educational games in the form of power points
2. Using this educational game can also use LCD and sound in the classroom, here the teacher only observes and motivates children in learning mathematics by using educational games in the form of power points.
3. By using an LCD the child can answer together or raise his hands in turns if the child can answer it.

Methods

The type of research used in this research is a development research method (Research Development) with modification of the Alessi & Trollip development model and evaluation of Tessmer's development. This study aims to produce products in the form of mathematical educational games in the form of power points for children aged 5-6 years. The subjects in the research on the development of mathematical educational games in the form of power points were 12 children at Kindergarten Muthiah Islamic school in Kayuagung.

As a reference for researchers in researching the development of mathematical educational games in the form of power points using the Alessi and Trollip development models. Alessi & Trolip development model, this model has three stages in development, namely planning, design and development) (Laurens et al., 2021). With evaluation using Tessmer (1993:16) the formative evaluation stage is as follows. (1) Self Evaluation. (2) Expert Review. (3) One-To-One Evaluation. 4) Small Group Evaluation (Tessmer, 1993).

Table 1. Criteria for Self Evaluation of Educational Game Learning Media

No	Assessment Aspects	Assessment Categories
1	Ease of navigation	There are flowcharts and storyboards
2	Text	Standard text has a size of 16 or 18 points
3	Display	Has images, backgrounds and animations
4	Audio or sound	The sound is clearly heard
5	Interactivity	There are games, rewards and punishments
6	Cognition content	The content of the media according to the mathematical material

Result/Findings

Planning Stage

Describe the criteria for a good educational game for children that are tailored to the themes in the curriculum. The analysis of children's needs and development was started with a field study in the form of observation activities carried out in three kindergartens, namely Muthiah Islamic School Kayuagung Kindergarten, Menara Fitrah IT Kindergarten in Indralaya and Bunga Anggrek Kindergarten in Tanjung Raja. The school targeted at this stage is Muthiah Islamic School Kayuagung Kindergarten. This observation is carried out to obtain information about the conditions of mathematics learning, the material taught, the potential of students, and the potential possessed by the school.

The data obtained from observations and interviews are described as follows: (a) In mathematics learning at Muthiah Islamic School Kayuagung Kindergarten has followed the 2013 curriculum. (b) media used in teaching about mathematics using the media of number cards, blocks and worksheets of learners. (c) the learning method is carried out conventionally with the lecture method, and the child works on the student's worksheet, it is necessary to develop a more creative and innovative learning model. (d) the educational institution is willing to use interactive learning media to read the beginning of children aged 5-6 years. The results of this observation are the basis for the development of a mathematical educational game in the form of Powerpoint for children aged 5-6 years.

Design Stage

In this stage, a planning document in the form of a Flowchart and Storyboard is carried out which will later be used as a guide for game development in terms of appearance, layout,

layout, and navigation. In the development of educational game media products for mathematics for children aged 5-6 years, the flowchart design made consists of start buttons, materials, next-back, play and games. The storyboard that will be created in an educational game for mathematics for children aged 5-6 years consists of components, namely narrative, text, scenes/actions and skets. After the flowchart and storyboard have been created, then determine a simple appearance design suitable for children aged 5-6 years.

Development Stage

Prepare instructions for the use of educational games / text presented in mathematical educational games in the form of power points. In the presentation of the text is combined with illustrative images and supporting sounds. This is done because students are not all able to read, so in the use of mathematics educational games with power point, children only listen to the voice of commands and answer questions contained in the game.

After compiling the content of the learning media, the next step is to produce a mathematical educational game in the form of a power point. The material that has been compiled will be converted into the form of an educational game using power points, then design the layout and content of each material. Each material refers to the theme, core competencies and basic competencies for the mathematical abilities of children aged 5–6 years in the Early Childhood Education curriculum. Images and illustrations are adapted to the material and theme used. The production process of this game is based on the design of the flowchart, and the storyboard that has been made before. At the development stage, an evaluation tool is also prepared which is used to assess mathematical educational games in the form of Powerpoint in the form of material validation, media and observation sheets to assess children's behavior towards the use of mathematical educational games in the form of power points.

Development Evaluation Phase

From the mathematical material produced in the form of a mathematical educational game in the form of a power point equipped with images, animations, music / audio and has been designed referred to as prototype 1. Furthermore, Prototype 1 was carried out in the self-evaluation stage. The self-evaluation stage is an assessment stage carried out by the researcher himself. After the self-evaluation is carried out, then proceed to the expert review stage consisting of content / material and design experts. In addition, a one-to-one evaluation trial was carried out on 3 children aged 5-6 years, and small group evaluation on 9 children in the age group of 5-6 years. The results of each evaluation stage are in accordance with Tessmer's formative evaluation model, which are as follows.

1. Expert Review Stage Results

This stage is carried out by two experts, namely content / material and design experts who aim to obtain material and design of mathematics educational games in the form of power points for children aged 5-6 years that are valid. The results of validation carried out by experts can be seen in the following table:

Table 2. Recapitulation of Validator Assessment Results

No	Indicators	Value Recapitulation							
		THEME 1	THEME 2	THEME 3	THEME 4	THEME 5	THEME 6	THEME 7	THEME 8
1.	Material	3,88	3,83	3,88	3,83	3,94	3,83	3,83	3,94
2.	Design	3,88	3,88	3,88	3,88	3,88	3,88	3,88	3,88
Average		3,88	3,85	3,88	3,85	3,91	3,85	3,85	3,91
X		3,87							
Category		Very Valid							

Based on table 2 data, it was found that the average expert review validation results for material and design aspects so that the average expert validation results of 3.87 categories were very valid. Thus, the eight themes of mathematical educational games in the form of power points developed have very valid criteria that have met the standards of product criteria on the material and design of the game so that they are worth testing for children based on suggestions and comments from experts.



Figure 1. One of the powerpoint game views.

2. One to One Evaluation Stage

At this stage, the respondents will be three children aged 5-6 years at random to represent the target population, namely children with low, medium, and high abilities. During the learning process using prototype 1, they were observed by researchers who aimed to see and assess firsthand the activities and behavior of children towards prorotype 1. Data on the results of children's observations can be seen in Table 3 below.

Table 3. One to One Evaluation Results

No	Name	Theme 1		Theme 2		Theme 3		Theme 4		Theme 5		Theme 6		Theme 7		Theme 8	
		S	X	S	X	S	X	S	X	S	X	S	X	S	X	S	X
1	NB	15	75	15	75	15	75	13	65	15	75	14	70	16	80	14	70
2	AA	18	90	19	95	18	90	18	90	17	85	19	95	19	95	18	90
3	RNA	18	90	18	90	20	100	20	100	19	95	19	95	18	90	19	95
Average		85		86		88		85		85		87		88		85	

Based on data from Table 4.5, the average percentage value of children's observations of the use of mathematical educational games in the form of power points in the one-to-one evaluation stage was obtained. Theme 1 (Family) by 85% (very good category), Theme 2 (Myself) by 86% (very good category), Theme 3 (Environment) by 88% (very good category), Theme 4 (Animals) by 85% (very good category), Theme 5 (Plants) by 85% (very good category), Theme 6 (Vehicles) by 87% (very good category), Theme 7 (Universe) is 88% (very good category), and Theme 8 (My Country) is 85% (very good category), so it can be concluded that the use of eight themes in mathematics educational games in the form of power points has practical criteria for children that are in accordance with the observation assessment indicators and are easy to use for children. Based on expert validation and child observation, prototype 1 is revised to prototype 2 which will then be tested at the small group evaluation stage.



Figure 2. Kids are being piloted using power point games

3. Small Group Evaluation Stage

In the small group evaluation stage, prototype 2 was tested on 9 children in groups. At the end of the small group evaluation trial, the child was observed again to be active in prototype 2 that was being developed. The average percentage value of children's observations of the use of mathematical educational games in the form of power points in the small group evaluation stage of Theme 1 (Family) was 91% (very good category), Theme 2 (Myself) was 92% (very good category), Theme 3 (Environment) was 91% (very good category), Theme 4 (Animals) was 92% (very good category), Theme 5 (Plants) was 94% (very good category), Theme 6

(Vehicles) at 92% (very good category), Theme 7 (Universe) at 94% (very good category), and Theme 8 (My Country) at 92% (very good category) (very good category), so that it can be concluded that the use of eight themes of mathematics educational games in the form of power points has practical criteria for children that are in accordance with the category of observation assessment indicators and are easy to use for children.



Figure 3. Trials on 9 children

Discussion

Furthermore, there is no varied learning in providing mathematics learning materials to attract and motivate children to mathematics learning materials, even though mathematics learning is the basis for children's development in their cognitive aspects. For this reason, a mathematics educational game media is needed that can display fun learning for children so that children are more interested and motivated in learning mathematics independently. Therefore, researchers developed a mathematical educational game consisting of material on recognizing / mentioning number symbols, introducing the concept of measurement (high-low, large-small, many-little, far-near), addition by counting objects, sorting numbers, geometric shapes packaged in a mathematics learning medium that uses interactive animations in the form of educational games that are interesting to children. After the planning stage is carried out, the researcher then carries out the design stage. The design stage consists of five stages, namely developing ideas, making initial program descriptions, creating flowcharts and story boards, collecting sources, and determining the software used.

The media of mathematics educational games for children has been widely developed by previous researchers using adobe flash software, but in this study researchers developed an educational game using software that is usually used to expose material to the audience, namely Microsoft powerpoint with various advantages, including 1) the material in this mathematics educational game uses eight themes that are in accordance with the 2013 curriculum, so that teachers can use this medium by adjusting the theme taught to children; 2) this game medium is conditionally reproducible or subtractible and can be used repeatedly; 3) make it easier for teachers to make learning indicators because in each theme and material have been explained indicators of the achievement of children's mathematical development; 4) media is easy to get and use because it is in the form of a game CD which facilitates the process of taking media; 5)

children can be cognitively aroused and motivated because this medium has audio, visual, and interactive elements.

The next stage is development. The results obtained are as follows: 1) ease of navigation or ease of use of the media seeing the existence of a simple flowchart and story board; 2) the text on the media has a letter size of 12 points and above; 3) the display on the media already has images, animations and backgrounds that match the theme; 4) the audio used is in the form of a .wav format which means high quality and original sound; 5) interactive in this game in the form of giving rewards if true and punishment if you answer the wrong questions in the game; 6) the material on the media has been in accordance with the mathematical indicators of children aged 5-6 years. After the self-evaluation stage, then to the expert review evaluation stage.

Mathematical educational games in the form of power points that have been developed are then validated by experts (expert review). Overall, the average expert review validation results for content/material and design aspects on the eight themes developed were 3.87 with very valid categories. It is said to be valid because the media meets the standards of mathematical educational game products in the form of power points, both material and design such as 1) the appearance of the product is seen from the suitability of the overall display design of the media, the background and colors on the media do not mess with the appearance of the screen and the information conveyed, the use of character letters on the product is easy to understand; 2) audio/music does not mess with the product according to the character of the product, learning materials and learning themes; 3) animations and images used in accordance with the characteristics of the child and the theme of learning; 4) the productivity of the work of the product developed is able to foster comfort in learning and is able to increase children's learning motivation.

The average percentage value of children's observations of the use of mathematical educational games in the form of powerpoints at the one-to-one evaluation stage on eight themes is 86% with very good categories, which means that children have reached a very good level of development according to mathematical indicators of children aged 5-6 years such as summing by counting objects, sorting numbers, grouping geometric shapes, comparing measurement concepts, and numbering/mentioning numbers. Thus, it can be concluded that the use of eight themes in mathematical educational games in the form of power points has practical criteria. In line with the research presented by Panggayudi, et al, (2017) in a journal entitled culture-based educational game media for learning number recognition in early childhood, resulting in a score of 83.50% in the practical category in the trial stage of products in children (Panggayudi et al., 2017).

Based on the description and analysis of the data from the research results, it was found that the mathematics educational game product in the form of a powepoint developed is very valid and practical, so that it can be used as a learning medium in mathematics learning for children aged 5-6 years. Furthermore, in line with the results of research from Sagita (2014) that the educational game media of travel games is valid and practical. The criteria for validity can be shown through expert assessment of material and media categories both with an ideality of 24.5 criteria for the practicality of interactive media that have been developed can be seen from

the results of the student response questionnaire with an ideal percentage of 71.22% with a high category. this is what corroborates the findings of the research that researchers conducted (Larasati, 2019).

Conclusion

The mathematical educational game in the form of a power point developed for children aged 5-6 years is declared very valid based on the validation results of experts (expert review), so that this power point-shaped mathematical educational game is worthy of being used as a learning medium for learning mathematics in aspects of children's cognitive development. This can be seen from the average value of expert review results on eight themes of 3.87 with very valid categories that have met the standard product criteria on the material and game design so that they are worthy of being tested on children based on suggestions and comments from experts.

Based on the results of the one-to-one evaluation stage on eight themes, 86% of the categories were very good, while the results in the evaluation stage of the small group evaluation got an average of eight themes of 92% with very good categories, so that based on the results of one-to-one evaluation and small group evaluation, it can be stated that mathematics educational games in the form of power points developed are easy to use for teachers and children in mathematics learning in aspects of cognitive development in aspects of cognitive development which is fun as well as motivating and makes the child interested in learning mathematics. Therefore, mathematics educational game media in the form of power points for children aged 5-6 years has been tested for practicality.

References

- Angraini, W., & Darma Putri, A. (2019). Penerapan Metode Bermain Peran (Role Playing) dalam Mengembangkan Kognitif Anak Usia 5-6 Tahun. *Jeced*, 1(2), 104–114.
- Budasi, I. G., Ratminingsih, N. M., Agustini, K., & Risadi, M. Y. (2020). Power point game, motivation, achievement: The impact and students' perception. *International Journal of Instruction*, 13(4). <https://doi.org/10.29333/iji.2020.13432a>
- Busril, A., Mayar, F., & Eliza, D. (2020). Pengaruh Permainan Logico Terhadap Kemampuan Berhitung di Taman Kanak-Kanak Aisyiyah Bustanul Athfal Kayu Gadang. *Islamic EduKids*, 2(1). <https://doi.org/10.20414/iek.v2i1.2270>
- Dewi, R. K., Kamid, K., & Saharudin, S. (2019). Pemerolehan Pengetahuan Matematika pada Anak Usia Dini. *Edumatica: Jurnal Pendidikan Matematika*, 9(1). <https://doi.org/10.22437/edumatica.v9i1.5624>
- Ezkanandyta, N., Rachmawati, Y., & Mariyana, R. (2019). Efektivitas Penggunaan Busy Book Terhadap Kecerdasan Logika Matematika Anak Usia Dini. *Edukid*, 16(1). <https://doi.org/10.17509/edukid.v16i1.20874>
- Febrinatasia, W. (2019). Pengembangan Media Pembelajaran Maze Game berbasis Power Point untuk Mata Kuliah English for Biology. ... *Pembelajaran Maze Game Berbasis Power ...*
- Hasjiandito, A., & Adiarti, W. (2016). Efektivitas Media Pembelajaran Berbasis Powerpoint Tema Agama Di Kb-Tk Assalamah Ungaran Kabupaten Semarang. *Jurnal Penelitian Pendidikan Unnes*, 33(1), 7–12.

- Ibda, F. (2015). PERKEMBANGAN KOGNITIF: TEORI JEAN PIAGET. *Jurnal Intelektualita*, 3, 27–38.
- Kafai, Y. B., & Burke, Q. (2015). Constructionist Gaming: Understanding the Benefits of Making Games for Learning. *Educational Psychologist*, 50(4), 313–334. <https://doi.org/10.1080/00461520.2015.1124022>
- Kara, N., & Cagiltay, K. (2020). Smart toys for preschool children: A design and development research. *Electronic Commerce Research and Applications*, 39. <https://doi.org/10.1016/j.elerap.2019.100909>
- Larasati, A. A. (2019). PENGEMBANGAN MEDIA PEMBELAJARAN TRAVEL GAME PADA MATERI INTEGRAL TAK TENTU. *AL-Ahya*, 01(01), 219–232.
- Laurens, T., Mananggal, M. B., & Sapulette, F. (2021). PENGEMBANGAN MEDIA PEMBELAJARAN DESAIN GRAFIS DAN ANALISIS REAL BERBASIS DIGITAL. *Jurnal Magister Pendidikan Matematika (JUMADIKA)*, 3(2). <https://doi.org/10.30598/jumadikavol3iss2year2021page85-92>
- Maryani, S. (2019). Math Game for Early Childhood. *Empowerment*, 8(1), 39. <https://doi.org/10.22460/empowerment.v8i1p39-48.1156>
- Okdiantari, E., & Komalasari, D. (2019). Pengembangan alat permainan edukatif (APE) prisma angka untuk meningkatkan kemampuan kognitif anak usia 4-5 tahun. *PAUD Teratai*.
- Panggayudi, D. S., Suweleh, W., & Ihsan, P. (2017). Media Game Edukasi Berbasis Budaya Untuk Pembelajaran Pengenalan Bilangan Pada Anak Usia Dini. *Journal of Mathematics Education, Science and Technology*, 2(2), 255–266.
- Pratiwi, E. Y. R., & Siswanto, M. B. E. (2020). Pengembangan Education Game Berbasis Microsoft Power Point dalam Media Pembelajaran Pendidikan Kewarganegaraan. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, 4(1). <https://doi.org/10.20961/jdc.v4i1.43331>
- Sari, K. M., & Setiawan, H. (2020). Kompetensi Pedagogik Guru dalam Melaksanakan Penilaian Pembelajaran Anak Usia Dini. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 4(2). <https://doi.org/10.31004/obsesi.v4i2.478>
- Sari, N. M., & Yetti, E. (2020). Pengembangan Media Permainan Mipon ' s Daily untuk Meningkatkan Kemampuan Berhitung Anak Abstrak. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 4(2), 831–839. <https://doi.org/10.31004/obsesi.v4i2.428>
- Selvi, I. D. (2019). Pengembangan Bahan Ajar Materi Bilangan Berbasis Saintifik Untuk Anak Usia 5-6 Tahun Di Tk Islam Alkautsar Indralaya. *Jurnal Tumbuh Kembang : Kajian Teori Dan Pembelajaran PAUD*, 6(1). <https://doi.org/10.36706/jtk.v6i1.8338>
- Selvi, I. D., & Saraswati, D. A. (2021). Pompom Box Toy to Develop Numeracy Skills in Early Childhood. *Sawwa: Jurnal Studi Gender*, 16(2), 191–212. <https://doi.org/10.21580/sa.v16i2.8012>
- Selvi, I. D., & Wulantaka, N. (2020). Pengembangan Kreativitas Dan Alat Permainan Edukatif Anak Usia Dini Dalam Perspektif Atribut Dan Organisasi. *PAUDIA : Jurnal Penelitian Dalam Bidang Pendidikan Anak Usia Dini*, 9(1), 103–110.
- Setiawan, A. (2018). Meningkatkan Kemampuan Berhitung Anak Usia Dini Melalui Media Pembelajaran Matematika di RA Ma'arif 1 Kota Metro. *Seling: Jurnal Program Studi PGRA*, 4.
- Singh, P., Hoon, T. S., Md Nasir, A., Md Ramly, A., Md Rasid, S., & Meng, C. C. (2021). Card game as a pedagogical tool for numeracy skills development. *International Journal of Evaluation and Research in Education*, 10(2). <https://doi.org/10.11591/ijere.v10i2.20722>
- Suhendro, E. (2020). Strategi Pembelajaran Pendidikan Anak Usia Dini di Masa Pandemi Covid-19. *Golden Age: Jurnal Ilmiah Tumbuh Kembang Anak Usia Dini*, 5(3), 133–140.

- <https://doi.org/10.14421/jga.2020.53-05>
- Suyadi, S., & Selvi, I. D. (2019). Implementasi Mainan Susun Balok Seimbang Berbasis Kearifan Lokal Yogyakarta untuk Anak Usia Dini. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 4(1). <https://doi.org/10.31004/obsesi.v4i1.345>
- Suyadi, & Selvi, I. D. (2022). Online learning and child abuse: the COVID-19 pandemic impact on work and school from home in Indonesia. *Heliyon*, 8(1), e08790. <https://doi.org/10.1016/j.heliyon.2022.e08790>
- Tessmer, M. (1993). Planning and conducting formative evaluations: Improving the quality of education and training. In *Planning and Conducting Formative Evaluations*. Routledge. <http://books.google.com/books?hl=en&lr=&id=GZbe0pOj4FUC&oi=fnd&pg=PA7&dq=Planning+and+Conducting+Formative+Evaluations&ots=HilZ3PiNWC&sig=jHf9OVbV88BBSj6X9--n5KnxK-0>
- Utami, W. Z. S. (2017). Pengembangan Media Pembelajaran Matematika Untuk Meningkatkan Konsentrasi Dan Minat Belajar Siswa Tuna Grahita. *Jurnal Teknologi Pendidikan Volume*, 2(April).
- Wirajaya, O., Widiawati, W., & Rahayu, C. (2019). Penggunaan Power Point Game pada Materi Persegi Panjang Kelas VII SMP Muhammadiyah Pagaram. *ARITHMETIC: Academic Journal of Math*, 1(2). <https://doi.org/10.29240/ja.v1i2.966>
- Yosepina Handarini, Y. H. (2019). Efektivitas Media Pembelajaran Corong Berhitung Untuk Meningkatkan Hasil Belajar Penjumlahan Sederhana Pada Anak Kesulitan Belajar. *Jurnal Penelitian Pendidikan Kebutuhan Khusus*, 7.