PROCEEDINGS OF INTERNATIONAL CONFERENCE ON EDUCATION
TEACHER TRAINING & EDUCATION FACULTY
UNIVERSITAS SERAMBI MEKKAH
NO. ISSN 2987-4564

THE EFFECT OF NUMBER WHEE GAMES ON STEAM LEARNING

Sinta Sri Rahayu[1*], Annisa Purwani[2]

[1,2] Early Childhood Islamic Education Department, Tarbiyah Faculty, STAI DR. KHEZ Muttaqien Purwakarta, Indonesia, Purwakarta, 41151, Indonesia

*sintasrirahayu372@gmail.com

ABSTRACT

This research stems from the problems faced at Harapan Pertiwi Kindergarten, namely the lack of children's ability to recognize numbers. This can be seen from the teacher's lack of creativity in using the right media to improve children's counting and reading skills so that children easily get bored and feel bored with the activities provided by the teacher. This study aims to determine how effective the number wheel media is on children's reading skills at Harapan Pertiwi Kindergarten. This study used a single-subject SSR quantitative approach in the form of a quasy experiment 10 people. The research population was the children of Harapan Pertiwi Kindergarten, totaling 10 people. At baseline 1, the 1st and 2nd study subjects obtained a percentage of 0.88% and 33.3% and the second percentage obtained 66.6% and 100%. The results of the study show that children are increasing after conducting experiments which are at a vulnerable level of 0.88% to 33.3% after being given treatment the tendency towards children's abilities continues to increase. So this proves that the magic board game media is effective in increasing symbolic thinking skills and solving problems in children aged 4-5 years at Harapan Pertiwi Kindergarten.Harapan Pertiwi Kindergarten. This study used a single-subject SSR quantitative approach in the form of a quasy experiment 10 people. The research population was the children of Harapan Pertiwi Kindergarten, totaling 10 people. At baseline 1, the 1st and 2nd study subjects obtained a percentage of 0.88% and 33.3% and the second percentage obtained 66.6% and 100%. The results of the study show that children are increasing after conducting experiments which are at a vulnerable level of 0.88% to 33.3% after being given treatment the tendency towards children's abilities continues to increase. So this proves that the magic board game media is effective in increasing symbolic thinking skills and solving problems in children aged 4-5 years at Harapan Pertiwi Kindergarten.

Keywords: *Magic Hand, Pemecahan Masalah, Anak Usia Dini*

1. INTRODUCTION

The STEM and STEAM approaches are issues regarding the latest learning strategies currently recommended by experts to be applied at every level of education from early childhood to higher education. This is because STEM can develop various skills such as problem solving, creativity, critical analysis, group work, independent thinking, initiative, communication and digital literacy. These various skills need to be owned by students to face the challenges of globalization (Yulianti, 2019). STEAM learning is project-centered and student-centered where children are more active in carrying out the activities they want, where the teacher is only a facilitator. From this learning, the teacher is also required to be more creative in presenting various playing activities so that children do not get bored quickly. Development of STEM (Science, Technology, Engineering, and Mathematics) with art (Art). The integration of art into STEM learning produces a new acronym, namely STEAM (Science about curiosity and curiosity), Technology (tools or media used in learning), Engineering (a technique that starts from identifying a problem then thinking of a solution and trying it), Art (adding art provides opportunities for children to hone their creativity and imagination), and Mathematics (training children to have mathematical thinking including comparing, sorting, working with patterns and identifying shapes).

Through STEAM learning, children are trained in their ability to think critically, solve a simple problem so they can hone their creativity The STEAM approach encourages students to learn to explore all the abilities they have, in their own way. STEAM will also bring out different and unexpected works from each individual or group. In addition, collaboration, cooperation and communication will emerge in the learning process because this approach is carried out in groups. A further goal of STEAM education is to develop STEM literacy The introduction of STEAM for early childhood can be done by creating a safe and fun learning environment. Providing opportunities for children to explore, discover, build, experiment, predict, seek temporary answers and relate knowledge to real life are key activities that can be carried out in STEAM implementation. These key activities can be designed through play activities so that children feel comfortable and enthusiastic about being involved in them (Putri, 2019). STEAM learning happens naturally every day as kids explore, play, and try new things. When young children have the opportunity to investigate the world around them, they learn and experiment with new STEAM skills and theories. In Ministerial Regulation No. 137 of 2014 concerning Standards for Levels of Achievement The development of the cognitive aspects of symbolic thinking that must be achieved in children 4-5 years old is to recognize number symbols 1-10, recognize number symbols 1-10, recognize the concept of numbers and recognize letter symbols. The ability to think symbolically is one aspect that is included in cognitive development and is a very important aspect that must be achieved by children. To improve the ability of symbolic thinking in early childhood certainly cannot be separated from the role of educators or parents in stimulating it. The stimulation carried out must of course be fun for children, therefore every learning activity on the role of the media is so important for conveying material that will be taught to early childhood Education is one of human needs, because with education humans acquire knowledge, values, attitudes, and skills that are very important for the development of the nation and state. Therefore, one of the government's efforts to improve human resources is to improve the quality of education. In improving the quality of education, teachers and students are the main pillars in the learning process in schools, thus awareness of the process of improving the quality of human resources encourages people to improve education. This is disclosed in Law no. 20. Early Childhood Education (PAUD) is a coaching effort aimed at

children from birth to the age of 6 years which is carried out through the provision of educational stimuli to help physical and spiritual growth and development so that children have further readiness. Early childhood is a different individual, unique, and has its own characteristics according to their age stage. At this time the stimulation of all aspects of development has an important role for further developmental tasks. Aspects of these developments include moral, social, emotional and independence, cognitive, language and physical motor values. Counting is one part of the aspect of children's numeracy skills, with the reason that children can recognize letters, numbers, or in the form of sentences. In addition, reading can train children's concentration and hone children's language skills. Reading should be introduced to children from an early age in order to help children know the difference between uppercase and lowercase letters (Anwar, 2009). Does not make children illiterate and also children are more familiar with the various forms of letters that form words or sentences in their surroundings. The teacher is an educator who can help develop aspects of a child's language, one of which is the child's reading ability. It is appropriate to provide the right stimulants at every stage of child development and in accordance with the characteristics of early childhood, namely playing while learning and learning while playing. A learning process can be said to be successful if there is encouragement and motivation given by the teacher to his students. In addition, professional teachers are teachers who can create an effective and fun learning atmosphere for children. Research conducted by (Devitawati, 2017) examined "Improving Children's Reading Ability through Magic Box Games in Aisyiyah Paingan Kindergarten, Padang Pariaman Regency". This type of research is classroom action research. The results of the study show that playing the magic box can improve children's reading skills. Subsequent research conducted by ntitled "Effectiveness of Crossword Games in Improving Children's Reading Ability at Harapan Pertiwi Kindergarten. The similarities that the researchers did with previous researchers were that they both researched children's counting abilities, with the same type of research, namely Quasy Experiment research. Meanwhile, the difference that the researcher did with the previous researcher was different in terms of the media. The previous researcher examined the effectiveness of the crossword puzzle game while the researcher will examine the number wheel media (Yulianti, 2019). Based on the initial observations of researchers in the field, children's interest in reading activities is still not visible, such as reading pictures. Children find it difficult to read words in pictures, children are less able to connect pictures with words, and children are less able to name the vocabulary in pictures. The lack of teacher creativity in using media in improving children's reading skills so that children are easily bored and feel bored with the activities provided by the teacher. In addition, teachers experience difficulties in teaching/introducing numbers to children. Based on this phenomenon, researchers can describe a problem that has been found in the field. This can be seen from the fact that it is difficult for children to read the numbers in pictures and children are less able to connect pictures with numbers. In addition, the teacher's lack of creativity in using media in improving children's reading skills. Therefore, the authors are interested in researching children's reading abilities under the title the "Effectiveness of Number Wheel Media on Children's Readi ng Ability at Harapan Pertiwi Kindergarten. In this study, children can also think symbolically in differentiating the dissolution between sweet tea.

2. LITERATURE REVIEW

2.1 Cognitive Theory

According to Piaget in desiminta, (2019) that cognitive ability can be understood as a child's ability to think more complexly as well as the ability to reason and solve problems. In developing cognitive abilities, it will make it easier for children to master broader general knowledge, so that children are able to continue their functions naturally in their interactions with society and the environment (Ibda, 2015). According to (Khadijah, 2016) cognitive development is an ability to learn and think with intelligence that is able to learn new skills and concepts Skilled at understanding what is going on around him and skilled at using memory and solving simple problems. Meanwhile, according to Naisser in Narussakinah Daulay, cognitive comes from the word cognition which means knowing which means knowing, another meaning of cognition is acquisition, arrangement and knowledge.

2.2. Mathematical Theory

In the Integrated Mathematics Learning Book for Early Childhood states that mathematics is a pattern of thinking, a pattern of organizing logical evidence, language that uses terms that are carefully defined, clear and accurate, representation with symbols and solid, more in the form of language. Symbo about ideas or ideas rather than about sounds, knowledge of organized structures properties/theories are made deductively based on defined or undefined elements, axioms, properties/theories that have been proven in fact, an art whose beauty lies in its order and harmony. Meanwhile states that mathematics is a deductive science which does not accept generalizations based on observation or observation (inductive) but these generalizations must be based on deductive proofs; mathematics as a language, art and the queen of science, the science of well-organized structures, the science of patterns and relationships.

Science or also known as Natural Science according to (can be defined as a systematic science that is formulated in accordance with natural phenomena and is based on observation and induction. Meanwhile views science or natural science as knowledge obtained through a series of systematic processes to reveal everything related to the universe. Science for early childhood is not just a collection of facts, but involves observing what is happening, classifying or organizing information, predicting what will happen, testing predictions through guided activities and formulating conclusions. This is also in line with the opinion expressed by which mentions several activities in the scientific process in the context of science learning for early childhood, such as observation, prediction, conducting experiments, and interpreting.

According roshayanti, 2022 the following is an explanation of the STEAM learning method. (1) Science, which becomes a process for children to understand and also find out about various things. Children can explore various things by searching for appropriate data and then finding relationships and patterns from existing events. This method can make children more sensitive to events that are happening around them. In addition, this can also form children to be more critical in thinking. (2) Technology, can be introduced to children starting from the simple first. This is done so that children can use and also develop what they use. This method can help children find out what interests and talents they

have. (3) Engineering can be done by making a simulation to solve a problem from the smallest first. This method can be done by assembling to become a car or other shapes. (4) Art, done to train children in experimenting with the imagination they have. Children can explore their thoughts and creativity. Children can carry out various kinds of wishes without having to follow the existing structure so that they can be free. 5) Mathematics, to find out the basic concepts in mathematics. Children can be invited to make predictions or look at numbers to tell which ones are more or le (Roshayanti et al., 2022).

3. METHODS

This research uses the SSR research method (Single subject research), which is research that examines or observes the same object continuously.Single subject research is experimental research to look at behavior and evaluate certain interventions or treatments for the behavior of a subject single with repeated assessments at a certain time Single subject research is a quantitative study by providing intervention or treatment to research subjects within a certain period of time. The term single subject does not mean that only one research subject is studied, but it is more typical to be somewhere between one to five participants, which is why the single subject research design is sometimes called the small-n design, where n is statistical symbol for sample size (Prahmana, 2021). Single Subject Research (SSR) research, namely subject research with research procedures using an experimental design to see the effect of treatment on changes in behavior. The data was analyzed using graphical visual analysis techniques, namely by plotting the data onto a graph, then the data was analyzed based on the components in each baseline condition (A1), intervention (B), baseline (A2) (Yuwano, 2019). Based on the problems studied, namely the Effectiveness of the Use of Number Wheel Media on the Counting Ability of Children in Harapan Pertiwi Kindergarten, the form of research used is a Quantitative approach, Quantitative talks with numbers to describe the situation being studied. This research uses a quasi-experimental research type. Quasy experiment with the type of nonequivelent control group design which aims to determine the effect of the independent variable on the dependent variable after using the wordwheel media. In the research design, the experimental class was given treatment (X), whereas in the control class with the usual approach (-), then both classes were given the same test (Mutia & Diana, 2010). This can be seen from the following table: The population in this study were 2 children. In this study, the samples were two children where children were able to think symbolically and solve problems by dissolving two different types of sweet tea. Children were able to distinguish between the two drinks, seen in the child's development record through assessment in report cards (child development reports) and the age of the child. the same one. To improve the ability of children in this study, the instrument or tool used to collect research data was a test. The hypothesis is a temporary answer from a study, because the results of testing the hypothesis are the answers to the problems faced by children. In this study, the subjects were 2 children aged 4-5 years at Harapan Pertiwi Kindergarten, whose initials were YD, SI, the two subjects were given a number wheel game intervention in learning (STEAM) to improve symbolic thinking skills and problem solving. The data collection technique is through discussion with the subject, field observations to observe the subject directly using research instruments that match the criteria set by the researcher, as well as documentation when the child is playing the number wheel game.

4. RESULTS & DISCUSSION

Problems The concept of learning in early childhood is learning while playing (learning by playing), learning by doing (learning by doing), and learning by stimulating (learning by stimulating), so that the learning process of early childhood is carried out through fun activities, doing experiments -simple experiments or real activities, and educators must be active in stimulating the learning process. Thus, educators will be able to help children to develop every aspect of their growth and development optimally. Regulation of the Minister of Education and Culture of the Republic of Indonesia (Permendiknas number 5 of 2020) concerning the National PAUD Standard article 10 explains that "Aspects of child development according to their level of development include religious and moral, physical-motor, cognitive, language, social-emotional, and artistic aspects". The six aspects of development are a unity that cannot be separated and are interconnected with one another. If one aspect of a child's development is problematic, it will have an impact on other aspects of development. Aspects of child development are also a determinant or foundation for children in carrying out activities of daily life, both in interacting, communicating, learning, playing and others. Children in their daily life are faced with various kinds of problems so that children really need knowledge as a solution to solve every problem. Therefore, in addition to developing other aspects of child development, it is very important to develop and improve the ability of cognitive aspects. The scope of cognitive development is divided into three, one of which is problem solving ability.

The STEM approach is based on the development of learning on the existence and relationship between science, technology, engineering and math, while STEAM has the addition of an "art" component in it. Many people think that the application of STEM or STEAM for early childhood education is difficult and not entirely true, because early childhood can be said to be natural scientists because they have high curiosity which is often marked by the emergence of many questions. STEAM children are invited to create something based on their own thinking and imagination so that it is possible for children to form a good mindset. The introduction of STEAM for early childhood can be done by creating a safe and fun learning environment. Providing opportunities for children to explore, discover, build, conduct experiments, predict, seek temporary answers and relate knowledge to real life are key activities that can be carried out in implementing STEAM. These activities can be designed through play activities so that children feel comfortable and enthusiastic about being involved in them From the results of the initial observations made by the researchers, the condition was that there were 30 chidren ged 4-5 years (Group A) in Harapan Pertiwi Kindergarten, but the researchers conducted research on only 2 children. In the initial conditions of the study, the researcher found that the two subjects had low knowledge in symbolic thinking and problem solving. From the beginning of the study until treatment was given to the 2 subjects, this will be explained below.

4.1 Data Description

Intervention Conditions (B) and Baseline Conditions (A2) in 3 subjects are described in the graph below.

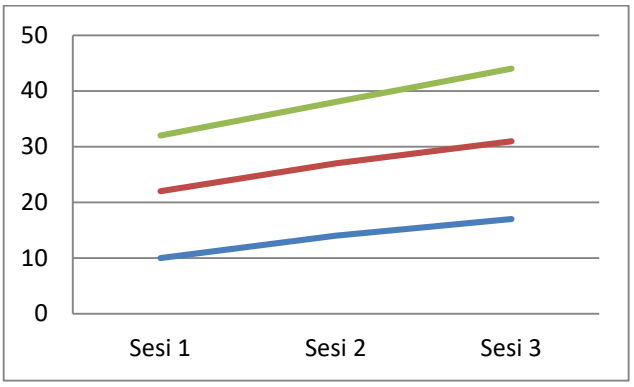

Chart 1. Baseline 1

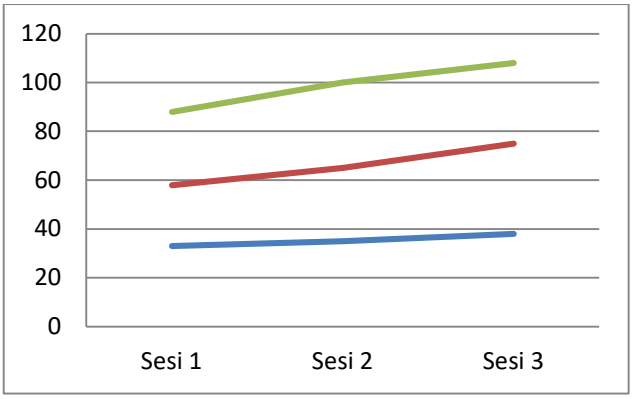

Chart 2. Baseline 2

Table 1. Baseline 1 Gain Score (Session 1-3)

Name	Session Test Achievement To(%)		
	1	2	3
YD	25%	35%	42,5%

Name	Session Test Achievement To (%)		
	1	**2**	**3**
SI	50%	65%	67,5%

Table 2. Intervention Gain Score (Session 1-3)

Name	Session Test Achievement To (%)		
	1	2	3
YD	50%	65%	67,5%

Name	Session Test Description To (%)		
	1	**2**	**3**
SI	37,5%	45%	47,5%

Table 3. Baseline 2 Gain Score (Session 1-3)

Name	Session Test Achievement To (%)		
	1	2	3
YD	82,5%	87,5%	95%

Name	Session Test Description To (%)		
	1	**2**	**3**
SI	62,5%	75%	92,5%

4.2 Data Analysis

a) Analysis Under Condition

Analysis Condition	Baseline 1	Intervention	Baseline 2
Condition Length • YD • SI	3 Sesion 3 Sesion	3 Sesion 3Sesion	3 Sesion 3Sesion
Directions Trend • YD • SI			
Stability Trend • YD • SI	33,3% 33,3%	66,6% 66,6%	100% 100%
Data Trail • YD • SI	(+) (+)	(+) (+)	(+) (+)

Stability Level And Range • YD • SI	33,3% (25-42,5) (30-35)	66,6% (50-67,5) (37,5-47,5)	100% (82,5-95) (62,5-92,5)
Level Change • YD • SI	(42,5-25) (+17,5) (35-30) (+5)	(67,5-50) (+17,5) (46,5-37,5) (+10)	(95-82,5) (12,5) (92,5-62,5) (+30)

b) Analysis Between Conditions

Between Condition	Baseline 1 (A1) /Intervention (B)	Intervention (B) /Baseline 2 (A2)
Variable Number • YD • SI-	1 1	1 1
Trends and Their Effects • YD • SI	(+) (+)	(+) (+)
Stability Change • YD • SI	Unstable/ unstable Unstable/ unstable	Unstable/ unstable Unstable unstable
Level Change • DS • AA	42,5-50 (-7,5) 35-37,5 (-2,5)	67,5-82,5 (-15) 47,5-62,5 (-15)
Overlapping Data	$\frac{0}{2} \times 100\% = 0\%$	$\frac{0}{2} \times 100\% = 0\%$

From the results of the data above, it can be seen that the results of data analysis under conditions and the results of analysis between conditions were contained in nine sessions, namely three sessions before the intervention (A1), three intervention sessions (B), and three sessions after the intervention was given (A2). It can be concluded that before the intervention (A1) was given to the 2 subjects using the number wheel game, the ability to think symbolically and problem solving was still low, which was in the range of 32.5% to 42.5%. treatment in the intervention conditions the tendency for the ability to think symbolically and problem solving to increase (+) which lies in the range of 47.5% to 72%, and after being given treatment / treatment the tendency towards the ability of children continues to increase (+) which lies in the range of 87.5% up to 95%. So this proves that the magic plate game media is effective in increasing symbolic thinking skills and problem solving in children aged 4-5 years at Harapan Pertiwi Kindergarten.

5. CONCLUSION

STEAM is able to increase children's curiosity and stimulate children's ability to ask questions, so that children can build their knowledge, are able to explore, and are able to show an inquiring attitude. In STEAM learning, it can be applied directly in class by training children to study science which includes learning about the environment, oneself and natural phenomena. By using this number wheel game, the ability to think symbolically and solve problems in children aged 4-5 years at Harapan Pertiwi Kindergarten increases, as shown in the results of the analysis above, which shows that before the initial ability of children was only 32.5% - 42.5%. After being given treatment using the median wheel game, the child's ability to think symbolically and solve problems increased to 47.5% - 72%. And after the treatment was stopped, the child's ability continued to increase to 87.5% - 95%, where the child was able to recognize symbols and the concept of numbers 1-10, know the concept of many and few, recognize geometric shapes, group objects by color, size and so on.

6. ACKNOWLEDGMENTS

All praise and gratitude we pray to Allah SWT. Because of His blessings, grace and gifts and miracles, we can finish this journal. We as the writers are well aware that there are people who are very meritorious behind the completion of this journal. We thank those who have helped us a lot. In particular, we would like to thank Ms. Annisa Purwani, M.Pd as the lecturer who guided the Early Childhood Mathematics and Science Learning course, who took the time, energy, thoughts and provided assistance during the process of making this journal. Thank you also to TK Harapan Pertiwi for giving us the opportunity to do research there.

All the shortcomings and imperfections of this journal, we as writers really appreciate input, constructive criticism and suggestions towards the improvement and refinement of this journal. So many difficulties experienced by the author to write in the preparation of this journal.

We hope that this journal can be useful for all parties and hopefully the good deeds that have been given will be rewarded by Allah SWT. Ameen.

7. REFERENCES

Anwar. (2009). *Early childhood education (Practical guide for mother and prospective mother)*. Alphabeta.

Devitawati, E. (2017). Efektivitas media kincir kata terhadap kemampuan membaca anak di taman kanak-kanak harapan dharmawanita painan kabupaten pesisir selatan. *PAUD Lectura: Jurnal Pendidikan Anak Usia Dini*, *1*(1).

Ibda, F. (2015). Perkembangan kognitif: Jean Piaget. *INTELEKTUALITA*, *3*(1).

Khadijah. (2016). *Pengembangan kognitif anak usia dini*. Perdana Publishing.

Mutia, & Diana. (2010). *research procedures a practice approach*. KENCANA.

Prahmana, R. C. I. (2021). *Single Subject Research: Teori dan implementasinya suatu pengantar*. UAD Press.

Putri, S. U. (2019). *Pembelajaran sains untuk anak usia dini*. Royyan Press.

Roshayanti, F., Wijayanti, A., & Purnamasari, V. (2022). *Model pembelajaran berbasis STEAM berorientasi life skils*. PT. Nasya Expanding Management.

Yulianti, A. . (2019). *Manual and digital learning media*. Ghalia Indonesia.

Yuwano, I. (2019). *BUKU 1 Penelitian SSR (Single Subject Research)*. Universitas Lambung Mangkurat.