



Needs Analysis on Robmanjar (Learning Partner Robot) Game Design to Stimulate Early Childhood Literacy

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ABSTRACT

The purpose of this study was to analyze the learning needs of early childhood by designing the Robmanjar (Learning Partner Robot) game to stimulate the development of basic literacy in children's SPNF SKB Pontianak City Playgroup. The design of the Robmanjar game was prepared based on an analysis of the needs of the children's learning outcomes in the Pontianak City SPNF SKB Play Group in the first quarter of the odd semester of the 2022/2023 school year. The research method used was survey research. The number of respondents consisted of 1 educator, 8 parents of students, and 8 children of the SPNF SKB Playgroup in Pontianak City. Data collection techniques used interviews, observation, and questionnaires. The data analysis technique used was descriptive quantitative and qualitative analysis. The results showed that the average results of the elements of achievement in learning the basics of literacy were still low because the level of achievement of children who developed as expected was still below 50%. The details of the developmental achievements of the elements of the basics of child literacy in the Pontianak City SPNF SKB Play Group were 40.6% of children who had not yet developed; 42.2% of children started to develop; 15.6% of children developed as expected; and 1.6% of children developed very well. For the learning achievement elements of basic literacy to increase, it is necessary to design types of games that can stimulate children's development in the learning achievement elements of basic literacy. The Robmanjar game is expected to stimulate aspects of child development in the Pontianak City SPNF SKB Playgroup in the learning achievement elements of basic literacy.

INTRODUCTION

Education can reflect the culture of a nation. That is what causes the important role of education for humans related to the formation of an attitude, habits, and culture. Therefore, education should be

given from an early age, with the hope that children will have good attitudes, habits and culture as a provision to overcome challenges in the future.

Education, when viewed as a process of cultural transformation, is an activity of cultural inheritance from one generation to another (Suardi, Dalman, & Hesti, 2020: 4). According to Ki Hajar Dewantara, every child has their nature. The teacher oversees guiding his nature. If the child has a good nature, through education the child will get better (Yus, 2011: 9). According to Montessori, education begins when a child is born. Very formative periods occur in the first year of a child's life and are the most important times both physically and mentally (Yus, 2011: 7). Early childhood education is education organized for early childhood which aims to stimulate growth, development, and aspects of the child's personality (Habibi, 2015: 115).

Early Childhood Education (PAUD) is expected to be able to develop all the potential that exists in children and stimulate aspects of early childhood development which include aspects of the development of religious and moral values, aspects of physical-motor development, aspects of social-emotional development, aspects of cognitive development, aspects of language development, and aspects of artistic development. Early Childhood Education can be organized through three channels, namely first; formal education pathway (Kindergarten, Raudhatul Athfal, or other equivalent forms), second; non-formal education pathways (Play Groups, Child Care Centers, or other equivalent forms such as Similar PAUD Units), and third; informal education pathways (organized in family education or education organized by the environment).

Early childhood is a child who is in the age group between 0 to 8 years. The nature of early childhood is a unique individual has a pattern of growth and development in the physical, cognitive, socio-emotional, creativity, language, and special communication aspects according to the stages experienced by the child (Saputra, 2019).

Early childhood is a child who is always active and is in a phase they like to play. Playing is the best way of learning in early childhood. Through play, children will get a variety of experiences and knowledge because in the game there will be dialogue between children which can lead to creativity and critical thinking. Therefore, an educator must always apply the play method in implementing the learning process in the classroom, because this method is following the level of development of early childhood who are still in the playful phase.

According to Elfiadi (2016), playing is a very important activity for children, because for them playing has the same value as working and studying for adults. Playing is a means to change the potential energy that exists in children into experiences to recognize the world. Fun play activities can stimulate children's growth and development, therefore parents at home and teachers at school need to organize a play environment that is safe, comfortable, and conducive (Hayati & Putro, 2021).

One of the potentials that must be developed in early childhood is creativity. Play activities that are systematic, pedagogical, regular, planned and adapted to the growth and development age group can develop children's creative talents so that children's creative potential will develop optimally. The best way to develop early childhood creativity is through play because by playing, children's growth and development will be achieved optimally (Priyanto, 2014).

The playing method is the application of the game as a vehicle for learning in early childhood. Based on a literature review, it is proven that playing is the most effective and efficient method in improving children's learning ability to remember quickly and a lot, children do not feel bored. There are several benefits of the playing method, namely spiritual benefits, motor benefits, affective benefits, cognitive benefits, and balance benefits (Widyastuti, 2022: 121-122). Children are allowed to understand the world, interact with other people and express and control emotions through play activities (Habibi, 2015: 20). Meaningful learning for children will occur if aspects of the child's thoughts and feelings

are involved in the learning process (Hadis & Nurhayati, 2019: 71). The use of learning multimedia has a very good influence on learning processes and outcomes because it helps children to understand material concepts concretely (Lovandri & Putra, 2015). The use of learning multimedia products can help develop children's cognitive aspects in learning to recognize numbers 1 to 10 (Riska & Ismaniati, 2017).

There are many game tools that children can use in playing, both traditional games and modern games. Along with the development of science and technology, the types of children's games have also changed. Early childhood currently prefers games that use digital electronics. In choosing play equipment for early childhood, things that must be considered by educators are the factors of safety, safety and comfort and the play activities carried out must be educative for children.

To find out whether the play activities carried out by early childhood are educative or not, educators can answer the following questions: first, is the game on target? The game is categorized as an educational game if the goal of the game can stimulate aspects of cognitive, effective, language, religious and moral values, social-emotional and psychomotor development of children. Second, is the game multifunctional? Games are classified as educational games if they do not only develop cognitive, effective, religious, and moral values, language, social-emotional, or psychomotor, but rather a combination of two or all these developmental aspects. Third, is the game fit for purpose? The game is said to be an educational game if it has a clear purpose and educational value. For example, games are designed to develop children's literacy skills in recognizing numbers and letters, training dexterity, practising problem-solving skills, training responsibility, creative thinking skills, communication skills, and so on. Fourth, can the game train basic concepts? If the game can stimulate basic concepts about literacy, namely about the introduction of numbers, letters, and numeracy, namely about early mathematical concepts (addition, subtraction), as well as other concepts, then the game is educational. Fifth, can games stimulate children's creativity? Games are categorized as educational games if they can stimulate young children to think critically and creatively.

Today's early childhood is identified as the alpha generation, namely children born starting from 2010 to 2025. The characteristics of the alpha generation are learning through IOT (Internet of Things), renewal, strong opinions, experiencing changes, not liking boundaries, and interacting through social media (Saputra, 2022). The characters and ways of learning for each generation are different, so an adaptation process is needed so that there is synergy between the ways of learning and the character of generations through the 4.0 era learning approach which requires a technological approach in the learning process (Kamal, 2020: 8).

We are currently in the era of the industrial revolution 4.0. According to Risdianto (2019), the era of the industrial revolution 4.0 has the following characteristics: firstly, robot automation means that the production process no longer relies on the number of human workers but is replaced by a robotic system. Because the use of robotic systems can work better than humans. Second, 3D printers that print using a 3D printer machine. Third, the Internet of Things, namely the speed controlled by the Internet. Now all work is always connected to an internet connection. Fourth is big data.

Now we are in the era of the 21st century, a situation characterized by the rapid development of information that is completely digital so a generation that has 21st-century skills is needed. Generation 4.0 must have the 4C skills, namely Creativity Thinking and innovation, Critical Thinking and Problem Solving, Communication and Collaboration (Agustin, 2021: 8-9). The four skills that must be possessed by the 21st-century generation are following the three learning outcomes in the PAUD foundation phase contained in the independent curriculum, namely the learning achievement elements of religious values and character, identity and the basics of literacy, mathematics, science, technology, engineering, and art. Early literacy is the ability to read, write and count in early childhood which must be stimulated and developed through play activities.

Independent learning can make the learning atmosphere more enjoyable, without being burdened with achieving certain grades. On Early Childhood Education, independent learning is synonymous with independent play. Playing is nutrition for early childhood brains to welcome a better future so that they can find solutions to the problems they face (Widyastuti, 2022: 26).

The Pontianak City SPNF SKB Playgroup implemented an independent curriculum for the 2022/2023 school year. From the results of observations on the learning outcomes of children in the SPNF SKB Play Group in Pontianak City for the 2022/2023 Academic Year in the first quarter, the elements of learning achievement in the basics of literacy were still low, where only 15.6% of children developed as expected and 1.6% of children developed very good. To improve learning outcomes in early childhood, it is necessary to design a type of game that can improve children's learning outcomes. The design of the Robmanjar (Learning Partner Robot) game aims to stimulate learning outcomes of the basics of literacy in the early childhood education foundation phase. This learning achievement needs to be improved because it is the basic capital for early childhood to prepare themselves to continue to Phase A at the Elementary School level.

Based on the results of observations when the children in the SPNF SKB Pontianak City Play Group played in class, the children quickly got bored with the playing activities they were doing. The game was not finished they had changed to another game. Therefore, a strategy is needed to foster children's interest in playing games until they are finished. The use of robots in a game is an attraction for children to participate in carrying out a game until it is finished.

The word robot, originally *Robota*, which means work, was introduced by Karel Capek, a Czech writer, during Rossum's Universal Robots performance, which means Rossum's world robot (RUR) in 1921 (Budiharto, 2013: 91-92). The word robotics also comes from a science fiction novel entitled *Runaround* written by Isaac Asimov in 1942. A system can be said to be a robot if it can adopt one or two systems in humans such as the vision system (eyes), the hearing system (ears) or the movement system. (Wahyudi, 2022: 2-5).

Sensors, microcontrollers, and mechanical components form the basic components of a robot assembly. Sensors are devices used by robots to gather information and monitor environmental conditions. Microcontrollers are used to amplify information from sensors so that robot-like results can be obtained. Mechanics are robot-assisted devices used to move (Marindani, 2012). Based on their mobility, robots are divided into stationary robots (robots that are operated with a fixed and certain environment and movements) and mobile robots (robots that move autonomously and have navigation so that their movements are not fixed. The design of mobile robots is in the form of legs (leg robots), wheels (wheel robots), and tanks.

According to the results of Febriko's (2017) research, the application of the Mobile Robot playing method could improve cognitive development in recognizing forms and creativity in early childhood in kindergarten. The results of Sobah Horunisa and Cahyati's (2020) research showed that the use of the *Sunda Manda* game as a luminous robot can improve the results of the development of children's balance. The design of an educational robot game must be able to unite needs as a playing medium as well as a teaching medium (Wahyujati, 2022).

Based on the results of a literature review on research using robots as learning media for early childhood, this study aimed to analyze the learning needs of early childhood by making a game design using wheeled robots as an attraction for children to complete the game in the hope of stimulating the achievement elements. learning the basics of literacy in the PAUD foundation phase.

METHOD

The research method used was survey research. The number of respondents consisted of 1 teacher, 8

parents of students and 8 children of the Pontianak City SPNF SKB Playgroup consisting of 4 girls and 4 boys. The number of children aged 4 years was 3 people, 5 years was 2 people, and 6 years was 3 people. Data collection techniques used interviews, observation, and questionnaires. Observations were made to observe early childhood behaviour related to learning and games. Interviews and questionnaires were conducted to collect data from parents and educators. The data analysis technique used was descriptive quantitative and qualitative analysis.

RESULTS AND DISCUSSION

Results

To find out the interests of the children in the SPNF SKB Pontianak City Play Group was carried out by observing and interviewing the children while they were playing. The results of the children's interest in the SPNF SKB Play Group in Pontianak City can be seen in Table 1.

Table 1
The Interest of the Children in the KB SPNF SKB Pontianak City

Respondents	L/P	Age	Hobby	Ambition	Favourite Toy
1st child	L	4 years	Playing ball, singing, watching YouTube	Police	Cars, guns
2nd child	L	4 years	Watch YouTube	Soldier	Balls, guns, robots, cars
3rd child	P	4 years	Drawing, colouring, watching YouTube	Police	Putting together a puzzle rug
4th child	L	5 years	Fishing, watching YouTube	Nurse	Balls, remote cars, robots
5th child	P	5 years	Watching YouTube, colouring	Police	Cars, robots
6th child	P	6 years	Watch YouTube	Sailor	Cooking
7th child	L	6 years	Playing ball, watching YouTube	Police	Cars, putting together a puzzle carpet
8th child	P	6 years	Colouring, drawing, watching YouTube	Police	Play dolls, robots

The number of KB SPNF SKB Pontianak City children in the categories of hobbies, aspirations, and preferred types of toys can be seen in Fig. 1, 2, and 3.

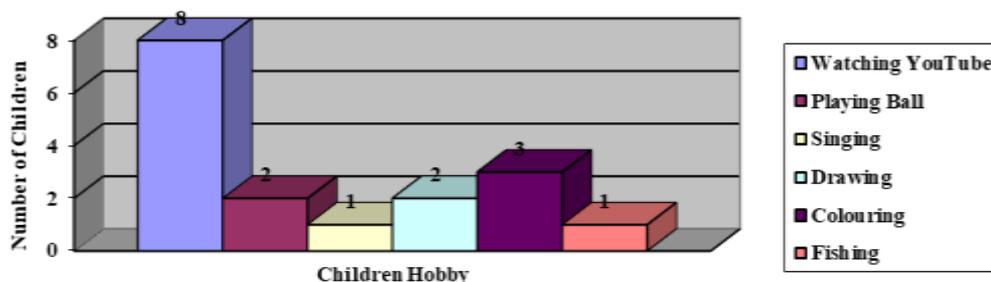


Fig. 1 Children Hobby KB SPNF SKB Pontianak City

In Fig. 1, 8 children (100%) had hobbies watching YouTube, 2 people (25%) playing ball and drawing, 1 singing and fishing (12.5%), and 3 colouring (37.5%). From these data, it turns out that children learn a lot from watching YouTube. Of course, in this case, adult assistance is needed so that children's viewing is more oriented towards positive things.

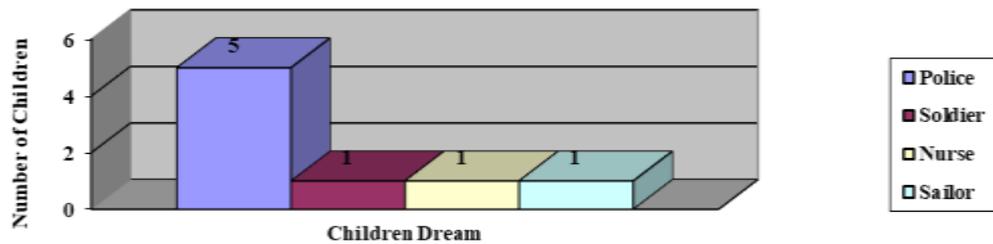


Fig. 2 Children Dream KB SPNF SKB Pontianak City

In Fig. 2, 5 children (62.5%) aspired to become police, 1 person became a soldier (12.5%), 1 person became a nurse (12.5%), and 1 person became a sailor (12.5%).

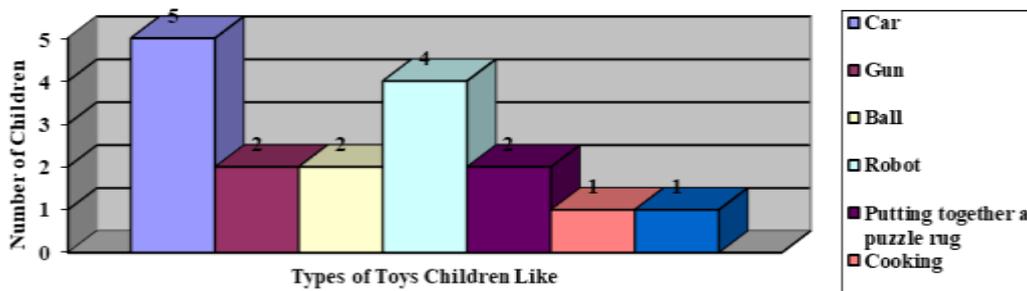


Fig. 3 Types of Toys that Children Like KB SPNF SKB Pontianak City

Fig. 3 shows the types of toys that children like KB SPNF SKB Pontianak City, namely 5 children (62.5%) liked cars, 2 children (25%) liked gun toys, 2 children (25%) liked ball toys, there were 2 children (25%) who liked the puzzle carpet set toy, as many as 4 children (50%) liked robot toys, and there was 1 child (12.5%) who liked to play cooking and 1 child (12, 5%) liked playing with dolls.

At the time of observation, it was also seen that when carrying out playing activities the children often changed their games. Not finished one game they have changed to another type of game. Children often do not finish the game they choose. They get bored quickly and move on to other games.

To find out whether the child's development is following the learning outcomes in the independent curriculum, observations and interviews were carried out. Based on the results of observations and interviews with the children of the SPNF SKB Playgroup in Pontianak City in the first quarter of the odd semester of the 2022/2023 Academic Year after 3 months of school, if it is related to the independent curriculum in the learning achievement elements of literacy basics with the sub-element children showing interest, passion, and participating in pre-reading and pre-writing activities for new children in the stage of achievement aspects that have not yet developed and are starting to develop, meaning that children still need the help of educators in pre-reading and pre-writing activities. Based on this fact, to improve learning outcomes in the learning achievement elements of literacy basics with the sub-elements' children showing interest, liking, and participating in pre-reading and pre-writing activities the following indicators were made:

1. Children can say numbers from 1 to 10 randomly (C1).
2. Children can name the alphabet from a to z randomly (C1).
3. Children can write numbers 1 to 10 (C1).
4. Children can write the alphabet a to z (C1).
5. Children can read the word in the picture (C1).
6. Children can tell pictures (C2).

7. Children can compare two different pictures (C2)
8. Children can count the number of objects in the picture (C3).

The results of observations and interviews on the learning outcomes of the basics of child literacy in the Pontianak City SPNF SKB Play Group can be seen in Table 2.

Table 2
Learning Achievements of the Basics of Children's Literacy in the KB SPNF SKB Pontianak City

Respondents	P/L	Age	Indicator
1st child	P	4 years	<ol style="list-style-type: none"> 1. Can mention the numbers 1 and 10 (MB). 2. Could not say the alphabet (BB). 3. Can write numbers 1 and 2 (MB). 4. Cannot write the alphabet (BB). 5. Cannot read the word on the picture (BB). 6. Can not tell the picture (BB). 7. Cannot compare two different images (BB) 8. Can count the number of objects in the image with the help of (MB).
2nd child	L	4 years	<ol style="list-style-type: none"> 1. Can mention the numbers 1 and 2 (MB). 2. Could not say the alphabet (BB). 3. Can write the number 1 (MB). 4. Cannot write the alphabet (BB). 5. Cannot read the word on the picture (BB). 6. Can not tell the picture (BB). 7. Cannot compare two different images (BB) 8. Cannot count the number of objects in the image (BB).
3rd child	P	4 years	<ol style="list-style-type: none"> 1. Can say numbers 1 to 10 at random (BSH). 2. Can mention the alphabet a to j (MB). 3. Can write numbers 1 to 6. Number 6 upside down (MB). 4. Can write the alphabet a to e (MB). 5. Cannot read the word on the picture (BB). 6. Can tell pictures with the help of question sentences (MB). 7. Cannot compare two different images (BB) 8. Can count the number of objects in the image (BSH).
4th child	L	5 years	<ol style="list-style-type: none"> 1. Can say the numbers 1 to 10 (MB). 2. Could not say the alphabet (BB). 3. Can write numbers 1 and 2 (MB). 4. Cannot write the alphabet (BB). 5. Cannot read the word on the picture (BB). 6. Can tell pictures with the help of question sentences (MB). 7. Can not compare two different images (BB). 8. Can count the number of objects in the image with the help of (MB).
5th child	P	5 years	<ol style="list-style-type: none"> 1. Can say the numbers 1 to 10 (MB). 2. Could not say the alphabet (BB). 3. Can write numbers 1 and 0 (MB). 4. Cannot write the alphabet (BB). 5. Cannot read the word on the picture (BB).

			<ol style="list-style-type: none"> 6. Can tell pictures with the help of question sentences (MB). 7. Cannot compare two different images (BB). 8. Can count the number of objects in the image with the help of (MB).
6th child	P	6 years	<ol style="list-style-type: none"> 1. Can say the numbers 1 to 10 (MB). 2. Could not say the alphabet (BB). 3. Can write numbers 1 to 10, but exemplify (MB). 4. Cannot write the alphabet (BB). 5. Cannot read the word on the picture (BB). 6. Can tell pictures with the help of question sentences (MB). 7. Can not compare two different images (BB). 8. Can count the number of objects in the image with the help of (MB).
7th child	L	6 years	<ol style="list-style-type: none"> 1. Can say numbers 1 to 10 at random (BSH). 2. Cannot name the alphabets e, m, and t (MB). 3. Can write numbers 1 to 10 and can teach his friends (BSB). 4. Can write alphabets a to d (MB). 5. Cannot read the word on the picture (BB). 6. Can tell pictures with the help of question sentences (MB). 7. Can compare two different images with the help of (MB). 8. Can count the number of objects in the image (BSH).
8th child	P	6 years	<ol style="list-style-type: none"> 1. Can say numbers 1 to 10 at random (BSH). 2. Can mention alphabets a to z randomly (BSH). 3. Can write numbers 1 to 10. Write numbers 2, 5, 6, 9, and 10 upside down (BSH). 4. Can write alphabets a to z (BSH). 5. Can read words on pictures (BSH). 6. Can tell pictures with the help of question sentences (MB). 7. Can compare two different images with the help of (MB). 8. Can count the number of objects in the image (BSH).

Information:

BB = Not Developed

MB= Start Developing

BSH= Growing as Expected

BSB = Very Well Developed

Aspects of child development in the Pontianak City SPNF SKB Play Group in the first quarter of the odd semester of the 2022/2023 school year, each indicator for learning achievement of literacy basics can be seen in Fig. 4.

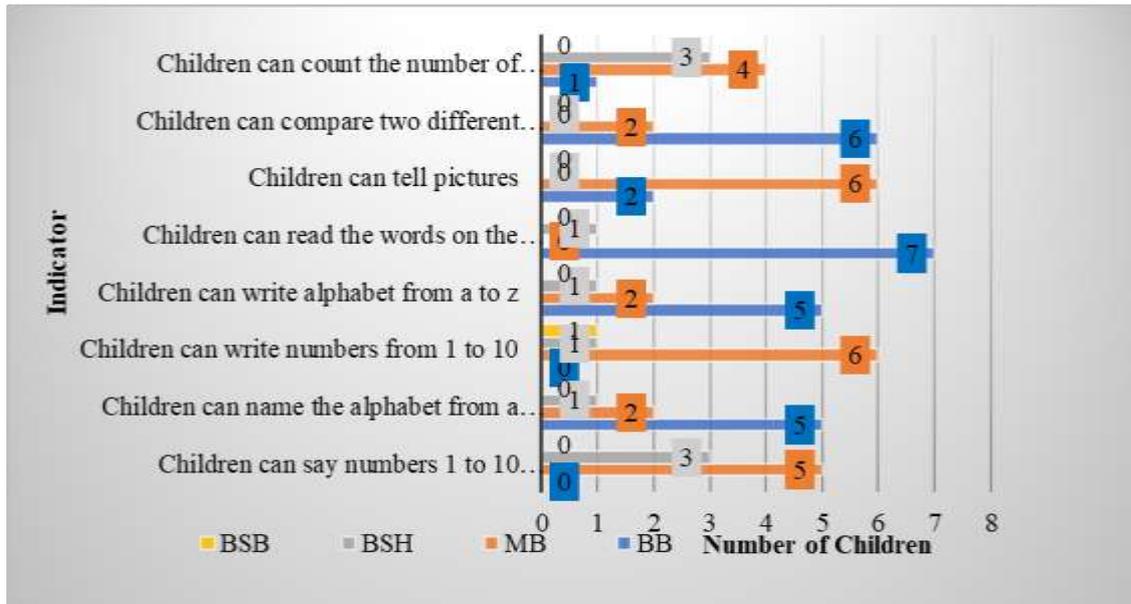


Fig. 4 Learning Outcomes of Basics of Children's Literacy KB SPNF SKB Pontianak City

In Fig. 4, the children indicator can say numbers from 1 to 10 at random: 62.5% of children began to develop and 37.5% of children developed according to expectations. The indicator of children can name the alphabet from a to z randomly: 62.5% of children were not yet developing, 25% of children were starting to develop, and 12.5% of children were developing as expected. The indicator of children can write the alphabets a to z: 62.5% of children were not yet developing, 25% of children were starting to develop, and 12.5% of children were developing as expected. The indicator of children can write numbers 1 to 10: 75% of children began to develop, 12.5% of children developed as expected, and 12.5% developed very well. The indicator of children can read words in pictures: 87.5% of children were not yet developing and 12.5% of children were developing as expected. The indicator of children can tell the picture: 25% of children were not yet developing and 75% of children were starting to develop. The indicator of children can compare in two different pictures: 75% of children were not yet developing and 25% of children were starting to develop. The indicator of children can count the number of objects in the picture: 12.5% of children were not yet developing, 50% of children were starting to develop, and 37.5% of children were developing as expected. From the results of data processing, it can be concluded that for the average results of the learning achievement elements of the basics of literacy in children in the Pontianak City SPNF SKB Playgroup, 40.6% of children had not yet developed; 42.2% of children started to develop; 15.6% of children developed as expected; and 1.6% of children developed very well.

Discussion

The low achievement in learning the basic elements of literacy in children in the Pontianak City SPNF SKB Playgroup is caused by the children's difficulties in remembering numbers and letters. When asked about numbers and letters in sequence, most children can answer correctly, because they memorize the sequence of numbers and letters. On the other hand, if letters and numbers are asked at random, only a few children can answer.

Based on the results of the analysis of the needs of the children in the SPNF SKB Play Group in Pontianak City, in terms of interest, namely, the type of toys they like: 50% of children liked robots and 62.5% of children liked toy cars. Based on the results of the analysis of the needs of children in the SPNF SKB Pontianak City Play Group in terms of learning outcomes and learning outcomes of the independent curriculum on the basic elements of literacy, aspects of child development are still very low because only 15.6% of children developed as expected and 1.6% of children very well developed. Based on the results of the analysis of the needs of the children in the SPNF SKB Pontianak City Play

Group which were studied from the interests of the children, the independent curriculum, and learning outcomes, it is necessary to create a game design that can stimulate the learning achievement elements of the basics of children's literacy. The use of games using wheeled robots is expected to foster children's interest in the Pontianak City SPNF SKB Play Group in completing games that will be designed with consideration based on needs analysis 62.5% of children liked toy cars and 50% of children liked robot toys. To stimulate the achievement elements of learning the basics of literacy, it is necessary to design question cards that contain material on number recognition, letter recognition, introduction to early mathematical concepts, telling the contents of pictures and comparing two pictures. From the results of the analysis of the needs of the SPNF SKB Playgroup children in Pontianak City, a Robmanjar game design was made. The design of the Robmanjar game was made to stimulate the learning achievement elements of the basics of literacy in children in the Pontianak City SPNF SKB Playgroup and foster children's interest in having the desire to complete the game so that the learning outcomes that have been designed can be achieved.

Playing activity is a means to develop children's thinking capacity and the development of their moral behaviour. The involvement of children in the learning process is very important. So, educators must be able to create a happy, intimate, and warm learning environment through play activities. According to Ki Hadjar Dewantara, education aims to guide all natures that exist in children, so that as members of society, they can achieve safety and happiness in their lives (Habibi, 2015: 125-131).

The results of Nufiari's (2020) research stated that the creative thinking skills of early childhood, especially those aged 5 years, can be improved through robotics activities. Creative thinking skills can be improved through robotics activities because they are activities based on constructive and manipulative activities. Through robotics activities, children can also find out about technological advances through games.

CONCLUSIONS

Based on the results and discussion, it can be concluded that the average results of the elements of achievement in learning the basics of literacy were still low because the achievement level of children who developed as expected was still below 50%. The details of the developmental achievements of the elements of the basics of child literacy in the Pontianak City SPNF SKB Play Group were 40.6% of children who had not yet developed; 42.2% of children started to develop; 15.6% of children developed as expected; and 1.6% of children developed very well. For the learning achievement elements of basic literacy to increase, it is necessary to design types of games that can stimulate children's development in the learning achievement elements of basic literacy. The Robmanjar game is expected to stimulate aspects of child development in the Pontianak City SPNF SKB Play Group in the learning achievement elements of basic literacy.

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