

DEVELOPMENT OF BOI-BOIAN TRADITIONAL GAME WITH STEM APPROACH TO IMPROVE COGNITIVE ABILITY AND SOCIAL EMOTIONAL INTELLIGENCE

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ABSTRACT

This development research aims to explain the feasibility, practicality and effectiveness of boi-boian games traditional with a STEM approach to improve cognitive abilities and social emotional intelligence of children with group B Kindergarten. This development research uses the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model developed by Robert Maribe Branch. The subjects of the research were 30 kindergarten children aged 5-6 years from Permata Bunda Kindergarten, Mambaul Ulum Kindergarten and Kepuh K Shipping TK DWP. Data collection techniques using interviews, observation and questionnaires. Results of this research indicate that: (1) the results of media validation obtained a value of 3.75 in the very valid category, the results of the guidebook validation obtained a value of 3.78 in the very valid category, the material validation obtained a value of 3.73 in the very valid category, and validation. RPPH obtained a value of 3.56 with a very valid category; (2) the practicality results from the implementation of learning in the first meeting got a percentage of 75% and the second meeting got a percentage of 94% in the well-executed category, while the children's activities at the first meeting got a percentage of 77% and the second meeting got a percentage of 94% with the active category; (3) the results of the effectiveness of the use of traditional Boi-boian games on children's cognitive abilities obtained an n-gain value of 0.67 in the moderate category, and the use of traditional Boi-Boian games on children's emotional social intelligence obtained an n-gain value of 0.66 in the moderate category. Thus, it can be concluded that the traditional Boi-boian game can be used as an innovative medium in Kindergarten Group B in improving children's cognitive abilities and social emotional intelligence.

KEYWORDS: boi-boian traditional game, STEM approach, cognitive ability, social emotional intelligence

INTRODUCTION

In the philosophical foundation of the 2013 curriculum, it is explained that early childhood is a time when children spend most of their time playing. Therefore, learning in PAUD is carried out through play and activities that contain the principle of play. The principle of playing for children is a game

that can develop a productive, active, creative attitude, and be able to produce positive and fun activities for children. In general, young children really enjoy playing games and will continue to do so wherever they have the opportunity, so playing is one way for children to learn, because through playing children learn about what they want to know and in the end are able to recognize all the events that occur around them.

In ancient times children played with a variety of simple equipment around them such as wood, stone, tile fragments, paper, patchwork and so on. Various kinds of children's games in ancient times were typical games of each region and became one of the nation's cultural wealth which is better known as traditional games. Traditional games in the past made children so active outside, sweating, laughing with friends, until they lost track of time. And before technological developments emerged as they are today, various traditional games had colored the lives of Indonesian children. Some of them are widely known in various areas such as hide and seek, galah salted or gobak sodor, marbles, rubber jumps, fortifications, boi-boian, and so on.

Whereas traditional games are the wealth of the nation's local culture that describes the forms of life behavior that have been experienced by ancestors. But not all of our generation, the nation's children, are familiar with these kinds of traditional games. Even today, traditional games are fading away with the times. And the current phenomenon of gadgets is like poison for today's children, little by little they ask for games on their cellphones, or intermittently want to watch videos on YouTube or tablets. When the gadget is taken, it is not uncommon for children to get angry and cry. In today's era, children prefer to play gadgets than games outside the home that involve physical activity. Children rarely interact with each other's friends, and become more individualistic. Traditional games of the past are starting to be abandoned and are getting more and more fun with their respective gadgets. Whereas traditional games are very diverse and involve all motor activities in children so that they are always agile, active, and can interact and make friends with each other.

One of the most famous traditional games on the island of Java is the boi-boian game. However, today's children do not know these traditional games, so it is necessary to preserve and introduce them to learning activities that are integrated with a method approach so that the game becomes an element of fun learning. One of the learning approaches that are widely discussed in early childhood education today is the STEM approach. The STEM approach in learning activities can stimulate children's thinking skills to think critically in solving problems, is open, and fun for children, because it provides opportunities for children to think more creatively with all their ideas.

The STEM approach is a method of learning based on Science, Technology, Engineering, and Mathematics. This learning is prepared to meet children in the 21st century. Because the STEM approach emphasizes active learning, stimulates children to solve problems, focus on solutions, build logical and systematic ways of thinking, and sharpen critical thinking skills. So it has a big role in preparing children to build career opportunities in the technical and creative fields in the future.

Science, Technology, Engineering, and Mathematics (STEM)-based learning is taught in an integrated manner in PAUD. STEM is used to focus on understanding the integrated nature of the disciplines of science, technology, engineering, and mathematics and their importance in children's long-term academic success, economic well-being and community development (Han, et al., 2016). STEM is an appropriate approach to be integrated with boi-boian games as a fun learning method for early childhood. Because traditional boi-boian games with a STEM approach can train children to play while learning. The use of the STEM approach in the learning process through boi-boian games can provide open learning activities,

In Early Childhood Education institutions such as Kindergartens, Playgroups, Early Childhood Education Posts and other similar educational institutions, cognitive development is also known as the development of thinking power or intellectual development. The intellectual development of children aged 3-5 years is often referred to as the development of preschool age, which is characterized by creative, free and imaginative attitudes and behavior. At this age is a golden age for children which is marked by the emergence of a period of sensitivity to a number of aspects of their development, various forms of creativity in playing from the child's imagination, because at this time is a creative period according to experts, namely the emergence of various forms of creativity in playing which is a form of creativity original creativity with the frequency of its appearance that seems uncontrollable compared to other times. Meanwhile, at the age of 6 years, children are in a transition period from late childhood, children begin to be able to think logically with global observations, able to basic skills that are academic and non-academic.

While other children's intellectual development according to Piaget (in Sujiono, 2014: 3.10), namely the age of 4-7 years is the age at the pre-operational stage of cognitive development children begin to use primitive reasoning and want to know answers to all forms of questions. Where at this age is characterized by the development of knowledge from close and observable experience, exploration and manipulation of concrete objects, and coordination of knowledge in concrete operations. Another opinion, according to Vygotsky (in Sujiono, 2014:4.12), explains that the basic principle of children's cognitive development is that children build a variety of knowledge, and cognitive development cannot be separated from the social context. Children learn through social interaction, and cognitive abilities as part of their induction into the way of life. Cognitive development of children through thinking tools that develop from an early age to adulthood.

In addition to cognitive development that is no less important for children is the development of children's social-emotional intelligence. The development of emotional social intelligence is a development that is difficult to separate explicitly from one another. The attachment is stronger when the expression of the combination of the two is raised by children. And the cognitive aspect has a big influence in the emotional process, because emotional development in infants and children is often associated with cognitive development. Emotion is a complex condition, can be in the form of feelings or vibrations of the soul which is characterized by biological changes that appear to accompany the

occurrence of a behavior. In organizational theory by Sroufe and Lewis, describing the emergence of emotions as a process that is distinguished by maturity, cognitive development, and socialization. Socialization is the ability to behave in accordance with social norms, values or expectations. Socialization is a process of training self-sensitivity to social stimuli related to social demands in accordance with social norms, values or expectations.

Based on the results of initial observations, it is known that the ability of children in Kindergarten Group VI, Waru District, Sidoarjo Regency, it was found that children aged 5-6 years still have difficulty in classifying objects based on color, shape, and size, mentioning symbols for numbers 1-10, recognizing various types of vowels and consonants. This is because in learning activities the teacher conveys activities that lack strategies or innovations that are fun for children, so children easily feel bored in the learning activities provided by the teacher. In addition, it is known that the social-emotional intelligence of children in Cluster VI still needs to be improved. In learning activities through play, they still look impatient or less able to obey the rules, less able to cooperate with friends,

In the Regulation of the Minister of Education and Culture No.137 of 2014, it is explained that the ability of children in the scope of cognitive development according to the Level of Achievement of Child Development aged 5-6 years is that children are able to classify objects based on color, shape, and size (3 variations), recognize ABCD patterns -ABCD, mentions the symbols of numbers 1-10, recognizes various symbols of vowels and consonants. While in the scope of socio-emotional development, including children are able to obey the rules, be cooperative with friends, recognize manners and manners in accordance with local socio-cultural values such as sportsmanship and honesty in playing. But in reality, many parents only prioritize their children's intellectual abilities that stand out compared to their children's social skills, and without them realizing that intellectual and social emotional abilities are equally important to develop, because many successful people start with good social skills.

Based on the facts and some of the opinions above, it can be seen that the cognitive abilities and social emotional intelligence of children aged 5-6 years in cluster VI, Waru District, Sidoarjo Regency still need to be improved and developed. In developing these abilities, it is necessary to use interesting strategies and methods that are also fun for children, so that learning activities become more meaningful for children, then playing activities are very appropriate, children can learn outdoors by introducing traditional children's games in the past. The game was developed attractively with a modification of the method approach and several developments to preserve the nation's culture, so the idea emerged to develop a traditional boi-boian game with a STEM approach. And in fact, the traditional boi-boian game with a STEM approach is very fun to introduce to early childhood. This traditional boi-boian game with a STEM approach can introduce children to learning in the open, stimulate children to be able to think creatively, socialize, and train cooperation.

THEORETICAL FRAMEWORK

Traditional Boi-Boian Games

Play is defined as an activity carried out with tools or without tools which in its activities produce understanding, provide information, provide fun and can develop children's imagination. Games provide pre-practice opportunities to get to know the rules of the game, comply with norms and prohibitions, and act honestly (Wiyani & Barnawi, 2012:92-93). Traditional games are games that are commonly played by ancient rural children, which are characterized by simplicity and use nature as a support in their games. Togetherness caused when playing causes more interaction and socializing with peers and the environment. In subsequent developments, traditional games are often used as a type of game that has original regional characteristics and is adapted to local cultural traditions (Soesilo, 2015:27).

This game is called the game "boi-boian" because in the past the players were more boys which in English is "boy". The uniqueness of this game lies in the rules of carrying the ball. The group on guard (team B) tried to throw the ball to hit the group making up the tower (team A), but not by running the ball and then throwing it on the opponent's body. The ball must be passed to members of the group while trying to catch and throw the ball. One round of this game is considered complete if team A manages to arrange the tiles, and they shout 'Boi-boi' when the towers are arranged perfectly, meaning they won the game. Therefore, the ball throwing group exchanges positions with the compiling group or the game is declared over if there is already one of the teams whose members all fall.

STEM Approach in Early Education

Tsupors (2009) that integrated STEM education is interdisciplinary in learning, in which students use science, technology, engineering, mathematics in contexts that connect schools, the world of work, and the global world, thereby developing literacy. STEM that enables students to be able to compete in the new economic era. Another opinion was expressed by Kelley and Knowles (2016) which states that STEM is a learning approach to teach STEM content from two or more domain teams, linked by STEAM practice in an authentic context for the purpose of connecting the subject in improving student learning.

Soylu (2016) explains the importance of STEM being applied from early childhood that the need to emphasize science, mathematics, technology and engineering lessons in the school environment to improve 21st century individual skills, starting with early childhood by using a development-appropriate approach stated by a large number of studies.

Early Childhood Cognitive Development

Cognitive is a thought process, namely the ability of individuals to relate, assess and consider an event or events. Cognitive processes are related to the level of intelligence (intelligence) that characterizes a person with various interests, especially those aimed at ideas and learning (Sujiono, 2014:1.3). Further Witherington (1985) says that cognitive development is the development of the mind. Thoughts are part of the thinking process of the brain. The mind is used to recognize, know, and understand.

Cognitive development is the development of the mind to know, understand, give reasons, and convey in solving problems / problems by developing creative strategies. Basically, cognitive development is intended so that children are able to explore the world around them through their five senses. With the knowledge gained, children can reason and solve various problems in every experience they experience with the cognitive process which includes aspects of perception, memory, thoughts, symbols, reasoning, and problem solving.

Through cognitive development, the child's thinking function can be used quickly and precisely to overcome a situation in solving a problem. In learning, children are always associated with problems of remembering and thinking, both of which are cognitive activities that really need to be developed. And the development of the cognitive structure of each individual takes place in the same order, each individual will certainly experience and pass through each of the same stages, even though the speed of development at these stages is passed relatively.

Emotional Social Intelligence

Socialization is a process in which individuals (especially) children train themselves to be sensitive to social stimuli, especially the pressures and demands of life (the group) and learn to get along by behaving like other people in their social environment. (Loree in Nugraha, 2014: 1.17). Playing activities for children have a big enough role in developing social skills before children start making friends. Play activities prepare children for social experiences. Social development through play activities can prepare children to face social experiences. Attitudes that can be developed through playing activities according to Nugraha (2014: 1.20) include social attitudes, learning communication, learning to organize, respecting other people and differences and respecting harmony and compromise.

Emotions as feelings arise when someone is in a situation that is considered important by the individual. Emotions are represented by behavior that expresses comfort or discomfort with the situation or interaction being experienced. Emotions can take the form of pleasure, fear, anger, and so on. Emotions are feelings that exist in us, can be feelings of pleasure or displeasure, feelings of good or bad (Rachmawati, 2014:13). Emotional intelligence is the ability to recognize, process, and control emotions so that children are able to respond positively to every condition that stimulates the emergence of emotions. With emotional and social skills, children will be better able to overcome various problems that arise during the development process towards adult humans, and are better able to overcome the emotional challenges of modern life. Because children who have high emotional intelligence are children who are happy, confident, popular, and more successful in school. They are better able to control emotional turmoil, build relationships with those around them, can manage stress and have good mental health.

Play helps children develop the ability to organize and solve problems. Children who play must think about how to organize the material according to the purpose of their play. Other than that, Play

improves children's social competence. According to Catron and Allen (in Sujiono, 2009: 145), play supports the development of socialization in terms of social interaction, cooperation, saving resources and caring for others.

METHOD

The type of research used in this research is development research that produces products. The research and development method is a research method used to produce a particular product and test the effectiveness of the product (Sugiyono, 2015: 297). This study aims to develop a traditional boi-boian game with a STEM approach to improve cognitive development and social emotional intelligence of children aged 5-6 years in Kindergarten with good qualifications by paying attention to three aspects of quality, namely valid, practical, and effective.

Borg and Gall (1983:772) define development research as a process used to develop and validate educational products. The steps of this process are usually referred to as the research and development (R&D) cycle which studies the research findings related to the product being developed, develops the product based on these findings, the test area in the setting where it will be used eventually and revises it to correct any deficiencies found. in the stage of submitting a test. This research design uses the research and development design of the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model developed by Robert Maribe Branch. The ADDIE development model was chosen because it is effective, dynamic and supports the performance of the program itself.

The research subjects in this development research were children aged 5-6 years in Kindergarten Group VI, Waru Sidoarjo District. And taken from only 3 institutions in one cluster by random. This research was conducted in Permata Bunda Kindergarten, Mambaul Ulum Kindergarten and DWP Kepuh Shipment II Kindergarten.

This type of research is development research to product development. Development research used to products and get the effectiveness of the products (Astutik & Prahani, 2018). The instruments and procedures used in this study were 1) The validation sheet as an assessment given by the validator by giving a check (√); 2) Observation sheets on the implementation of learning and activities of teachers' children were used to obtain practical data on the boi-boian traditional game in supporting learning activities. Observation sheets and questionnaires will be implemented for teachers and students who contribute to product trials; 3) Observation sheets (check lists) are used to obtain data on the effectiveness of media in cognitive development and social emotional intelligence of children. The questionnaire sheet was used to obtain data on the teacher's response to the benefits after using the traditional boi-boian game developed. Product development data is obtained from the traditional boi-boian game which has been validated by experts/media experts and material experts. The results of the assessment were concluded in a qualitative descriptive form using Likert's reference. Likert's reference table is as follows.

Table 1. Validation Rating Scale

Score	Criteria
1	Not good
2	not good
3	Pretty good
4	Good
5	Very good

(Sugiyono, 2015:141)

The data generated from the validation is in the form of a score. The percentage of agreement between validators is calculated using the percentage of agreement (R), with the formula:

$$R = \frac{\sum K}{\sum N}$$

Information:

R = Average

K = Number of aspects assessed

N = Quantity all aspects

The results of data analysis on each aspect of the average score are then interpreted into the following table 2.

Table 2. Validity Coefficient Classification

Value Interval	Value Category	Information
3.6 P 4.0	Very Valid	Can be used Without Revision
2.6 ≤ P 3.5	Valid	Can be used with minor revisions
1.6 ≤ P 2.5	Less Valid	Can be used with major revisions
1.0 P 1.5	Invalid	Can't be used yet

(Adapted from Ratumanan & laurens, 2015: 181)

Analysis of the data from the observation of children's cognitive abilities and social emotional intelligence were analyzed using a gain score on the pretest and posttest scores. The magnitude of the increase was analyzed using the formula (Hake, 1999)

$$\langle g \rangle = \frac{\text{skor posttest} - \text{pretest}}{\text{skor maksimum} - \text{pretest}}$$

The gain scores obtained are interpreted into the n-gain categories below.

Table 3. Classification of N-Gain Score

Normalized Gain Value	Interpretation
-1.00 $g < 0.00$	There is a decrease
$g = 0.00$	No increase
$0.00 < g < 0.30$	Low
$0.30 g < 0.70$	Medium
$0.70 g 1.00$	High

Hake (1999)

The effectiveness test of the product developed in this study was analyzed using the t test with the paired t test formula. This is to prove the significance of differences in cognitive abilities and social emotional intelligence of children using the traditional boi-boian game based on the STEM approach, it needs to be tested statistically with a correlated t-test (related). To find out the changes from the initial conditions and final conditions, in this case the final conditions are better than the initial conditions.

RESULT

Eligibility of Traditional Boi-Boian Games

Before being used for research, the instruments used were validated by expert validators. All of the instruments that were validated were validation of the developed boi-boian game, validation of guidebooks, validation of daily learning implementation plan and instructional material validation. The results of the validation by the validator are presented below.

Table 4. Research Instrument Validation Results by Experts

No.	Validated instruments	Average Score	Predicate
1.	Boi-Boian Game	3.75	Very valid
2.	Guidebook	3.78	Very valid
3.	Instructional Material	3.73	Very valid
4.	Daily Learning Implementation Plan	3.56	Very valid

From the validation results, it can be seen that the entire instrument used for the study obtained a very valid category because it was in the range of values from 3.6 to 4.0. The validity of the feasibility of the developed learning strategy was carried out to determine the feasibility level of the traditional boi-boian game with the STEM approach. The quality of this aspect of the game was validated by several experts, namely material experts validating the material and media experts validating media quality. The validation of the traditional boi-boian game was carried out first to material experts and then media

experts. The validation of the game consists of the feasibility of the traditional boi-boian game and its supporting media, as well as the user manual, while the validation of the material includes the material to be used during learning activities and the Daily Learning Implementation Plan.

The size of a product can be said to be of quality if it meets several aspects of product quality. The product developed in this development research based on the expert validator's assessment has shown that all aspects tested have a Very Good product validity score. This statement is in accordance with the opinion expressed by Nieveen (1999:123) that a product can be said to be of quality if it meets the product quality aspects, including (1) validity; (2) practicality; (3) effectiveness

Practicality of Traditional Boi-Boian Games

Assessment of the practicality of boi-boian traditional game products with a STEM approach through game activities. In the condition of the Covid-19 pandemic, face-to-face learning activities at schools cannot be carried out, so learning activities are carried out by means of home schooling in one of the children's homes. The following are the results of the implementation of children's learning and activities derived from the observer's assessment:

Table 5. Results of Practicality Recapitulation

No.	Rated aspect	Implementation	Average	Percentage	Information
1	Implementation of learning	<i>Pretest</i>	3.00	75%	Very well executed
2	Implementation of learning	<i>Posttest</i>	3.77	94%	Very well executed
3	Children's activities	<i>Pretest</i>	3.1	77%	Active
4	Children's activities	<i>Posttest</i>	3.8	94%	Active

The learning activities in the first meeting (pretest), the implementation stage received scores from the two observers as a whole, obtaining a percentage of 75% in the very good category, while at the second meeting (posttest) it obtained a percentage of 94% in the very good category. The results of the observation of children's activities at the first meeting got a score from two observers overall getting a percentage of 77% in the active category, while children's activities at the second meeting got a percentage value of 94% in the active category.

Product can be said to be practical if it makes it easier for users to use or use the product. The products produced in this development research were tested to determine the level of practicality of a product. The test results can be seen from the observations of 2 observers. The development of traditional boi-boian games with a STEM approach is certainly very fun for early childhood, because they can move freely in the open, children can explore and find new experiences in their playing activities. Without realizing it, the children have learned in the game activities.

According to Nieveen (1999) besides being valid, learning tools must also be practical and effective. Not only RPP, traditional boi-boian games with a STEM approach must also be feasible before being tested. Furthermore, to obtain data on the practicality of the boi-boian traditional game with the STEM approach that has been developed, an instrument of observation sheets for children's activities was used during the implementation of the traditional boi-boian game with the STEM approach, namely by observing the activities carried out by children and observing the implementation of learning according to with the learning tools design.

Sardiman (2014:103) that in learning there needs to be activity, because in principle learning is doing or learning by doing. Activity is a principle or principle that is very important in learning interactions. According to Nur & Wikandari (2000:1) learning is more than just remembering. A child really understands and can apply science, they have to work hard to solve problems, find something and always be in touch with ideas or ideas. The learning process that is expected to occur according to Aunurrahman (2013) is a process that can develop the potential of children in a comprehensive and integrated manner. For this reason, in the learning process, teachers are not only required to deliver subject matter, but must be able to actualize its strategic role in an effort to shape children's character through personality development and prevailing values.

Effectiveness of Traditional Boi-Boian Games

The effectiveness of the traditional boi-boian game with the STEM approach developed by the researcher can be seen from the observation of cognitive development and the observation sheet of emotional social intelligence. The implementation of learning in groups, and each group consists of 5 children. Data from children's cognitive abilities and emotional social intelligence were analyzed using n-gain and statistical tests of effectiveness.

The effectiveness of the product can be seen from the results of increasing the ability of children from before being given treatment (pretest) and after being given treatment (posttest). This is in accordance with the statement (Purwanto, 2011: 38) which states that learning outcomes are used to find out how far a person accepts or understands the material or material that has been delivered. In this research and development, the effectiveness is seen from the results of cognitive abilities and social emotional intelligence of children given to children through pretest and posttest using the traditional game boi-boian with a STEM approach.

Data analysis in this study used a paired t-test to determine the significance of the traditional boi-boian game with the developed STEM approach. Statistical analysis includes parametric statistical tests, so it must meet the prerequisite tests, namely normality tests and homogeneity tests. The error rate (significance level) used in this study was 0.05. This analysis prerequisite test aims to determine whether or not there are deviations from the existing variables.

Normality test in this study using Kolmogorof-Smirnov. To find out whether the data distribution is normal or not, it can be seen from the value of Kolmogorov-Smirnov on each variable to be studied. The test criteria if the p value 0.05 then the data is normally distributed. Conversely, if the p value 0.05 then the data is not normally distributed. The results of the normality test of several variables in this study can be seen from the following table.

Table 6. Result of Normality Test

Variable	Significance (p)	Information
Cognitive Ability (pretest)	0.072	Normal
Cognitive Ability (posttest)	0.101	Normal
Emotional Social Intelligence (pretest)	0.141	Normal
Emotional Social Intelligence (posttest)	0.085	Normal

Source: Data processed by the author, 2021

Based on the table, the results of the normality test can be seen that the significance value for all data on each variable in the study obtains a value greater than 0.05, then all data are declared normally distributed. To perform the homogeneity test, it can be done using Levene's test, by looking at the significance level of the calculated Levene value. If the Levene value shows a significance level of more than 0.05, it can be said that there is no difference in variance between the sample groups or in other words, the variance between groups is the same. The results of the homogeneity test can be seen in the following table.

Table 7. Homogeneity Test Results

Variable	Levene	Score Significance	Information
Cognitive Ability (pretest)	1,308	0.287	Homogeneous
Cognitive Ability (posttest)	0.647	0.531	Homogeneous
Emotional Social Intelligence (pretest)	1,352	0.276	Homogeneous
Emotional Social Intelligence (posttest)	0.182	0.671	Homogeneous

Source: Data processed by the author, 2021

Based on the table, the homogeneity test on the pretest cognitive ability shows a value of 0.287 which means greater than 0.05, while the homogeneity test on the posttest cognitive ability shows a value of 0.531 which means greater than 0.05. In the pretest emotional social intelligence variable, the homogeneity test value of 0.276 means greater than 0.05, while the posttest emotional social intelligence shows a homogeneity test value of 0.671 which means greater than 0.05. From the whole data, it can be said that there is no difference in variance between sample groups or in other words the variance between groups is the same or homogeneous.

Table 8. Descriptive Statistics of Children's Cognitive Development Data

No.	Description	Maximum Score = 12	
		Pretest	Posttest
1.	Average	7.07	10,20
2.	N-Gain		0.67
3.	The highest score	9	12
4.	Lowest Value	4	7

Source: Data processed by the author, 2021

The cognitive ability research focuses on aspects of (1) arranging pictures according to color and type; (2) sorting number symbols; (3) compose vowels (a, i, u, e, o). Based on the results obtained in table 6, it is stated that the value obtained by the child's cognitive ability between the pretest and posttest scores has increased. This is evidenced by the first meeting (pretest) as a whole getting an average score of 7.07, then at the second meeting (posttest) there was an increase by obtaining an average score of 10.20 from a maximum score of 12.

Table 9. Results of Testing the Effectiveness of Boi-Boian Games with STEM Approach to Cognitive Ability

t count	Sig. (p)	Information
19.078	0.000	There is a significant difference between pretest and posttest

Source: Data processed by the author, 2021

Based on table 9 calculations using the significance test for the value of children's cognitive abilities in this study obtained tcount of 19.078 with a significant of 0.000. So, it can be concluded that the significance value (0.000) < 0.05. Thus, it can be stated that there is a significant difference in children's cognitive abilities using the traditional boi-boian game with the developed STEM approach.

Furthermore, the emotional social intelligence focuses on aspects, namely (1) obeying the rules of the game; (2) being cooperative with friends; (3) being sporty and honest in playing.

Table 10. Descriptive Statistics of Children's Emotional Social Intelligence Data

No	Description	Maximum Score = 12	
		Pretest	Posttest
1.	Average	7,10	9.80
2.	N-Gain		0.59
3.	The highest score	9	12
4.	Lowest Value	4	7

Source: Data processed by the author, 2021

Based on the results obtained in table 7 that the value obtained by children's emotional social intelligence between the pretest and posttest scores increased. This is evidenced by the overall score at the first meeting (pretest) obtaining an average score of 7.10, then at the second meeting (posttest) an increase by obtaining an average score of 9.80 from a maximum score of 12.

Table 11. Results of Testing the Effectiveness of Boi-Boian Games with STEM Approach to Emotional Social Intelligence

t count	Sig. (p)	Information
12,868	0.002	There is a significant difference between pretest and posttest

Source: Data processed by the author, 2021

Based on table 11 calculations using the significance test for the value of children's emotional social intelligence in this study obtained tcount of 12.868 with a significant of 0.002. So, it can be concluded that the significance value (0.002) <0.05. Thus, it can be stated that there is a significant difference in children's social intelligence using the traditional boi-boian game with the developed STEM approach.

DISCUSSION

The findings of this study are relevant to research conducted by Rahmawati & Reza (2014) that boi-boian media can improve the cognitive abilities of Kindergarten children. The use of modified boi-boian games has a more significant effect on cognitive abilities, especially in recognizing children's geometric shapes than learning without games and media when learning to recognize geometric shapes. Cognitive children can be developed through games, he believes through games and real experiences make children have imagination.

Children's thinking ability or cognitive development has its own stages, according to Piaget's stages of cognitive development (in Beaty, 2013: 269) there are 4 stages, namely sensorimotor, preoperational, concrete operations, formal operations. Children aged 5-6 years are included in the preoperational stage. Where at this age children master symbolic thinking. Children use objects to symbolize actions and events. Children learn to predict the effect of one action on another, children are fooled by appearances, and children think about the final product. Meanwhile, according to Ministerial Regulation No. 58 of 2009 that children aged 5-6 years have a level of achievement of cognitive development covering three aspects, namely learning and problem solving, logical thinking, and symbolic thinking. There are many things that make children's cognitive development increase, one of which is the use of traditional boi-boian games with a STEM approach. It is undeniable that these two have a relationship.

Rasyid (2009:142) states that children are happy with the colors in every object, writing and image they see. Children begin to learn to observe or recognize the differences and similarities of various

shapes, sizes, pictures, colors, letters and numbers. The statement above can be observed to what extent the ability of Kindergarten children aged 5-6 years in recognizing letters, counting and recognizing colors. The role of the teacher here in stimulating children to recognize letters, colors and numbers is very much needed. The introduction of vowels, colors and counting can be done by the teacher by choosing activities that are interesting, simple, and fun for children.

Through direct practice activities in traditional *boi-boian* games with a STEM approach in the implementation of treatment, children can do more activities. Children are directly involved in learning. What is found in the conditions in the field is in accordance with the benefits stated by Sudjana & Rivai (2011: 24), namely that children can do more learning activities because they do not only listen to teacher descriptions, but also other activities such as observing, doing, acting, and so on. -other. Early childhood is different from adults. Children have their own and unique characteristics or characteristics. The distinctive characteristics possessed by children at this time is a growth and development that must really be maximized. Here are some characteristics of early childhood according to various opinions, but in the implementation of research not all of these characteristics appear. As for some of the characteristics found by researchers will be discussed and analyzed according to theory and field conditions during research.

The next characteristic is that children have a strong curiosity and are enthusiastic about many things. It can be seen when the teacher explains the use of the traditional *boi-boian* game with the STEM approach, the children look enthusiastic in learning and want to try what the teacher exemplifies. This is in line with Fadillah's theory (2012: 57) that children tend to pay attention to talking and questioning various things they have seen and heard, especially to new things. Have high enthusiasm and motivation to learn and learn a lot from experience.

Social development is a process of forming social self (personal in society), namely personal in family, culture, nation, and so on. Meanwhile, Hurlock (in Nugraha, 2014) explains that social development is the acquisition of the ability to behave in accordance with social demands. Socialization is the ability to behave in accordance with norms and values. The ability of social behavior is needed by early childhood because when children have good social behavior, children will easily adapt to new environments. Sabanci & Omeroglu (2015) states that children are raised to show behavior as expected by society depending on social development. Children's social development in the early years is their future social basis for social behavior.

Play activities for children have a big enough role in developing social skills before children start making friends. Play activities prepare children for social experiences. Social development through play activities can prepare children to face social experiences. Play helps children develop the ability to organize and solve problems. Children who play must think about how to organize the material according to the purpose for which they play.

The traditional boi-boian game was developed using elements of the STEM approach. Learning in early childhood to stimulate creativity is carried out through a variety of varied programs. Learning that is prepared to welcome children to face the 21st century is learning based on Science, Technology, Engineering, Art, and Mathematics (STEAM). Science is often a subject that is neglected or even ignored by teachers. However, for young children, it is often the subject that makes them most curious, excited, and thirsty to learn (Krogh, SL & Slentz, 2008). Children are trained to dare to express themselves in the form of criticism and opinions. From this it improves children's verbal and nonverbal communication skills as well as their openness to other people's perceptions and understanding of new things in children through reflection from their own experiences and emotions. (Seidel, et al., 2009)

Play improves children's social competence. According to Catron and Allen (1999), play supports the development of socialization, including: a) social interaction, namely interaction with peers, adults, and conflict resolution; b) cooperation, namely mutual assistance, sharing, and rotation patterns; c) saving resources, namely using and maintaining objects and the environment appropriately; d) caring for others, such as understanding and accepting individual differences, understanding multicultural issues. The character values contained in the boi-boian game include the value of cooperation or smart work, and the value of obeying social rules. Children can also play an active role in boi-boian traditional game activities in groups and children can also play with friends. It is very clear that the traditional boi-boian game with a STEM approach can train children to be able to work together with others. This is in line with Minartin's (2013) research that the group work method can increase children's cooperation, where when children's learning activities are divided into groups, it is intended those children train themselves to work together with others. In addition, when children do traditional boi-boian game activities, children can do social support with other people. This can be seen when children can appreciate friends. Children can listen to friends and teachers when they talk. Children can apologize to friends when they are wrong and they want to take turns when talking. This is in line with the research of Kovacevic & Opic (2014) that traditional games contribute to the quality of relationships and the frequency of children.

While the emotional aspect is the child's ability to recognize various things he feels, express feelings in a form that is acceptable to his environment, and the ability to control and overcome his feelings. Emotional maturity does not happen by itself but is gradual and requires the participation of parents and the social environment. Controlling emotions in play when they throw the ball not hit the intended person. other than that, through this game, children learn to be sporty, namely playing honestly, showing respect for other players, accepting victory with a fair attitude or accepting defeat openly. In this traditional boi-boian game with a STEM approach, children's self-confidence can be grown. This self-confidence is very important as a provision for him to face various challenges in his life in the future. With self-confidence, children feel more daring to enter social circles wherever they are.

CONCLUSIONS

The validity of the traditional boi-boian game with the STEM approach can be seen from the results of the validation of the feasibility of the boi-boian game developed, namely the average score of 3.75 and the guide book an average score of 3.78, while the results of material validation obtain an average score of 3.73, and RPPH average score is 3.56. All of the instruments used have a very valid category, where each aspect of the indicator has an average of 3-4. By using a Likert scale assessment reference in determining the criteria for the validation results.

The practicality of the traditional boi-boian game with a STEM approach, obtained from data using an instrument of observation sheets for the implementation of learning and children's activities during the traditional boi-boian game, namely by observing and observing the implementation of learning in accordance with the RPPH design and playing activities carried out by children. . The results of the implementation of learning in the first meeting obtained an average score of 3.00 and a percentage of 75% with the category carried out well. And at the second meeting, the average score was 3.77 and the percentage was 94% with the category carried out well. While the results of the activity of the first meeting children obtained an average score of 3.1 and a percentage of 77% in the active category. And the second meeting obtained an average score of 3.8 and a percentage of 94% in the active category.

The effectiveness of the traditional boi-boian game with a STEM approach is seen from the results of children's cognitive abilities and social emotional intelligence given to children through pretest and posttest using games. The results of children's cognitive abilities have an average pretest value of 7.07 and an average posttest value of 10.20 with an n-gain of 0.67 in the medium category. While the results of children's emotional social intelligence obtained an average pretest value of 7.10, and posttest an average value of 9.80 with an n-gain value of 0.59 in the medium category. From all these data, it shows that the traditional boi-boian game with a STEM approach is effective for improving cognitive abilities and emotional social intelligence of early childhood.

REFERENCES

- Adi, B. S., Sudaryanti., & Muthmainnah. (2020). Implementasi Permainan Tradisional dalam Pembelajaran Anak Usia Dini sebagai Pembentuk Karakter Bangsa. *Jurnal Pendidikan Anak*, 9 (1), 33-39
- Astutik, S., & Prahani, B. K. (2018). The practicality and effectiveness of Collaborative Creativity Learning (CCL) model by using phet simulation to increase students' scientific creativity. *International Journal of Instruction*, 11 (4), 410–424
- Aunurrahman. (2009). *Belajar dan Pembelajaran*. Bandung: Alfabeta
- Beaty, J. (2013). *Observasi Perkembangan Anak Usia Dini*. Jakarta: Kencana Prenadamedia Group.

- Bodrova, Elena & Leong, Deborah. (1996). *Tools of The Mind: The Vygotskian Approach to Early Childhood Education*. New Jersey: Merrill Prentice Hall.
- Borg, W. R. & Gall, M. D. (1983). *Educational Research: An Introduction*, Fifth Edition. New York: Longman.
- Branch, R. M. (2009). *Instructional Design: The ADDIE Approach*. New York: Springer.
- Catron, Carol E. & Allen, Jan. (1999). *Early Childhood Curriculum A Creative Play Model*. New Jersey: Merrill, Prentice-Hall.
- DeJarnette, N. K. (2018). Implementing STEAM in the Early Childhood Classroom. *European Journal of STEM Education*, 3 (3), 1-9
- Early Childhood STEM Working Group (2017). *Early STEM Matters: Providing High-Quality STEM Experiences for All Young Learners*. A policy report by Early Childhood STEM working group. Chicago: Diunduh dari <http://ecstem.uchicago.edu>.
- Ergin, B., & Ergin, E. (2017). The Predictive Power of Preschool Children's Social Behaviors on Their Play Skills. *Journal of Education and Training Studies*, 5 (9), 140– 145. <https://doi.org/10.11114/jets.v5i9.2601>
- Fadillah, Muhammad. (2012). *Desain Pembelajaran PAUD*. Yogyakarta: Ar Ruzz Media
- Hake, R. R. (1999). *Analyzing Change/Gain Scores*. Woodland Hills: Department of Physics, Indiana University
- Han, S., Rosli, R., Capraro, M. M., & Capraro, R. M. (2016). The effect of Science, technology, engineering and mathematics (STEM) project based learning (PBL) on students' Achievement in four mathematics topics. *Journal of Turkish Science Education*, vol. 13, 3-29. DOI: <http://doi.org/10.12973/tused.10168a>
- Kelley, T. R., & Knowles, J. G. (2016). A Conceptual Framework for Integral STEM Education. *International Journal of STEM Education*, 3 (11), 1-11.
- Khasanah, I., Prasetyo, A., & Rakhmawati, E. (2011). Permainan tradisional sebagai media stimulasi aspek perkembangan anak usia dini. *Jurnal Penelitian Paudia*, 1(1), 91–105
- Kovačević, T., & Opić, S. (2014). Contribution of traditional games to the quality of students, relations and frequency of students socialization in primary education. *Croatian Journal of Education*, 16 (1), 95–112.
- Krogh, S.L & Slentz, K. L. (2008). *The Early Childhood Curriculum*. New Jersey: Lawrence Erlbaum Associates, Inc.
- Marginson, S., Tytler, R., Freeman, B., & Roberts, K. (2013). *STEM: Country Comparisons*. Melbourne: The Australian Council of Learned Academies. Accessed from <https://acola.org/wp-content/uploads/2018/12/saf02-stem-country-comparisons.pdf>
- Michel, A., & Wortham, S. (2007). Listening beyond the self: How organizations create direct involvement. *Learning Inquiry*, 1 (2), 89–97. DOI: <http://doi.org/10.1007/s11519-007-0016-y>
- Minartin. (2013). Meningkatkan perilaku sosial anak melalui metode kerja kelompok pada kelompok A di tk aisyiyah bustanul athfal toboli. *Jurnal Kreatif Tadulako Online*, 1 (3), 157– 171.

- Ministry of National Education. (2010). *Pedoman Pengembangan Program Pembelajaran di Taman Kanak-kanan*. Jakarta: Direktorat Jenderal Manajemen Pendidikan Dasar dan Menengah.
- Ministry of Education and Culture. (2014). *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 137 Tahun 2014 tentang Standar Nasional Pendidikan Anak Usia Dini*. Jakarta: Kemendikbud
- Moleong, Lexy J. (2011). *Metodologi Penelitian Kualitatif*. Bandung: Remaja Rosdakarya
- Musfiroh, Tadkiroatun. (2008). *Cerdas Melalui Bermain*. Jakarta: Grasindo.
- Musfiroh, Tadkiroatun. (2008). *Teori dan Konsep Bermain*. Modul 1. Accessed from <http://repository.ut.ac.id/4699/1/PAUD4201-M1.pdf>
- Nieveen, N. (1999). Prototyping to Reach Product Quality. Dalam Plomp, T; Nieveen, N; Gustafson, K; Branch, R.M; dan van den Akker, J (eds). *Design Approaches and Tools in Education and Training*. London: Kluwer Academic Publisher.
- Nur, Haerani. (2013). Membangun Karakter Anak Melalui Permainan Anak Tradisional. *Jurnal Pendidikan Karakter*, 3 (1), 87-94
- Nurjanah, S., & Nur'aeni, E. (2020). Pengembangan Permainan Tradisional Boi-boian sebagai Media Ajar Sifat-Sifat Segitiga. *Pedadidaktika: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, 7 (2), 234-242.
- Nugraha, Ali dan Rachmawati, Yeni. (2014). *Perkembangan Sosial*. Tangerang Selatan: Universitas Terbuka.
- Nur, M. & Wikandari, P. R. (2000). *Pengajaran Berpusat Kepada Siswa dan Pendekatan Konstruktivis dalam Pengajaran*. Surabaya: Unesa University Press.
- Purwanto. (2011). *Evaluasi Hasil Belajar*. Yogyakarta: Pustaka Pelajar
- Quigley, C. F., & Herro, D. (2016). Finding the Joy in the Unknown: Implementation of STEAM Teaching Practices in Middle School Science and Math Classrooms. *Journal of Science Education and Technology*, 25 (3), 410-426. DOI: <https://doi.org/10.1007/s10956-016-9602-z>
- Rachmawati, Yeni & Kurniati, Euis. (2010). *Strategi Pengembangan Kreativitas Pada Anak Usia Taman Kanak-Kanak*. Jakarta: Kencana
- Rahmawati, N., & Reza, M. (2014). Pengembangan Permainan Boi-Boian Modifikasi Untuk Meningkatkan Kemampuan Kognitif Anak Usia Dini Kelompok A Di Taman Kanak-Kanak. *PAUD Teratai*, 3 (3), 1-5.
- Rasyid, Harun. (2009). *Asesmen Perkembangan Anak Usia Dini*. Yogyakarta: Multi Pressindo.
- Ratumanan, G. T. (2015). *Inovasi Pembelajaran*. Yogyakarta: Penerbit Ombak
- Sabanci, A., & Omeroglu, M. (2015). Preschool Teachers' Views and Experiences about ICT Use in Instruction: A Case Study. *International Journal of Academic Research in Business and Social Sciences*, 5 (6), 170-183. <https://doi.org/10.6007/IJARBS/v5-i6/1667>.
- Sardiman, A. M. (2014). *Interaksi dan Motivasi Belajar Mengajar*. Jakarta: Raja Grafindo Persada

- Sari, C. R., Hartati, S., & Yetti, E. (2019). Peningkatan Perilaku Sosial Anak melalui Permainan Tradisional Sumatera Barat. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, vol. 3 (2), 416-424.
- Scott, C. L. (2015). *The Futures of learning 1: why must learning content and methods change in the 21st century?*. UNESCO Education Research and Foresight, Paris: [ERF Working Papers Series, No. 13]
- Seidel, S., Tishman, S., Winner, E., Hetland, L., & Palmer, P. (2009). *The qualities of quality: Understanding excellence in arts education*. Cambridge: Project Zero, Harvard Graduate School of Education. Accessed from <http://www.wallacefoundation.org/knowledge-center/Documents/UnderstandingExcellence-in-Arts-Education.pdf>.
- Soesilo, Tritjahji Danny. (2015). *Teori dan Pendekatan Belajar: Implikasinya dalam Pembelajaran*. Yogyakarta: Ombak
- Soylu, S. (2016). STEM Education In Early Childhood In Turkey. *Journal of Educational and Instructional Studies in the World*, 6 (1), 38-47.
- Sudjana & Rivai. (2011). *Media Pengajaran*. Bandung: Sinar Baru Algensido.
- Sugiyono. (2015). *Metode Penelitian Pendidikan*. Bandung: Alfabeta.
- Sujarno. (2010). Nilai-nilai Yang Terkandung Dalam Permainan Tradisional Di Kabupaten Cilacap. *Jurnal Partrawidya*, 11 (1), 145-175.
- Sujiono, Yuliani Nurani. (2009). *Konsep Dasar Pendidikan Anak Usia Dini*. Jakarta: PT Indeks.
- Sujiono, Yuliani Nurani, (2014). *Metode Pengembangan Kognitif*. Tangerang Selatan: Universitas Terbuka.
- Tedjasaputra, Mayke S. (2005). *Bermain, Main dan Permainan Untuk Pendidikan Anak Usia Dini*. Jakarta: Gramedia Widiasarana Indonesia.
- Tsupros, N., Kohler, R., & Hallinen, J. (2009). *STEM Educational: A Project To Identify The Missing Components*. A Collaborative Study Conducted by the IU1 Center for STEM Educational and Carnegie Mellon University.
- Wahyuningsih, S., Pudyaningtyas, A. R., Hafidah, R., Syamsuddin, M. M., Rasmani, U. E. E., & Nurjanah, N. E. (2020). Efek Metode STEAM pada Kreatifitas Anak Usia 5-6 Tahun. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 4 (1), 295-301.
- Witherington, H. C. (1985). *Psikologi Pendidikan* (terjemahan Buchori M). Jakarta: Aksara Baru
- Wiyani, Novan Ardy & Barnawi. (2012). *Format PAUD Konsep, Karakteristik, & Implementasi Pendidikan Anak Usia Dini*. Yogyakarta: Ar-Ruzz Media.