Eduvest – Journal of Universal Studies
Volume 2, Number 11, November 2022
p- ISSN 2775-3735- e-ISSN 2775-3727

A SCIENCE-BASED MODIFICATION OF THE BOI-BOIAN GAME TO STIMULATE SCIENCE PROCESS SKILLS IN EARLY CHILDHOOD

Rizka Maulia, Euis Kurniati
Universitas Pendidikan Indonesia, Bandung, Indonesia
Email: rizkamaulia@upi.edu, euiskurniati@upi.edu

ABSTRACT

This study aims to analyze the implementation of a science-based Boi-boian game modification in stimulating Science Process Skills (SPS) in early childhood. This learning innovation is expected to restore children's mental health due to not inadequate play activities. In addition, this modification is also expected to solve lost learning due to lack of stimulation during online learning. The method used in this research is qualitative with the research subject, namely a group of eight children in a kindergarten in Parongpong, West Java. Data collection was carried out by audiovisual records and observation. Furthermore, the results of the data were analyzed using six steps, including data collection, data organization, reading the entire data, data coding, data interrelation, and interpretation of meaning. The results show that the science-based modification of the Boi-boian game can invite children to explore, observe, and solve problems. These activities stimulate the ability to predict, ask questions, observe, classify, differentiate, measure, record, and communicate. In practice, learning development can also stimulate the emergence of critical and creative thinking skills in children. The emergence of various SPS is supported by two factors, namely the four principles of learning science in early childhood and classroom management.

KEYWORDS *The Traditional Boi-boian Game, Science Learning, Science Process Skills, Early Childhood*

INTRODUCTION

The spread of Covid-19 has had a broad impact on the education sector, including in early childhood education. During the pandemic, governments in many

How to cite:	Rizka Maulia, Euis Kurniati (2022). A Science-Based Modification of The Boi-Boian Game to Stimulate Science Process Skills in Early Childhood. Journal Eduvest. *Vol 2* (11): 2397-2410
E-ISSN:	2775-3727
Published by:	https://greenpublisher.id/

countries established policies that required students to do online learning. The implementation of this policy has changed children's daily lives which has an impact on their psychology. Christner et al. (2021) and (Egan et al. (2021) found that during online learning, children miss playing with their friends and all their routines at school. The situation made children bored, lonely, sad, and even became tantrums (Milawati et al., 2022; Tabi, 2020). The same thing was also found by Pisano et al. (2020) who examined attitude and psychological problems during the lockdown period of 5989 children aged 4-10 years in Italy, that 54% of children became irritable, 43% were lazy, 31% showed excessive anxiety, 21% had tantrums, and 19% had sleep difficulty.

On the other hand, during online learning, not all family conditions support the creation of an environment that is rich in stimulation. First, the busyness of parents while working from home makes it difficult for them to accompany their children, triggering parents to let their children play with gadgets for hours (Ulfasari & Fauziah, 2021; Wardani & Ayriza, 2020). This certainly makes children lazy to do activities and socialize (Rohayani, 2020). Second, low economic factors make it difficult for parents to facilitate an educative environment so children's development is not optimal. Finally, the low educational factor also causes parents to have difficulty in understanding the psychology of children's learning, how to stimulate children according to their development, how to provide appropriate rewards and punishment, and how to deal with children's erratic moods. (Ambarita et al., 2021; Wiresti, 2020). This lack of understanding triggers parents to guide their children under pressure or take over their children's assignments so they can finish quickly (Rohayani, 2020). This mentoring crisis certainly results in a lack of development of important abilities in children, such as independence, problem-solving, fine and gross motoric skills, communication skills, material exploration, and creativity (Egan et al., 2021).

The existence of mental health issues and lost learning that may occur in children during the lockdown period should be of concern to educators to arrange appropriate learning activities during the new normal period. Cahapay (2020) emphasizes that face-to-face learning for early childhood in the new normal period apart from paying attention to health protocols must be useful in nature. Utility means that the curriculum must consider the learning content needed now and in the future. It means that the new normal curriculum must facilitate learning activities that can support children recover from the psychological impact of the pandemic while at the same time preparing children for future challenges. Thus, during the new normal period, teachers are required to accommodate learning activities that are not only appropriate to health protocols (Diana & Rofiki, 2020; Putri & Wulansari, 2021), but also deliver fun activities and stimulates 21st-century skills, such as critical thinking, communication, and problem-solving (Panda et al., 2021; Rogers, 2022).

Conditions in the field show that not all teachers can accommodate playing activities when face-to-face meetings are implemented. Based on observations in a kindergarten in Bandung, the researchers found that instead of the teacher giving children opportunities to play, interact, and explore, they actually used it to pursue math and reading skills that were left behind during the online learning period. The

same thing was also found by Putri & Wulansari (2021) that during the new normal era, teachers often used the storytelling method and gave assignments that were one-way. They reported that limited time, infrastructure, and limited teacher skills made it difficult for teachers to provide proper learning during the new normal period.

These problems show the need to develop learning methods during the new normal period which is not only provide opportunities for children to play and interact, but also stimulate various important skills. Modification of the science-based Boi-boian game can be an alternative. First, the Boi-boian game can make children keep their distance because it is played outdoors and does not invite children to crowd around for a long time. Second, the game is very fun (Adi et al., 2020) and encourages all children to be active (Rahmawati & Reza, 2014; Rosyidin & Kumaat, 2021). Finally, the elements of science included in these traditional games can stimulate various science process skills (SPS) in children which are closely related to 21st-century skills, such as the ability to predict, compare, classify, sort, solve problems, and communicate. It is hoped that these characteristics will not only restore children's mental health, but also solve lost learning that occurs due to lack of stimulation during online learning. In addition, the implementation of the traditional game as a learning method at schools can also help revive and preserve Indonesia's cultural heritage.

However, researches that focus on studying the development of science-based Boi-boian traditional game in early childhood is still very limited. In previous research, the modification of the Boi-boian game was aimed to introduce geometric shapes to kindergarten (Rahmawati & Reza, 2014), study triangular shapes in elementary children (Nurjanah & Nur'aeni, 2020), form the character of elementary children (Lusi'ani & Khusumadewi, 2008), improve gross motoric skills of early childhood (Purwanti, 2020), and develop basic movement skills of elementary children (Ribarto et al., 2006). In addition to different learning objectives, several steps of the Boi-boian game in this study are also different from the five studies above. The element of science learning in the Boi-boian game that the researchers have developed. This innovation is expected to be a solution to the issues of mental health and lost learning during the pandemic.

The need to develop learning methods during the new normal period and the limited relevant researches invites the author to conduct this research. Thus, this study aims to analyse the implementation of the modification of science-based Boi-boian game in stimulating science process skills in early childhood.

RESEARCH METHOD

This study used a qualitative method with the research subjects being a group of eight children in a kindergarten in Parongpong, West Java. The data were collected by audiovisual records and observation. This observation was carried out two times and was aimed to observe children's science process skills.

Furthermore, all research data were analyzed using the procedure described by Croswell (2015, p.236) as follows:

(1)Collection of all data with audiovisual records, observation, and interview
(2)Preparation of data analysis by changing all data into transcripts
(3)Read the entire data
(4)Coding data into themes and descriptions, namely classifying data into eight categories of science process skills (SPS) and building descriptions for each category
(5)Interrelation of themes and descriptions, namely connecting each SPS category with its description
(6)Interpretation of data, namely combining the results of analysis with relevant theory or research to create a certain meaning

The learning that is applied to stimulate the SPS is the Boi-boian game.

Boi-boian is a traditional game originating from West Java. In general, this game is played by 5 to 10 children who are divided into two groups: groups of players and guards (Ribarto *et al*., 2006). Media commonly used in this game including: tile or wooden blocks and balls (Astuti, 2018). In this study, the modification will be made to the media and steps of the game.

First, the media used is a circle tower (wooden blocks that have a gradation in size, the higher up the smaller the blocks). Likewise, for balls, the balls provided have different masses, including paper balls, volleyball balls, rubber balls, and cloth balls. In addition, there are also unstandardized scales and worksheets to support science learning. The learning media can be seen in Figure 1.

(a) (b) (c) (d)

Figure 1
The media: (a) circle tower; (b) balls; (c) unstandardized scales and blocks; (d) worksheet

Second, the modification of the science-based Boi-boian game is designed based on the principles of science learning in early childhood, including: being fun (Yoon & Onchwari, 2006), involving exploratory and investigative activities (Kelly & Stead, 2015), more emphasizing process than results (an abstract concept) (Harlen & Qualter, 2009), and maximizing the use of the five senses (Inan & Inan, 2015; Martin et al., 2005). The stages of the Boi-boian game can be seen in table 1. In practice, the science-based Boi-boian game activities are carried out in two days because the learning duration for the new normal is shorter than usual. On the first day, the children are given Boi-boian game activities while the activities on the second day are investigation and problem-solving related to the first day.

Table 1
Comparison of Original and Modified Boi-boian Traditional Games

No.	Original Boi-boian Game Steps	Modified Boi-boian Game Steps
1.	Children are divided into two groups (players and guards)	
3.	The group of players throws the ball into the pile of tiles	Before throwing the ball, the group of players must choose which ball to use to collapse the circle tower.
4.	When the tile collapsed, the group of players ran to avoid throwing balls from the guard group. At the same time, the group of players must also work together to rearrange the tiles. On the other hand, the guard group is in charge of guarding the tiles by throwing the ball at the players who are trying to arrange the tiles.	The steps are almost identical to the original version, except that groups of players have to arrange a circular tower from largest to smallest.
5.	The player hit by the ball is not allowed to continue the game. If all players are hit by the ball, they lose. The group of guards will have their turn to play.	
6.		Investigative activities: a. The teacher gives a problem, namely which ball has the greatest power to tear down the tower. Then, the teacher invites the child to predict the answer. b. The teacher invites children to explore the media. In this case, the teacher arranges three tables for different media, namely: the ball and tower; the scales and blocks; and the worksheet. Children in groups are allowed to play with the media for 5 minutes/table. c. The teacher gives children an opportunity to ask questions, then the teacher explains that to solve the problem at the start, they have to find out which ball is the heaviest and the lightest. d. The teacher demonstrates the use of media (scales and worksheet)

	e. The teacher allows children to practice how to weigh and record it in the worksheet f. The teacher directs the children to sort the balls from the lightest to the heaviest g. The teacher invites the children to throw the ball into the tower sequentially from the lightest to the heaviest balls. h. The teacher helps children conclude that the heavier an object is, the greater the pushing force.

RESULT AND DISCUSSION

Based on the results of observations, the children seemed to enjoy and have fun playing Boi-boian. They looked happy, running freely, laughing out loud when they managed to avoid throwing the ball, and cheered when they managed to reassemble the circle tower.

Besides being fun, the Boi-boian game is also rich in scientific experiences. This can be seen from the emergence of various SPS which can be seen in table 2.

Table 2
Observation Table of Science Process Skills (SPS)

Day	SPS	Activity
Day 1	Observation	Observing the game demonstration and selecting the balls
	Prediction	Selecting a ball
	Differentiate	Selecting a ball
Day 2	Observation	Observing the media
	Ask	Observing the media
	Experiment	Measuring the weight of balls and throwing the balls
	Measure	Weighing the balls
	Differentiate	Counting the number of blocks
	Classify	Counting the number of blocks
	Record	Recording findings to the worksheet

Table 2 shows that more SPS appeared on the second day than that on the first day. On the first day, the SPS that appeared in children included: observing, predicting, and differentiating. On the second day, SPS on the first day reappeared

on the second day, except for the prediction skill. On the second day, the learning activity developed the ability to observe, ask questions, experiment, measure, differentiate, classify, record, and conclude. In addition, based on table 2, it can also be seen that one activity can stimulate more than one SPS, such as selecting a ball. Besides raising the observation skill, the game also stimulated the prediction and differentiation skills.

Moreover, the science activities on the second day also triggered the emergence of critical and creative thinking skills. First, children showed critical thinking when they figured out which ball was heavier. They put forward their idea in a simpler way. They directly compare the two balls on the scales so that they could see which ball was heavier. Second, children's creativity emerges when they were allowed to play with the media. There were children making various buildings from blocks, weighing objects around them with scales, playing with wheels with circle towers, and playing bowling using balls and blocks.

At the beginning of the core activities, the researcher also used the free-play strategy. Free play is a classroom management strategy by giving children the opportunity to play with the media before entering the core activities. This strategy is carried out by three steps, including arranging tables to store different media; directing children to play at each table alternately and in groups; making an agreement about the play duration for each group. Based on the observations, this strategy succeeded in creating a conducive classroom where there was a minimal distraction from children playing media so that they could participate in all activities in an orderly manner. The class condition was conducive because children's curiosity about media has been channeled at the beginning of activities when they were playing freely.

Based on table 2, it can be concluded that the activities on the second day can stimulate more SPS than the activities on the first day because the core of science activities is on the second day. On the first day, children were invited to do play activities that contained problems. The problem was solved on the second day. In other words, on the second day, children were invited to carry out problem-solving investigations through exploration, experiment, measurement, and proofment. These whole processes triggered the emergence of various scientific process skills. In more detail, the emergence of SPS could be seen in the following discussion.

1. The Observation Skill

On the first day, the observation skill appeared in the game demonstration and ball selection activities. During the demonstration, the researcher asked, “Do all the wooden blocks in the tower have the same size? Please hold them! ". Then in the activity of selecting balls, the researcher also directed children to compare the balls first, "Please compare one ball with the others before you choose a ball!". Based on the observations, such directions encouraged children to identify the ball and the tower not only by seeing, but also by touching it. It is as described by Martin *et al*. (2005) that the observation is the ability to use various senses to gain information.

The children's observational abilities reappeared on the second day when they observed the media, such as towers, balls, scales, and worksheets. On the

second day, the researchers implemented the free-play strategy to have conducive science activities. Before entering the main activity (investigation), the researchers gave the children an opportunity to play with the media they would use. In this case, the researchers arranged three tables with each table containing different media, namely ball and circle tower; scales and wooden blocks; and worksheet. On this occasion, they were free to explore them (observing, touching, and playing the media within an agreed timeframe). After free play, they also agreed to focus on learning activities.

Based on observations supported also by the literature, the strategy of free-play provides many benefits. First, the free play strategy is effective in helping children focus on learning because their curiosity about the media has been channeled (Nugraha, 2005). While some children are tempted to play with the media again when the researcher gives an explanation, they can easily follow the researcher's directions to return to listening to the explanation. Involving children in making learning agreements makes it easier for them to be disciplined in rules. Second, the free play strategy can develop children's creativity (Andayani, 2021). Some children made buildings from blocks, played bowling with balls, and weighed any objects around the child in their way. Third, the free play strategy supported by interesting media can encourage children to make observations (Brunton & Thornton, 2014; Campbell et al., 2012; Oliver, 2006). Based on the results of observations, after the exploration activity, there was a child who mentioned the materials of the artificial scales. His explanation then invites other friends to identify the materials of the scales and correct their wrong answers. This reconfirms the explanation earlier that the interesting element in learning activities has an important role in forming children's intrinsic motivation so that children can be actively involved in activities (observation) initiatively. (Kelly & Stead, 2015; Musfiroh, 2014)

2. The Prediction Skill

Predictive abilities appear when children selected a ball. Brunton & Thornton, (2014) explained that it is important to stimulate children the prediction skill so children learn to think logically based on the results of the observations. Therefore it is important to ensure that they guess based on the results of observations, not because they followed their friends' choices. There were three ways to ensure it: directing children to compare one ball with another before choosing a ball; explaining that his friend's guess is not necessarily correct; as well as inviting the children to select a ball first then start the game. However, some children did not follow the directions so they did not make observations and selected balls quickly. Unlike most children, they seemed to think for a moment after comparing the balls, then made their decision.

Responding to the case above, the researchers tried to ask a teacher to confirm whether they usually do this. There is interesting information that the broken home factor made her withdraw from the environment. It was also found by Sary (2022) that 16 children aged 4-6 years having divorced from their parents caused them to be embarrassed to play with their friends because they were afraid of being made fun of so they withdrew from the association. It was

also same as the child in the class that she was also reluctant to communicate and did not want to participate in class activities. The researchers then asked about her preferences and it turned out that her hobby is drawing. Knowing this, the researchers tried to offer her a paper to draw on. Enthusiastically, she took the paper and other drawing tools. In this regard, Campbell *et al*. (2012) explained that science activities in early childhood do not always have to be done through experiments with certain media, but science activities actually can be carried out in informal learning, such as playing with blocks, cooking, playing on the beach, repairing toys, including drawing activities. Chang (2012) explains that when a child draws, the child must observe the details of the object to be drawn, records his identification in the form of an image, compares the results of the image with the original object, criticizes what parts do not resemble the original object, and allows for problem-solving when he finds it difficult to make the image match the object. In addition, various studies also emphasize that it is important for teachers to facilitate learning activities according to the interests and needs of children (Brunton & Thornton, 2014; Oliver, 2006; Santrock, 2010; Wortham, 2006). Therefore, researchers try to provide science activities to the child according to their interests (drawing).

3. The Ask Skill

The ability to ask appeared after the child made observations of the media. These questions include "What is this ball made of?" and “How do I make these scales?”. This ability is relatively less common in children, although researchers try to stimulate it by asking, "Anything you want to ask?" and “Anything you want to find out after looking at the ball?”. Based on the literature review, there are two possible factors regarding the skill. First, Brunton & Thornton (2014) explained that not all children use words to express their curiosity. Second, Santrock (2010) added that communication skills that are still not well developed can trigger children's difficulties in conveying ideas or curiosity.

4. The Experiment Skill

The child's experiment ability appeared in the activity of weighing and throwing the ball. When the child weighed the ball, the child was actively involved in trying to balance the two baskets by adding and removing the blocks until the basket of blocks was balanced with the ball basket. In this weighing activity, children's observational abilities were also stimulated again so that children were encouraged to observe the yellow line which is an indicator of balance.

5. The Measurement Skill

In early childhood, measurement activities are carried out using non-standard standards, such as spans, cubits, fathoms, and footsteps (Brunton & Thornton, 2014). In this activity, the non-standard standard used was the number of blocks. At the time of weighing, one of the children found a creative idea regarding how to find out which ball is heavier and which is lighter. She explained that we can also figure out which ball is heavier by directly comparing

two balls on the scale (each basket contains one ball) so we can see the results immediately. Hearing this creative and critical idea, the researcher immediately appreciated it and allowed him to put his idea into practice. Then the researcher resumed the activity of weighing the ball with a block. This is not because the child's idea was wrong, but because these activities will support the achievement of learning objectives.

6. The Record, Differentiation, and Classification Skills

The results of the scales were recorded in the worksheet. As shown in Figure 1. the worksheet contains children's activities recording the results of weighing in a table, sorting the number of blocks from the smallest to the largest, sorting the balls that have the smallest to the largest number of blocks, and finally determining which the ball has the greatest pushing force, whether the ball with the smallest or largest number of blocks.

Through the worksheet, children will be encouraged to record, identify, differentiate, and classify. These four abilities will appear sequentially. When children classified objects, children would identify similarities and differences then group them based on certain characteristics (Brunton & Thornton, 2014). Furthermore, the results of grouping were recorded in the worksheet (Chang, 2012). In this activity, the ability to classify appeared when the child counted the number of blocks in the weighing basket. The block used has three types of shapes, namely rectangles, squares, and triangles. First, the child differentiated each type of block in the weighing basket, then grouped the blocks according to their shape, then recorded them in the table. In this activity, to make it easy for children, weighing and recording can be done together with the teacher then giving children an opportunity to do it independently for the other balls.

In addition to the four abilities above, the worksheet can also stimulate children to think critically. When the researcher demonstrated the use of the worksheet and asked "Can we record the results of the rubber ball scales in the first row?". For a moment the children seemed to think and one child then replied "No, since the first row is for cloth balls". Getting this critical answer, the researcher immediately gave a thumbs up and praised him. In this case, Harlen & Qualter (2009) and Nurmawanti *et al*. (2021) explained that science learning can develop children's thinking skills.

The next activity is to interpret the record. Researchers helped children understand that the ball has the most blocks is the heaviest ball and vice versa. After the children understood it, they were asked to sort the balls from the lightest to the heaviest one. Finally, children are directed to test their guesses by throwing balls in sequence from the lightest to the heaviest balls.

7. The Communication Skill

The last science process skill is concluding. During the review, the children were able to tell what they had done. However, they found it difficult to explain what they already knew, so the researchers helped arrange the words and stopped several times to give them a chance to complete the sentences. In Vygotsky’s theory, this role is scaffolding which is temporary support to help

children master a task (Santrock, 2010; Wortham, 2006). This support will decrease as the child's skills increase. The concept of scaffolding is important in learning because temporary assistance can help children build their understanding systematically and coherently (Etnawati, 2022; Hong & Diamond, 2012; Nurtaniawati, 2017).

The emergence of various important abilities, not only science process skills but also 21st-century abilities (critical and creative thinking) in the learning activity shows that the development of this game can be alternative learning to overcome problems, such as mental health and lost learning.

CONCLUSION

Online learning that has been applied to early childhood for almost two years has had an impact on the emergence of various problems. Various studies have reported that during the lockdown period many young children were affected by mental health and lost learning. These two issues are the main considerations in the development of science-based Boi-boian games. Based on the observations, the active play element attached to the Boi-boian game makes the children happy and happy during the activity. On the other hand, the addition of science learning in Boi-boian games makes this fun game stimulate various important abilities, such as thinking skills and science process skills. The thinking skills are critical and creative thinking while the science process skills include: the skill of observation, prediction, asking questions, experiment, measurement, recording, differentiation, classification, and communication. Even so, there are also abilities that are not yet optimal in children, namely the ability to ask questions and conclude. In the implementation process, the emergence of various important abilities is supported by two factors, namely the principles of science learning and classroom management strategies. The modification of the science-based Boi-boian game was designed based on four principles, namely being fun, maximizing the use of the five senses, involving exploration and investigation activities, and emphasizing process more than results. In addition, various strategies are also used to support learning activities. These strategies include taking an emotional approach to children, implementing free play strategies, and accommodating children's interests and needs in learning activities.

REFERENCES

Adi, B. S., Sudaryanti, & Muthmainnah. (2020). Jurnal Pendidikan Anak , Volume 9 (1), 2020 , 33-39 Implementasi permainan tradisional dalam pembelajaran anak usia dini sebagai pembentuk karakter bangsa. *Jurnal Pendidikan Anak*, *9*(1), 33–39.

Ambarita, J., Yuniati, E., & Purnamasari, I. (2021). Problematika Orang Tua dalam Menjalankan Perannya sebagai Guru Bagi Anak Usia Dini. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *6*(3), 1819–1833.

Andayani, S. (2021). Bermain sebagai Sarana Pengembangan Kreativitas Anak Usia Dini. *JURNAL AN-NUR: Kajian Ilmu-Ilmu Pendidikan Dan Keislaman*, *7*(1), 1–10.

Astuti, E. T. (2018). Pengembangan Permainan Tradisional Boi-Boian Dalam Menanamkan Pola Pikir Sains Anak Sekolah Dasar. *Muallimuna : Jurnal Madrasah Ibtidaiyah*, *4*(1), 24.

Brunton, P., & Thornton, L. (2014). Science in the Early Years: Building Firm Foundations from Birth to Five. In *Science in the Early Years: Building Firm Foundations from Birth to Five*. SAGE.

Cahapay, M. B. (2020). Rethinking Education in the New Normal Post-COVID-19 Era: A Curriculum Studies Perspective. *AQUADEMIA*, *4*(2), 1–5.

Campbell, C., Jobling, W., & Howitt, C. (2012). *Science in early childhood* (2nd ed., pp. 1–207). Cambridge University Press.

Chang, N. (2012). What are the roles that children's drawings play in inquiry of science concepts? *Early Child Development and Care*, *182*(5), 621–637.

Christner, N., Essler, S., Hazzam, A., & Paulus, M. (2021). Children's Psychological Well-being and Problem Behavior During The COVID-19 Pandemic: An Online Study During The Lockdown Period in Germany. *PLoS ONE*, *16*(6 June), 1–20.

Diana, E., & Rofiki, M. (2020). Analisis Metode Pembelajaran Efektif Di Era New Normal. *Jurnal Review Pendidikan Dan Pengajaran*, *3*(2), 336–342.

Egan, S. M., Pope, J., Moloney, M., Hoyne, C., & Beatty, C. (2021). Missing Early Education and Care During the Pandemic: The Socio-Emotional Impact of the COVID-19 Crisis on Young Children. *Early Childhood Education Journal*, *49*(5), 925–934.

Etnawati, S. (2022). Implementasi Teori Vygotsky Terhadap Perkembangan Bahasa Anak Usia Dini. *Jurnal Pendidikan*, *22*(2), 130–138.

Harlen, W., & Qualter, A. (2009). *The Teaching of Science in Primary School* (5th ed.). Routledge.

Hong, S. Y., & Diamond, K. E. (2012). Two approaches to teaching young children science concepts, vocabulary, and scientific problem-solving skills. *Early Childhood Research Quarterly*, *27*(2), 295–305.

Inan, H. Z., & Inan, T. (2015). 3Hs Education: Examining hands-on, heads-on, and hearts-on early childhood science education. *International Journal of Science Education*, *37*(12), 1974–1991.

Kelly, L., & Stead, D. (2015). *Inspiring Science in The Early Years: Exploring Good Practice*. McGraw-Hill Education.

Martin, D. J., Jean-Sigur, R., & Schmidt, E. (2005). Process-Oriented Inquiry - A Constructivist Approach to Early Childhood Science Education: Teaching Teachers to do Science. *Journal of Elementary Science Education*, *17*(2), 13–26.

Milawati, Kurniawati, E. Y., & Khasanah, Y. U. (2022). Analisis Dampak Pandemi Covid 19 Pada Anak Pra Sekolah Usia 36-72 Bulan (Studi di KB Kuncup Melati dan TK Pamardi Putra). *Jurnal Ilmu Kebidanan Poltekkes Ummi Khasanah*, *8*(1), 6–13.

Musfiroh, T. (2014). Bermain dan Permainan Anak. In *Teori dan Konsep Bermain* (pp. 1–44). Universitas Terbuka.

Nurmawanti, I., Darmiany, D., Nurwahidah, N., & Kusuma, A. S. (2021). STEM and Critical Thinking: Alternative Learning Collaboration between Teachers

and Parents in The New Normal Era. *SOSHUM : Jurnal Sosial Dan Humaniora*, *11*(3), 293–304. https://doi.org/10.31940/soshum.v11i3.293-304

Nurtaniawati. (2017). Peran guru dan media pembelajaran dalam menstimulasi perkembangan kognitif pada anak usia dini. *Jurnal Tunas Siliwangi*, *3*(1), 1–20.

Oliver, A. (2006). *Creative Teaching Science: in The Early Years & Primary Classroom* (1st ed.). David Fulton.

Panda, P. K., Gupta, J., Chowdhury, S. R., Kumar, R., Meena, A. K., Madaan, P., Sharawat, I. K., & Gulati, S. (2021). Psychological and Behavioral Impact of Lockdown and Quarantine Measures for COVID-19 Pandemic on Children, Adolescents and Caregivers: A Systematic Review and Meta-Analysis. *Journal of Tropical Pediatrics*, *67*(1), 1–13.

Pisano, L., Galimi, D., & Cerniglia, L. (2020). A qualitative Report on Exploratory Data on The Possible Emotional Behavioral Correlates of Covid-19 Lockdown in 4-10 Years Children in Italy. *PsyArXiv*.

Putri, N. alfiani nur, & Wulansari, B. yulia. (2021). Analisis Kegiatan Pembelajaran Tatap Muka Pendidikan Anak Usia Dini. *Hasil-Hasil Penelitian Dan Pengabdian Masyarakat*, *4*, 674–681.

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.

Ribarto, T., Triansyah, A., Dwi, I., Program, P. W., Pendidikan, S., Fkip, J., & Pontianak, U. (2006). Pengaruh Modifikasi Permainan Tradisional Boi Terhadap Keterampilan Gerak Dasar. *Khatulistiwa*, *8*(5), 1–8.

Rogers, S. (2022). Play in the time of pandemic: children's agency and lost learning. *Education 3-13*, *0*(0), 1–12.

Rohayani, F. (2020). Menjawab Problematika Yang Dihadapi Anak Usia Dini di Masa. *Qawwam: Journal For Gender Mainstreaming*, *14*(1), 29–50.

Rosyidin, H. A., & Kumaat, A. N. (2021). Kontribusi Permainan Tradisionl "Boi-Boian" Pada Motorik Kasar Anak Usia 7-10 Tahun Di Dsn. Sidokampir Ds. Budugsidorejo Kec. Sumobito Kab. Jombang. *Jurnal Kesehatan Olahraga*, *O9*(03).

Santrock, J. W. (2010). *Life-Span Development* (13th ed., pp. 1–620). McGraw Hill.

Sary, Y. N. E. (2022). Kesehatan Mental Emosional Korban Perceraian pada Anak Usia Dini di Panti Asuhan. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *6*(4), 3680–3700.

Tabi, A. (2020). Problematika Stay at Home Pada Anak Usia Dini di Tengah Pandemi Covid 19. *Jurnal Golden Age*, *4*(01), 190–200.

Ulfasari, N., & Fauziah, P. Y. (2021). Pendampingan Orang Tua pada Pendidikan Anak di Masa Pandemi Covid-19 Berdasarkan Profesi Orang Tua. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *6*(2), 935–944.

Wardani, A., & Ayriza, Y. (2020). Analisis Kendala Orang Tua dalam Mendampingi Anak Belajar di Rumah Pada Masa Pandemi Covid-19. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *5*(1), 772.

Wiresti, R. D. (2020). Analisis Dampak Work From Home pada Anak Usia Dini di Masa Pandemi Covid-19. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*,

5(1), 641.
Wortham, S. C. (2006). *Early Childhood Curriculum Developmental Bases for Learning and Teaching* (4th ed., p. 432). Pearson Education.
Yoon, J., & Onchwari, J. A. (2006). Teaching young children science: Three key points. *Early Childhood Education Journal*, *33*(6), 419–423.