Proceedings Series on Proceedings of Multidisciplinary Sciences, Volume 2, No. 1
International Conference of Business, Education, Health, and Scien-Tech (ICBENS)
ISSN: -

Playing While Counting: A Strategy To Enhance Early Childhood Numeracy In Palopo City Through The Snakes And Ladders Game

Asmila[1], Busra Bumbungan[2*]
[1]Magister Pedagogy, Universitas Muhammadiyah Palopo, 91911, Indonesia
[2]Pendidikan Pancasila dan Kewarganegaraan, Universitas Cokroaminoto Palopo, 91911, Indonesia.

Corresponding Author Email: busrabumbungan@uncp.ac.id

Abstract

This study aims to enhance children's numerical ability through the implementation of the *Snakes and Ladders* game method. The research employed a qualitative design with a Classroom Action Research (CAR) approach, conducted in two cycles. The participants consisted of the principal, teachers, and students, with data collected through numerical ability tests, classroom activity observations, and documentation. The findings indicate a significant improvement in children's average numerical scores after the application of the *Snakes and Ladders* game method. In the pre-cycle, the mean score was only 62.3, with most children falling into the Poor (40%) and Fair (40%) categories, while only a small portion belonged to the Good category (20%). After the first cycle, the average score increased to 81.7, with the Poor category decreasing to 15%, Fair remaining at 40%, and Good rising to 45%. In the second cycle, the mean score reached 90.2, with the majority of children classified as Good (63%) and Very Good (33%), while the Poor category dropped to 0%. Overall, the mean score improved by 27.9 points (from 62.3 to 90.2). The percentage of children in the Good and Very Good categories rose dramatically from 20% in the pre-cycle to 96% in the second cycle, whereas the Poor category decreased from 40% to 0%.

Keywords: Learning_through_play; numeracy; early_childhood_education; snakes and ladders_ game

1. Introduction

Numerical ability is one of the fundamental skills crucial to children's cognitive development from an early age. This ability is not limited to counting activities but also encompasses the understanding of patterns, logic, and problem-solving skills in daily life [1], [2]. Strong numerical competence supports children's readiness for subsequent levels of education and provides the foundation for the development of critical thinking skills [3], [4]. Consequently, early childhood education plays a vital role in shaping character and fostering holistic child development, laying the groundwork for cognitive, social, emotional, and motor skills [5], [6].

However, many children still struggle with learning numerical concepts. One contributing factor is the lack of engaging instructional methods, which often tend to be monotonous and misaligned with children's natural curiosity and play-oriented learning preferences [7]. When numeracy learning is limited to classroom drills and worksheets, children may quickly lose interest and motivation [8]. Therefore, innovative and enjoyable teaching strategies are needed to encourage active participation and provide meaningful learning experiences [9].

One potential method is the use of educational games, such as *Snakes and Ladders*. Although simple in nature, this traditional game holds significant potential as a learning medium [10]. It integrates numbers, rules, and strategies, helping children practice counting, recognize numbers, and understand sequences [11]. Furthermore, the game fosters social

interaction, sportsmanship, and cooperation among children, thereby making the learning process more enjoyable [12].

The *Snakes and Ladders* game can be adapted to strengthen numerical memory through repeated practice of counting, number recognition, and sequencing [13], [14]. In addition to improving mathematical skills, it also imparts social and emotional values such as patience, cooperation, and fairness. Children learn to wait for their turns, respect peers, and accept both victory and defeat with resilience [15], [16]. Variations can also be introduced by incorporating mathematical questions that must be solved before proceeding, further enriching cognitive development while balancing entertainment and educational goals [17], [18]. Within the classroom, this method also enables teachers to better identify individual strengths and learning difficulties [19].

Observations in several Early Childhood Education (ECE) institutions, such as kindergartens in Palopo City, revealed variations in the implementation of game-based learning media, particularly *Snakes and Ladders*. Many teachers recognize the effectiveness of this medium in developing children's cognitive, socio-emotional, and motor domains [20]. In well-developed schools, teachers creatively modify the game board by incorporating letters, geometric shapes, or simple instructions, thereby expanding its instructional function [21]. Conversely, in resource-limited kindergartens, its use remains basic and not fully integrated into learning objectives [22].

Interviews with kindergarten teachers further indicated that *Snakes and Ladders* helps children recognize numbers and perform simple calculations, while also cultivating patience through adherence to game rules. Nevertheless, some teachers admitted that they are not yet accustomed to aligning the game with curricular objectives, perceiving it merely as recreational activity. Children, on the other hand, responded positively, demonstrating higher engagement and enthusiasm compared to traditional lecture-based or worksheet-based methods. Parental support varied as well: some facilitated the game at home, while others undervalued its educational benefits compared to formal academic activities.

Thus, the use of *Snakes and Ladders* in Palopo kindergartens can be characterized as developing but not yet optimal. While teachers have begun to integrate it, further training, creativity, and curricular alignment are necessary to maximize its benefits [23]. Parental and institutional support is also crucial to ensure broader and sustainable implementation of educational games such as *Snakes and Ladders* [24], [25].

2. Methodology

This study employed a qualitative research design, chosen for its emphasis on obtaining in-depth insights into the teaching–learning process, teacher–student interactions, and naturally occurring improvements in numerical ability within the classroom setting [26]. Data collected comprised not only numerical test results but also descriptive accounts of activities, behaviors, and changes in student attitudes throughout the learning process. The approach adopted was Classroom Action Research (CAR), conducted through iterative cycles consisting of four stages: planning, implementation, observation, and reflection.

The participants included the principal, teachers, and kindergarten students, with the research conducted at a kindergarten in Palopo City. Data collection techniques consisted of

numerical ability tests, classroom observation, and documentation [27]. The data analysis procedure followed three stages: data reduction, data display, and making conclusion [28].

To calculate the percentage of achievement indicators in learning outcomes, the following formula is used:

$$Persentage = \frac{Number\ of\ students\ achieving\ mastery}{Total\ Number\ of\ Students}\ X\ 100\%$$

Table 1. Percentage of Criteria of the Learning Process and Learning Outcomes [29]

No	Persentage (%)	Criteria
1	86% ≤ p ≤ 100%	Very Good
2	72% ≤ p ≤ 85%	Good
3	60% ≤ p ≤ 71%	Fair
4	p ≤ 59%	Poor

3. Results and Discussion

3.1 Results

Planning Stage

The planning stage consisted of two parts: selecting instructional media and designing the learning media. Prior to this, the researcher had conducted observations related to numeracy learning in the school. Based on the observations, the researcher designed an *APE* (Alat Permainan Edukatif/Educational Play Tool) as the learning medium. The next step in the planning stage was the development of the numeracy *Snakes and Ladders* learning media, which included: (1) Designing the *Snakes and Ladders* board using Google applications and producing it through digital printing.; (2) Creating dice from origami paper, which were then attached to the game board. The dice were marked with symbols representing numbers 1–6, ensuring the numbers were clearly visible and easy to read. (3) Preparing mathematics-related questions to be placed on each square of the game board. These questions had to be solved by the players (students) before they could continue their move.

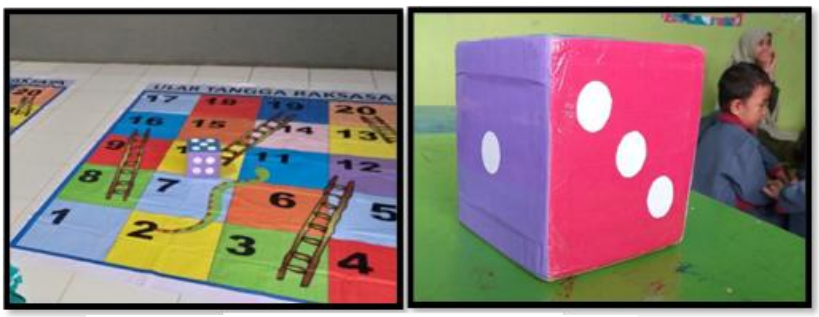

Figure 1. Snake and Ladder Game

Implementation Stage

After completing all planning activities, the educational game tool was implemented with the students. The implementation took place in the fifth week of the ongoing semester, coinciding with the administration of the classroom *Minimum Competency Assessment* (MCA). Prior to the start of the *Snakes and Ladders* game, the facilitator (teacher/researcher) provided a detailed explanation of the game procedures and rules as follows:

1. The class was divided into two groups.
2. Every group member was required to participate in the game.
3. The game was played alternately between groups.
4. Each square on the *Snakes and Ladders* board contained a question that had to be answered.
5. The token advanced according to the number indicated by the dice rolled by the player.
6. The group that rolled the dice had to answer the question corresponding to the token's final position.
7. The group that successfully reached the finish point first was declared the winner of the game.

During the game, the children demonstrated high levels of enthusiasm and motivation. They were informed that winners would receive a reward, which further stimulated their eagerness to complete the mathematical problems presented in the game. The use of the *Snakes and Ladders* game as a learning medium provided a positive stimulus for improving students' numeracy skills. It also facilitated a better understanding of numeracy-related tasks by presenting problems in contextualized forms, thereby encouraging the development of students' critical thinking skills.

Students who experienced difficulties in solving problems were assisted by the facilitator, enabling them to gain deeper understanding of the material and exercises. Thus, the game also played a significant role in helping students reinforce both conceptual understanding and problem-solving practice.

figure 2. Students are playing Snake and Ladder Game

Using the prepared instrument, the participants were asked to identify numbers randomly as indicated by the researcher. Subsequently, the students were also instructed to point to the numbers on the instrument corresponding to those mentioned by the teacher. The pre-test instrument is presented in Figure 1 below:

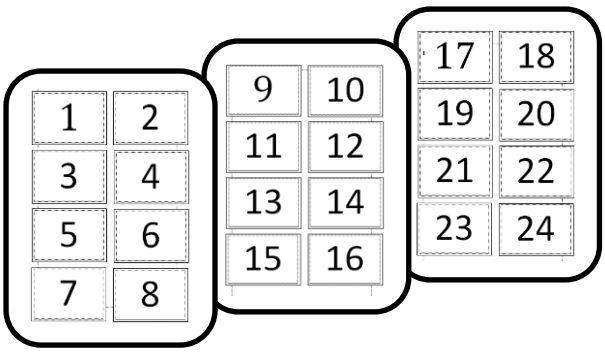

Figure 3. Instrument Model for Pre-test and Post-test on Number Naming and Pointing Tasks

Implementation of Numeracy Learning Using *Snakes and Ladders* Media in Cycle I

Evaluation Results of Cycle I

To assess the development of children's numeracy skills, both a pre-test and a post-test were administered during Cycle I. The results are as follows:

- The average student score increased from 62.3 on the pre-test to 81.7 on the post-test of Cycle I.
- The percentage of students in the *Good* and *Very Good* categories rose significantly, from 20% in the pre-cycle to 88% in Cycle I.
- The proportion of students in the *Poor* category decreased drastically, from 40% in the pre-cycle to 0% in Cycle I.

Table 2. Improvement in Student Scores and Changes in Categories from Pre-test to Post-test

Aspect	Pre-test	Post-test	Description
Average student score	62,3	81,7	Increased
Percentage of students in Good and Very Good categories	20%	88%	Significantly increased
Percentage of students in Poor category	40%	0%	Decreased to zero

Reflection

Reflection of Cycle I

The results of Cycle I indicated a significant improvement both in terms of average scores and the distribution of students' ability categories. The *Snakes and Ladders* game media proved effective in enhancing students' learning motivation and understanding of numeracy material. Nevertheless, several challenges remained: (1) time management during the game was not optimal, preventing all groups from completing the activity, and (2) student

participation was not yet evenly distributed, as some students remained passive and required additional encouragement.

Based on these findings, it can be concluded that the implementation of Cycle I was successful; however, improvements were still needed in terms of time management and strategies to foster broader student participation, in order to maximize learning outcomes in the subsequent cycle.

Improvement Plan for Cycle II

Drawing from the reflections in Cycle I, several refinements were introduced in Cycle II, including:

1. **More Efficient Time Management**
   - The teacher limited the duration of each round to ensure all groups had equal opportunities to complete the game.
   - Instructions were simplified and clarified at the beginning of the lesson to avoid unnecessary delays.
2. **Enhancing Student Participation**
   - Each group member was assigned a specific role (e.g., question reader, answer recorder, dice roller) to ensure active involvement.
   - Additional motivation, such as participation points, was provided to encourage passive students.
3. **Variety and Level of Difficulty in Questions**
   - Questions embedded in the *Snakes and Ladders* board were designed with varying levels of difficulty, ranging from simple to more challenging, to cater to different student abilities.
   - Additional tasks were prepared for students who completed the game earlier, keeping them engaged in meaningful learning.
4. **Utilization of Supplementary Media**
   - Besides the *Snakes and Ladders* board, the teacher prepared simple numeracy worksheets as reinforcement activities after the game to provide more measurable learning outcomes.
5. **More Structured Evaluation**
   - The post-test in Cycle II was equipped with more detailed assessment indicators to evaluate numeracy skills in terms of speed, accuracy, and conceptual understanding.

Implementation of Numeracy Learning Using *Snakes and Ladders* in Cycle I

The implementation of numeracy learning in Cycle I followed the established plan. The teacher used the *Snakes and Ladders* game as a medium to train students' numerical skills. At the beginning, the teacher explained the rules of the game and their relation to the numeracy topics being studied, such as addition, subtraction, and number recognition.Students were divided into small groups to ensure active participation. Each group received a modified *Snakes and Ladders* board containing numeracy problems on selected squares. When landing on such squares, students were required to solve the problem before continuing their move.

The learning activity took place in a lively and enjoyable atmosphere. Students appeared enthusiastic and motivated, stimulated by the element of healthy competition. They collaborated within their groups to find the correct answers. The teacher acted as a facilitator, providing guidance, clarification, and reinforcement whenever students encountered difficulties.

Observations revealed that most students showed increased engagement in the learning process. They were more active in solving problems, although some remained hesitant and required intensive guidance. The use of *Snakes and Ladders* succeeded in fostering students' interest in numeracy; however, time management inefficiencies and unequal participation were noted as issues to be addressed in the following cycle.

Implementation in Cycle I successfully fostered students' interest in numeracy through the use of the snakes and ladders medium. However, several challenges were identified, including less efficient time management and the unequal distribution of opportunities for students to answer questions. These issues serve as points of reflection for improvement in the subsequent cycle. The numeracy learning activities in Cycle I were carried out over two sessions, utilizing the snakes and ladders game as instructional media. At the outset, the teacher explained the rules of the game and their connection to the numeracy material being studied. Students were then divided into small groups and provided with modified snakes and ladders boards containing numeracy questions. Each time a student landed on a specific square, they were required to answer a question before continuing the game. The classroom atmosphere appeared more dynamic, with students showing enthusiasm in participating in the game, and peer interaction increased significantly. The teacher acted as a facilitator, providing guidance, direction, and reinforcement throughout the process.

Implementation of Numeracy Learning Using *Snakes and Ladders* in Cycle II

Evaluation Results of Cycle II

The results of the Cycle II post-test demonstrated further improvement compared to Cycle I:

- The average student score increased from 81.7 in Cycle I (post-test) to approximately 90.2 in Cycle II (post-test).
- The percentage of students in the *Good* and *Very Good* categories rose from 88% in Cycle I to 96% in Cycle II.
- No students remained in the *Poor* category; even those previously categorized as *Fair* successfully progressed to the *Good* category.

Table 3. Summary of Improvement in Students' Learning Outcomes from Cycle I to Cycle II

Description	Cycle I	Cycle II
Average Student Score (post-test)	81.7	90.2
Percentage of Students in *Good* & *Very Good* Categories	88%	96%
Percentage of Students in *Poor* Category	0%	0%

Reflection of Cycle II

The results of Cycle II demonstrated that the use of *Snakes and Ladders* media, combined with refined instructional strategies, significantly enhanced students' numeracy skills. Key successes included:

1. More evenly distributed student participation due to assigned group roles.
2. Improved time management, allowing all groups to complete both the game and the numeracy problems.
3. Increased enthusiasm, with the classroom atmosphere becoming more active, enjoyable, and healthily competitive.
4. Higher numeracy achievement, reflected in the rising average scores and the majority of students attaining *Good* and *Very Good* categories.

Cycle II was implemented in line with the improvements planned after Cycle I. The teacher began with motivational input and a concise explanation of the rules. Group roles were distributed to ensure equal involvement, such as dice roller, question reader, note taker, and responder. The *Snakes and Ladders* board was modified to include questions of varying difficulty levels, enabling differentiated learning according to students' abilities. In addition, simple numeracy worksheets were prepared as reinforcement activities after the game.

The learning process in Cycle II was more conducive compared to Cycle I. Students demonstrated greater enthusiasm, time was managed more effectively, and nearly all students actively participated. The teacher facilitated group discussions, provided feedback, and emphasized accuracy and speed in solving problems.

The comparative data from Cycles I and II, supported by graphical illustrations, clearly show that the *Snakes and Ladders* game method substantially improved children's numeracy abilities.

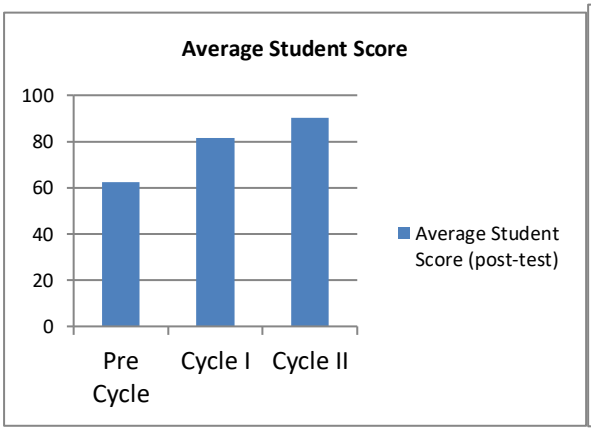

Figure 4. Bar chart of the average development of children's numerical scores

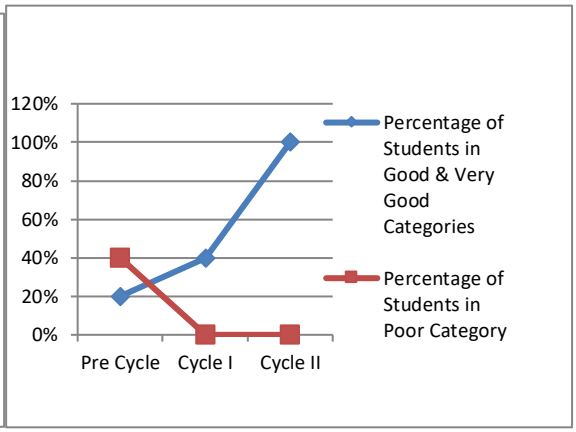

Figure 5. Line chart of the percentage development across categories of children's numerical

The findings of this study indicate that the use of the *Snakes and Ladders* game method significantly enhanced children's numeracy skills. In the pre-cycle stage, the average score was 62.3, with the majority of students still categorized as *Poor* (40%). Following the implementation of Cycle I, the average score increased to 81.7, with the proportion of students in the *Good* and *Very Good* categories rising to 88%, while the *Poor* category declined to 0%. This improvement became even more evident in Cycle II, where the average

score reached 90.2. At this stage, the percentage of students in the *Good* and *Very Good* categories increased to 96%, while only 4% remained in the *Fair* category and none were in the *Poor* category.

The observations also indicated that the use of game-based media such as *Snakes and Ladders* helped reduce children's fear or anxiety toward mathematics. What is typically perceived as a difficult and monotonous subject becomes more enjoyable, enabling children to more readily accept and understand the material. Thus, this method also contributes to fostering a positive attitude toward mathematics in early childhood.

Consequently, it can be concluded that the use of the *Snakes and Ladders* game medium is effective in improving students' numeracy skills. This is evidenced by the increase in mean scores from the pre-cycle through Cycle II and the attainment of the research's success indicators.

3.2 Discussion

The improvement in children's numeracy aligns with national policies that emphasize the importance of literacy and numeracy from an early age. Numeracy is a foundational competence enabling children to understand number concepts, simple arithmetic operations, and numerical problem-solving [30]. *Snakes and Ladders* is a well-known game among children and is readily adaptable to instructional settings. In this game, children move according to dice outcomes across squares containing numbers, ladders, and snakes. This activity allows children to interact directly with numbers, reinforcing their understanding of number sequences and simple addition [31], [32]. Through this game, children can become familiar with number symbols and relate them to concrete activities. For example, when a child rolls the dice and moves accordingly, they indirectly learn number recognition and computation, which form the initial foundation of numeracy [32]. This is consistent with Vygotsky's learning theory, which underscores the role of social interaction in children's cognitive development [33].

Beyond numeracy, *Snakes and Ladders* also stimulates fine motor skills and social skills in children. They learn to take turns, count steps, problem-solve, recognize patterns, and anticipate the result of dice rolls while following game rules. All of these provide a meaningful and enjoyable learning experience that supports balanced cognitive and affective development [34]. In addition to strengthening calculation ability, the game helps children recognize numerical patterns and practice logical reasoning. When landing on certain squares, children must plan which path to take next, implicitly developing strategies and simple problem-solving skills.

As a medium for numeracy instruction, *Snakes and Ladders* addresses the need for contextual, fun learning. Early numeracy experiences tend to enhance children's readiness for future learning. This approach is consistent with child development theories that emphasize learning through play [35]. The role of technology in integrating *Snakes and Ladders* into digital instructional media has also shown promising outcomes in Palopo City. Digital versions of the *Snakes and Ladders* game can offer more interactive challenges and immediate feedback, which help teachers monitor children's progress more readily [36]. This

further enriches instructional methods and enhances motivation among early childhood learners.

However, the success of a "play while counting" strategy using *Snakes and Ladders* depends on the readiness of the learning environment and the teacher's competence. Teachers must be able to facilitate the game, explain numeracy concepts simply, and provide positive praise. A conducive classroom environment and parental support at home also bolster the effectiveness of this strategy [37].

Therefore, successful implementation should be accompanied by clear usage guidelines and teacher training to maximize the potential of *Snakes and Ladders* as a numeracy learning medium. The variety of numeracy problems must also be matched to children's developmental levels and interests so the tasks remain challenging without causing frustration [38]. Thus, *Snakes and Ladders* is not merely a play tool but becomes an effective educational medium to improve early childhood numeracy in Palopo City. The integration of play and learning as a collaborative form between children and teachers can serve as a creative solution to support quality education from the earliest developmental stages [39].

4. Conclusion

The *Snakes and Ladders* method is an effective educational strategy for enhancing early childhood numerical ability, particularly in recognizing number concepts and arithmetic skills. This game enables children to learn while playing in an engaging and motivating manner, helping them remain active and avoid boredom during learning. Through *Snakes and Ladders*, children can learn to recognize numbers, count steps, and understand upward and downward moves that involve basic mathematical concepts. The research shows that using this method can significantly improve children's calculation skills to reach the targeted learning success standards. The specially developed *Snakes and Ladders* media with appealing visuals also increased children's interest and engagement in numerical learning. Therefore, the *Snakes and Ladders* method is highly recommended as an alternative for early numeracy instruction to effectively and enjoyably enhance young children's cognitive skills and numeracy literacy.

5. Acknowledgments

The authors would like to express gratitude to the school principals, kindergarten teachers in Palopo City, university institutions and supervisors, as well as the parents of the participating students for their full support in the conduct of this study. Appreciation is also extended to colleagues and academic mentors who consistently provided direction, motivation, and valuable feedback. It is hoped that this article may contribute to the development of strategies for teaching early childhood numeracy through stimulating and educational play.

6. Reference

[1] A. Saracho, "Early Childhood Mathematics Teaching and Learning," *Early Child Development and Care*, vol. 184, no. 8, pp. 1217–1228, 2014.

[2] C. Sophian, *Understanding Children's Mathematics*. New York: Oxford University Press, 2004.

[3] D. Clements and J. Sarama, *Learning and Teaching Early Math*. New York: Routledge, 2015.

[4] M. Musthofa, "Peran Guru PAUD dalam Meningkatkan Kemampuan Numerik Anak," *Jurnal Pendidikan Anak*, vol. 8, no. 1, pp. 45–55, 2019.

[5] B. Bredekamp and C. Copple, *Developmentally Appropriate Practice in Early Childhood Programs*. Washington, DC: NAEYC, 2009.

[6] NJ Shidiq, IP Setiawan, B Bumbungan. Analisis Implementasi Asesmen Perkembangan Sosial Emosional Anak Usia Dini di TK Asoka Makassar. *WANUA TO MACCA: Journal of Educational Studies*, Vol. 1 No. 2. https://lpi-journals.com/index.php/wanua/article/view/33, 2024

[7] N. Y. Rustaman, *Strategi Belajar Mengajar*. Bandung: UPI Press, 2011.

[8] S. Suryana, *Kurikulum Pendidikan Anak Usia Dini*. Bandung: PT Remaja Rosdakarya, 2013.

[9] A. Ridgway & G. Quinones, How do Early Childhood Students Conceptualize Play-Based Curriculum?. *Australian Journal of Teacher Education, 37*(12). https://doi.org/10.14221/ajte.2012v37n12.8, 2012

[10] H. S. Becker, "Games and Learning in Early Childhood Education," *Childhood Education*, vol. 85, no. 4, pp. 291–297, 2009.

[11] A. Pramudiyanti, "Pemanfaatan Media Permainan Ular Tangga dalam Pembelajaran Matematika," *Jurnal Pendidikan Anak Usia Dini*, vol. 9, no. 2, pp. 88–97, 2017.

[12] D. W. Santrock, *Child Development*. New York: McGraw-Hill, 2011.

[13] K. Khadijah & S. Wahyuni. Pengembangan Permainan Tradisional untuk Meningkatkan Perkembangan Anak Usia Dini. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *8*(5), 1151–1166. https://doi.org/10.31004/obsesi.v8i5.6073, 2024.

[14] L. Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*. Cambridge: Harvard University Press, 1978.

[15] E. Erikson, *Childhood and Society*. New York: W. W. Norton, 1993.

[16] L. Berk, *Development Through the Lifespan*. Boston: Allyn & Bacon, 2014.

[17] J. Piaget, *Play, Dreams, and Imitation in Childhood*. New York: Routledge, 1999.

[18] R. Astuti & T. Aziz, Integrasi Pengembangan Kreativitas Anak Usia Dini di TK Kanisius Sorowajan Yogyakarta. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *3*(2), 294–302. https://doi.org/10.31004/obsesi.v3i2.99, 2019.

[19] *E. M. Ratnasari.* Outdoor Learning Terhadap Literasi Numerasi Anak Usia Dini. ThufuLA Jurnal Inovasi Pendidikan Guru Raudhatul Athfal8(2):182. 10.21043/thufula.v8i2.8003, 2020.

[20] S. Sujiono, *Konsep Dasar Pendidikan Anak Usia Dini*. Jakarta: Indeks, 2012.

[21] H. Nur, "Kreativitas Guru dalam Memodifikasi Media Pembelajaran Anak Usia Dini," *Jurnal Golden Age*, vol. 3, no. 1, pp. 45–56, 2019.

[22] R. Wulandari, "Pemanfaatan Media Edukatif di PAUD Pedesaan," *Jurnal Pendidikan Anak Usia Dini*, vol. 10, no. 2, pp. 101–112, 2018.

[23] T. Yuliani, "Pengembangan Media Pembelajaran Anak Usia Dini," *Jurnal Ilmiah Pendidikan Anak Usia Dini*, vol. 5, no. 2, pp. 90–101, 2021.

[24] M. Musthofa, "Peran Orang Tua dalam Mendukung Pembelajaran Anak Usia Dini," *Jurnal Pendidikan Anak*, vol. 8, no. 1, pp. 45–55, 2019.

[25] R. Sari, "Peran Orang Tua dalam Mendukung Aktivitas Bermain Edukatif," *Jurnal Pendidikan Anak*, vol. 7, no. 2, pp. 77–85, 2017.

[26] N. K. Denzin and Y. S. Lincoln, *The SAGE Handbook of Qualitative Research*, 5th ed. Thousand Oaks, CA: SAGE, 2018.

[27] J. W. Creswell, *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*, 4th ed. Thousand Oaks, CA: SAGE, 2017.

[28] M. B. Miles, A. M. Huberman, and J. Saldaña, *Qualitative Data Analysis: A Methods Sourcebook*, 4th ed. Thousand Oaks, CA: SAGE, 2020.

[29] D. Sudjana, *Penilaian Hasil Proses Belajar Mengajar*. Bandung: Remaja Rosdakarya, 2016.

[30] Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi, *Rencana Aksi Nasional Literasi dan Numerasi*. Jakarta: Kemdikbudristek, 2021.

[31] C. H. Ginsburg, J. S. Lee, and S. Pappas, "Mathematics education for young children: What it is and how to promote it," *Social Policy Report*, vol. 22, no. 1, pp. 1–24, 2008.

[32] C. T. Baroody, "Fostering early numeracy in preschool and kindergarten," in *Engaging Young Children in Mathematics*, L. D. English, Ed. Mahwah, NJ: Lawrence Erlbaum, 2002, pp. 173–219.

[33] L. S. Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press, 1978.

[34] D. Clements and J. Sarama, *Learning and Teaching Early Math: The Learning Trajectories Approach*. New York: Routledge, 2009.

[35] H. Pyle and E. Danniels, "Play and learning in early childhood education," *Early Child Development and Care*, vol. 187, no. 5-6, pp. 785–796, 2017.

[36] A. Rahman, "Pengembangan media digital ular tangga numerasi untuk PAUD di Kota Palopo," *Jurnal Pendidikan Anak Usia Dini Indonesia*, vol. 6, no. 2, pp. 112–120, 2023.

[37] E. Hornby, *Parental Involvement in Childhood Education: Building Effective School-Family Partnerships*. New York: Springer, 2011.

[38] R. Copple and S. Bredekamp, *Developmentally Appropriate Practice in Early Childhood Programs*. Washington, DC: NAEYC, 2009.

[39] B. Bumbungan & M. Megawati, Kepemimpinan Pendidikan: Relasi Pendidik dan Peserta Didik Dalam Mewujudkan Mutu Pendidikan. *Indonesian Journal of Learning Studies (IJLS)*, *3*(3), 127-134. https://doi.org/10.53769/ijls.v3i3.1441, 2023.