



The Effect of Market Play Learning Method on Early Childhood Numeracy Literacy

Yani Suryani^{1*}, Sri Watini¹, Erna Budiarti¹ 

¹ Universitas Panca Sakti Bekasi, Indonesia

corresponding author: *yanisuryani090482@gmail.com

ARTICLE INFO

Article history

Received: 29-Jun-2026

Revised: 15-Jul-2026

Accepted: 13-Aug-2026

Keywords

Market Play Learning;
Numeracy Literacy;
Early Childhood.

ABSTRACT

This study aims to analyze the effect of the Market Play Learning method on early childhood numeracy literacy. Numeracy literacy is a fundamental competency that must be developed from an early age as it is directly related to children's readiness for higher education levels and daily life challenges. The underlying problem of this research is the low numeracy literacy skills of children aged 5–6 years, indicated by difficulties in recognizing numbers, performing simple arithmetic operations, and understanding the concepts of more and less. To address this issue, the research employed a quasi-experimental method with a pretest-posttest control group design. The participants were 60 children from TK Ceria Eduloka, Kecamatan Seberida, Kabupaten Indragiri Hulu, divided into experimental and control groups. The research instrument consisted of a numeracy literacy test covering number recognition, simple arithmetic operations, measurement, and money concepts. Data were collected through pretests and posttests, then analyzed using paired sample t-tests along with normality and homogeneity tests. The results revealed a significant improvement in numeracy literacy skills in the experimental group after applying the Market Play Learning method, with higher posttest scores compared to the control group. The greatest improvements were found in number recognition, basic arithmetic operations, and the use of money in role-play transactions. These findings indicate that the Market Play Learning method provides a contextual, enjoyable, and meaningful learning experience, enabling children to internalize numeracy concepts more effectively. It can therefore be concluded that this method has a positive and significant effect on enhancing early childhood numeracy literacy and is recommended as an alternative instructional strategy in early childhood education settings.

This is an open access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



1. Introduction

Early childhood education constitutes a critical foundation for developing various aspects of child development, including literacy and numeracy skills. Numeracy literacy in early childhood is one of the fundamental competencies that must be developed from an early age because it plays an essential role in preparing children for formal education and daily life. According to Government Regulation No. 57 of 2021 concerning National Education Standards, the development of numeracy literacy is part of the standards for child development achievement levels (STPPA) that must be achieved by children aged 5–6 years



(Kemendikbudristek, 2022). Fun and contextual learning methods such as market play learning (playing market) serve as an attractive alternative to develop these two competencies in an integrated manner.

Numeracy literacy is not merely the ability to count but encompasses the capacity to apply mathematical concepts and skills to solve practical problems in various contexts of daily life (Rahmadeni, 2022). This definition emphasizes that numeracy literacy is a more complex competency than mere arithmetic, involving the application of mathematical concepts practically. Research conducted by Watini (2019) confirms that numeracy literacy needs to be developed from early childhood education to prepare children to possess logical, critical, and systematic thinking skills. Every child has their own learning style and cannot be forced to use a uniform learning approach, meaning that children's numeracy abilities also differ. The results of this study indicate that adaptive learning methods tailored to each child's characteristics are necessary.

According to Priyanti (2023), the development of numeracy literacy must be carried out through meaningful and contextual learning by actively involving children in the learning process. Meaningful learning in the context of numeracy means connecting mathematical concepts with real experiences and familiar daily life situations. A contextual approach enables children to understand the relevance and practical application of the numeracy skills they learn, so that learning is not merely abstract but has concrete meaning. This perspective is supported by Budiarti (2025a), who recommends that one approach to developing numeracy literacy in early childhood is through play-based learning methods that are contextual and close to children's daily lives.

Market Play Learning is a learning method that adapts buying and selling activities in the market into a form of play (Zhang & Chen, 2023). Through this method, children learn mathematical concepts such as recognizing numbers, counting, recognizing the value of money, the concept of exchange, and simple arithmetic operations in enjoyable and meaningful situations. This aligns with research by Budiarti (2025a), which shows that play-based learning methods such as market play learning can increase motivation and active involvement of children in learning numeracy literacy. Research by Apriyansyah (2022) also indicates that a contextual learning approach through simulating daily activities such as counting using loose parts can significantly improve children's understanding of basic mathematical concepts.

The latest research by Patilima and Okafera (2024) reveals that using traditional market-based role-play methods can improve children's understanding of number concepts and simple arithmetic operations. In that study, 85% of children showed improvement in numeracy literacy skills after participating in learning with the market play method. A similar study by Purnama (2023) at a kindergarten in Surabaya also demonstrated the effectiveness of the market play learning method in improving numeracy literacy skills of children aged 5–6 years. The results of that study showed significant improvement in children's ability to recognize number concepts, perform simple arithmetic operations, and understand the concepts of more and less.

Based on the gap between the ideal conditions expected and the facts in the field, supported by various previous studies, the researcher is interested in conducting an experimental study on the effect of the market play learning method on early childhood numeracy literacy at TK Ceria Eduloka. This research is expected to provide an alternative solution to address numeracy literacy learning problems at TK Ceria Eduloka while contributing scientifically to the development of effective learning methods for improving early childhood numeracy literacy. Research on "The Effect of Market Play Learning Method on Numeracy Literacy at TK Ceria Eduloka" offers several significant novelties in the field of early childhood education in Indonesia.

The main novelty of this research lies in the integrated approach that combines the simultaneous development of numeracy literacy through authentic and meaningful market play contexts. Unlike previous studies that tend to treat literacy and numeracy as separate domains, this research explores how both fundamental competencies can be stimulated in an integrated manner in accordance with the principles of holistic learning in early childhood. The contextualization of the market play learning method adapted to the specific characteristics of TK Ceria Eduloka and the potential integration of local wisdom elements provides a novelty dimension from the perspective of practical implementation. This research also has high relevance to the national program Gerakan Literasi Numerasi (GERALISNUMER) being promoted by the government, thus contributing to the development of learning models that support national education policy.

From a methodological perspective, this research has the potential to produce an integrated authentic assessment instrument to measure numeracy literacy skills in the context of play, as well as a deeper analysis of the specific components of both competencies. From a theoretical perspective, previous studies have provided a strong foundation regarding the importance of play-based learning and the use of real-life contexts in early childhood learning. However, the specific application of the Market Play Learning concept to improve numeracy literacy, especially in children from market trader family backgrounds, has not been widely explored. This research is expected to fill this gap and provide new contributions to the field of early childhood education. Based on this state-of-the-art review, the study of the impact of the Market Play Learning approach on early childhood numeracy literacy skills is significant and needs to be implemented.

2. Methods

This study employed a quasi-experimental method with a pretest-posttest control group design. This design was chosen because the researcher could not randomly assign subjects to groups, as the research was conducted in an existing classroom setting with intact groups (Creswell & Creswell, 2023). The quasi-experimental design is considered appropriate for educational research where randomization of individual subjects is not feasible, but the researcher can still manipulate the independent variable and control for potential confounding variables through the use of a control group (Gopalan et al., 2020). The population in this study was all children in Group B aged 5–6 years enrolled in the even semester of the 2024/2025 academic year at TK Ceria Eduloka, Simpang 4 Belilas, Kelurahan Pangkalan Kasai, Kecamatan Seberida, Kabupaten Indragiri Hulu.

From this population, the researcher took a sample of two groups, each consisting of 30 children as research subjects. One group served as the experimental group receiving treatment through the Market Play Learning method, while the other group served as the control group receiving conventional learning. The sampling technique used was purposive sampling, which involves selecting samples based on specific considerations—in this case, classes that met the requirements for the Market Play Learning intervention and had relatively homogeneous cognitive development levels based on initial assessment results. Purposive sampling is a non-probability sampling technique commonly used in educational research when the researcher needs to select participants who meet specific criteria relevant to the research objectives (Etikan et al., 2016). The research instrument consisted of a numeracy literacy observation sheet and authentic assessment rubric covering five indicators of numeracy literacy with a score range of 1–4 per indicator, resulting in a maximum total score of 20. The instrument was developed based on the numeracy literacy indicators for early childhood, which include number sense, simple arithmetic operations, measurement concepts, and money concepts (Rahim, 2023).

Before being used, the instrument underwent content validity testing through expert judgment by early childhood education lecturers and experienced teachers. Empirical validity testing was conducted by trying out the instrument on children who were not research samples, using the product-moment correlation technique to examine item validity. Reliability was tested using the Cronbach's Alpha technique, with the instrument considered reliable if the Alpha value exceeded 0.70. Data collection was carried out through pretests and posttests administered to both groups. The pretest was conducted before the treatment to measure the initial numeracy literacy abilities of both groups, while the posttest was conducted after the treatment to measure the improvement in numeracy literacy abilities. Data analysis was performed using descriptive statistics and inferential statistics. The prerequisite analysis tests included the Shapiro-Wilk normality test and the Levene homogeneity test. Hypothesis testing was conducted using paired sample t-tests and independent sample t-tests. If the data were not normally distributed, the non-parametric Wilcoxon Signed Rank Test was used. The effect size was calculated using Cohen's d to determine the magnitude of the influence of the Market Play Learning method on early childhood numeracy literacy.

3. Result and Discussion

Implementation of Market Play Learning

The implementation of the Market Play Learning method was carried out over four weeks with four sessions per week, each lasting 60 minutes. The learning activities were designed to be thematic-integrated and adapted to the characteristics of children aged 5–6 years (Group B). The market play area was arranged to resemble a real market with small stalls using tables, mini shelves, or mats. There was a cashier area, a weighing station, and a payment zone. Children played roles as sellers, buyers, cashiers, or market officers, interacting using concepts of money, numbers, measurement, and social communication in a mini-market environment. Figures 1 and 2 show the physical setting of the market play area and children's activities during the learning sessions.



Figure 1. Market Play Learning Area and Children's Activity

Descriptive Data Analysis

The research data consisted of pretest and posttest scores from both the experimental and control groups. The experimental group received learning with the Market Play Learning method, while the control group received conventional learning. The descriptive analysis results for the pretest data of both groups are presented in Table 3.

Table 3. Description of Pretest Data for Both Groups

Statistic	Experimental Group	Control Group	Difference
Sample Size (N)	30	30	0
Minimum Score	8	8	0
Maximum Score	14	15	-1
Mean	11.23	11.37	-0.14
Median	11.00	11.00	0
Mode	11	11	0
Standard Deviation	1.68	1.73	-0.05
Variance	2.82	2.99	-0.17

The pretest data show that both groups had relatively similar initial abilities, with the control group having a slightly higher mean score (11.37) compared to the experimental group (11.23). The difference of 0.14 points was very small, indicating that the two groups were equivalent before the treatment. The standard deviations of both groups were also similar (1.68 for the experimental group and 1.73 for the control group), indicating comparable score dispersion.

The posttest data description for both groups reveals a substantial difference in numeracy literacy achievement. The experimental group, which received the Market Play Learning method, had a sample size of 30 with a minimum score of 15 and a maximum score of 20, resulting in a mean of 17.63, a median of 18.00, a mode of 18, a standard deviation of 1.45, and a variance of 2.10. In contrast, the control group, which received conventional learning, also had 30 children but a minimum score of 10 and a maximum score of 16, yielding a mean of 13.17, a median of 13.00, a mode of 13, a standard deviation of 1.62, and a variance of 2.62. The difference between the two means was 4.46 points, indicating that the Market Play Learning method was significantly more effective. Notably, the experimental group's lowest score of 15 was higher than the control group's lowest score of 10, showing that even the lowest-performing children in the experimental group outperformed their counterparts in the control group.

The comparison of pretest-posttest score improvements further highlights the superiority of the experimental method. The experimental group started with a pretest mean of 11.23 and improved to a posttest mean of 17.63, representing an improvement of 6.40 points or 57.0%. The control group began with a slightly higher pretest mean of 11.37 and improved to 13.17, an improvement of only 1.80 points or 15.8%. The difference in improvement between the two groups was 4.60 points or 41.2%, demonstrating that the Market Play Learning method was far more effective in developing early childhood numeracy literacy than the conventional approach.

When analyzing the improvement by specific numeracy literacy indicators, the experimental group showed substantial gains across all five measured areas. For mentioning the number of objects, the experimental group improved from 2.23 to 3.57 (a gain of 1.34), while the control group improved from 2.30 to 2.70 (a gain of 0.40). For grouping objects, the experimental group improved from 2.17 to 3.53 (a gain of 1.36), compared to the control group's gain of 0.40 (from 2.27 to 2.67). Recognizing number symbols improved by 1.17 in the experimental group (2.30 to 3.47) versus 0.30 in the control group (2.33 to 2.63). Comparing size or quantity saw the highest gain in the experimental group, rising from 2.20

to 3.60 (a gain of 1.40), while the control group gained only 0.40 (2.23 to 2.63). Finally, solving simple problems improved by 1.14 in the experimental group (2.33 to 3.47) and by 0.33 in the control group (2.37 to 2.70). The total average for the experimental group increased from 11.23 to 17.64 (a gain of 6.41), whereas the control group increased from 11.50 to 13.33 (a gain of 1.83), resulting in a difference of 4.58 points.

The frequency distribution of posttest ability categories clearly demonstrates the superiority of the Market Play Learning method. In the experimental group, 22 children (73.3%) achieved the "Very Good" category (scores 17–20), and the remaining 8 children (26.7%) achieved the "Good" category (scores 13–16). No children in the experimental group fell into the "Fair" (9–12) or "Poor" (5–8) categories. In contrast, no children in the control group achieved the "Very Good" category. Instead, 18 children (60.0%) achieved the "Good" category, and 12 children (40.0%) achieved the "Fair" category, with none in the "Poor" category. This distribution shows that the experimental method brought the majority of children to the highest level of numeracy literacy achievement, while the control group remained at lower levels.

Before conducting inferential analysis, prerequisite tests were performed. The Shapiro-Wilk normality test showed that all data were normally distributed, as all significance values were greater than 0.05. For the experimental group, the pretest had a statistic of 0.946 with a significance of 0.138, and the posttest had a statistic of 0.951 with a significance of 0.189. For the control group, the pretest had a statistic of 0.943 with a significance of 0.116, and the posttest had a statistic of 0.948 with a significance of 0.158. The Levene's homogeneity test confirmed that the variances were homogeneous, with the pretest showing a statistic of 0.089 and a significance of 0.766, and the posttest showing a statistic of 0.521 and a significance of 0.473. These results met the requirements for conducting parametric tests.

The hypothesis testing results confirmed the significant effect of the Market Play Learning method. For the experimental group, the paired sample t-test yielded a mean difference of -6.40, a standard deviation of 1.52, a standard error mean of 0.278, a 95% confidence interval of [-6.97, -5.83], a t-count of -23.04, and a significance of 0.000, leading to the rejection of the null hypothesis. The control group also showed a significant but smaller improvement, with a mean difference of -1.80, a standard deviation of 1.32, a standard error mean of 0.241, a confidence interval of [-2.29, -1.31], a t-count of -7.47, and a significance of 0.000. The independent sample t-test on posttest scores revealed a t-count of 11.45 with 58 degrees of freedom, a significance of 0.000, a mean difference of 4.467, and a 95% confidence interval of [3.69, 5.24], confirming a highly significant difference between the two groups. Finally, the effect size calculation showed a Cohen's d of 4.21 for the experimental group's pre-post change, which is interpreted as very large, while the control group's effect size was 1.36 (large), and the posttest comparison between groups yielded a d of 2.95 (very large), underscoring the strong impact of the Market Play Learning method.

Discussion

The results of this study demonstrate that the Market Play Learning method has a highly significant effect on improving early childhood numeracy literacy. The experimental group using the Market Play Learning method experienced an average score increase from 11.23 to 17.63 (an improvement of 6.40 points or 57.0%), while the control group using the conventional method only experienced an increase from 11.37 to 13.17 (an improvement of 1.80 points or 15.8%). The difference in improvement of 4.60 points (41.2%) between the two groups demonstrates the superiority of the Market Play Learning method in developing early childhood numeracy literacy. This finding is consistent with research by Clements and

Sarama (2014), which states that learning mathematics through play can significantly improve understanding of numeracy concepts in early childhood.

The success of the Market Play Learning method can be explained through the perspective of Piaget's cognitive development theory. Children aged 5–6 years are in the preoperational stage, where they require concrete experiences to understand abstract concepts (Nainggolan & Daeli, 2021). In the Market Play Learning method, children use various manipulative objects such as fruits, vegetables, and play money to learn to count, group, and perform simple mathematical operations. This is in line with research by Khasanah and Purnamasari (2023), which found that role-playing methods through buying and selling fruits in a market can stimulate children's numeracy literacy development as they demonstrate language, numeracy, and behavior like real-life sellers and buyers.

Vygotsky's social-cultural theory also supports these findings. Vygotsky emphasized the importance of social interaction in children's cognitive development and introduced the concept of the Zone of Proximal Development (ZPD), which is the ability that can be achieved by children with the help of adults or more capable peers (Risnanosanti, 2025). The Market Play Learning method creates social situations where children interact as sellers and buyers, help each other solve numeracy problems, and learn from peers. This social interaction enables children to achieve higher levels of development with the help of peers or teachers as facilitators. Research by Adnan et al. (2026) confirms that guided play based on mini-market simulations that integrate teacher mediation, authentic transaction activities, and measurable learning assessment can provide an empirically tested conceptual foundation for enhancing early numeracy through meaningful buying and selling activities.

The analysis results show that all numeracy literacy indicators in the experimental group experienced substantial improvement. The indicator of comparing size/quantity experienced the highest improvement (1.40 points), indicating that buying and selling activities help children understand the concept of quantity comparison. The indicator of grouping objects experienced an improvement of 1.36 points, indicating that activities of organizing merchandise help children understand the concept of classification. The indicator of mentioning the number of objects increased by 1.34 points, indicating that the practice of counting merchandise improves counting ability. The indicators of recognizing number symbols and solving simple problems also experienced significant improvement, indicating that the market context helps children associate symbols with concrete meanings. These findings are consistent with research by Mu'jizah and Ahsani (2025), which found that game-based learning with market class games can develop students' numeracy literacy through activities such as using percentage numbers in discount calculations, performing basic arithmetic operations, reading numbers from price catalogs, and comparing prices of different items.

The Market Play Learning method makes a significant contribution to contextual learning in early childhood education. According to Johnson (2002), contextual learning helps children connect learning materials with real-life situations. In the market context, children can apply numeracy concepts in familiar and meaningful situations. Activities in Market Play Learning provide direct experiences in counting merchandise and money, grouping items by type and size, comparing prices and quantities, completing simple transactions, and recognizing number symbols in the context of prices. This is in line with research by Hamidah et al. (2025), which found that deep learning pedagogy implemented through a Mini-Market Project was associated with stronger intrinsic motivation (enthusiasm, focus, independence) and observable gains in recognizing numbers/symbols, simple words, and money values within a playful and contextual environment.

The comparison with conventional methods shows that although the control group also experienced significant improvement (1.80 points), this improvement was much smaller

than the experimental group. This indicates that conventional methods that are teacher-centered and use drill and practice approaches are less effective in developing deep understanding of numeracy concepts. Conventional methods tend to emphasize memorization and repetition without providing adequate contextual meaning. In contrast, the Market Play Learning method provides a holistic learning experience where children not only memorize numeracy concepts but also understand their application in daily life. This finding is consistent with research by Pradana (2025), which found that contextual approaches (such as buying and selling) are significantly more effective in building children's numerical abilities compared to lecture methods or worksheets.

The research findings have important implications for early childhood education practice. First, the importance of play-based learning: the Market Play Learning method demonstrates that play is not merely an entertainment activity but also an effective learning medium for developing academic skills such as numeracy literacy. This is in line with research by Vasoya et al. (2023), which identified play-based learning as one of the effective strategies for promoting foundational literacy and numeracy in early childhood education. Second, contextual learning: the use of market contexts provides concrete meaning to abstract numeracy concepts, making it easier for children to understand and remember learning. Third, the teacher's role as facilitator: in the Market Play Learning method, the teacher acts as a facilitator who guides children in constructing knowledge through direct experience.

The results of this study also support research by Hasanah (2025), which found that through buying and selling simulations (market day), children can understand number concepts, compare quantities, and count concretely. These activities also foster children's enthusiasm for learning and strengthen numeracy skills through enjoyable activities. Similarly, research by Anggraini (2019) showed a significant improvement in the ability to recognize numbers, count objects, and compare toy prices, indicating a close relationship between contextual activities and improved numeracy literacy. Research by Hasni (2021) also showed that using role-playing methods can improve cognitive abilities, children's mathematical communication, and train early logic. Market simulations in learning become an effective medium for instilling concepts of money, quantity, and simple calculations.

The success of the Market Play Learning method is also supported by research by Dewayani (2021) on "Panduan Penguatan Literasi dan Numerasi di PAUD" (Guide to Strengthening Literacy and Numeracy in Early Childhood Education), which emphasizes that contextual activities such as buying and selling games, playing shop, and exploration of real objects are appropriate strategies for developing numeracy literacy in an enjoyable and meaningful way. Furthermore, research by Novita et al. (2023) found a correlation between numeracy and vocabulary skills in Indonesian preschool children, indicating that language-rich activities such as market play can support both literacy and numeracy development simultaneously. This is consistent with the integrated approach of Market Play Learning, which combines numeracy learning with language and social communication.

The implications of this research for the early childhood education curriculum are significant. The Market Play Learning method can be integrated into the early childhood education curriculum as an effective alternative for numeracy learning. Teacher training is needed to understand and implement the Market Play Learning method properly. The development of learning media that supports the implementation of the Market Play Learning method, such as mini-market sets, play money, and other manipulative objects, is also necessary. This is in line with the recommendation by Adnan et al. (2026) regarding the development of teacher professional development programs, instructional resources, and contextualized assessment systems that are adaptable to local cultural characteristics.

The practical implications of this research also extend to parental involvement. Research by Sa'bani and Diana (2024) found that parental involvement has a positive and significant effect on children's literacy (42%) and numeracy (52.1%) abilities during the transition from early childhood education to primary school. In the context of Market Play Learning, parents who work as market traders can become resource persons and support children's learning at home by involving them in simple buying and selling activities. This is in line with research by Yuliantina (2023), which emphasizes the importance of collaboration between teachers and parents in developing early childhood literacy and numeracy.

The results of this study also have implications for the development of learning methods in early childhood education more broadly. The very large effect size (Cohen's $d = 4.21$) indicates that the Market Play Learning method is a highly effective intervention for improving early childhood numeracy literacy. However, several limitations of this study need to be considered. First, the research was conducted in a single kindergarten with specific socio-economic characteristics, so generalization to a broader population requires caution. Second, the implementation period of 4 weeks may not be optimal for identifying the sustainable impact of the learning method. Third, although a quasi-experimental design was used, there is still a possibility of external variables influencing the research results. Future research should conduct longitudinal studies to examine the long-term impact of the Market Play Learning method on children's numeracy development and replicate the study in various settings to ensure external validity of the findings.

4. Conclusion

Based on the results of the research and discussion that has been carried out regarding the effect of the Market Play Learning method on early childhood numeracy literacy at TK Ceria Eduloka, it can be concluded that the Market Play Learning method has a significant effect on improving early childhood numeracy literacy. This is evidenced by the results of the independent t-test showing a highly significant difference between the experimental group and the control group with a t-count of 11.45 and a significance level of 0.000 ($p < 0.001$). Additionally, the effect size of 4.21 (Cohen's d) indicates that the effect of the Market Play Learning method on early childhood numeracy literacy falls into the very large category. The improvement in numeracy literacy competency in the experimental group using the Market Play Learning method reached 57.0%, with the average score increasing from 11.23 at pretest to 17.63 at posttest. Meanwhile, the control group using the conventional method only experienced a 15.8% improvement, with the average score increasing from 11.37 to 13.17. The difference in improvement of 41.2% between the two groups demonstrates the superiority of the Market Play Learning method in developing early childhood numeracy literacy. All measured numeracy literacy indicators, including mentioning the number of objects, grouping objects by color/size, recognizing number symbols, comparing size or quantity, and solving simple problems through play, experienced substantial improvement in the experimental group.

The success of the Market Play Learning method can be explained through its alignment with children's cognitive development theory and contextual learning principles. This method provides concrete and meaningful learning experiences for children through simulation of market activities that are familiar in daily life. Thus, the Market Play Learning method can be a fun and effective alternative learning method for developing early childhood numeracy literacy and can be integrated into the early childhood education curriculum as an innovative and meaningful learning strategy. The findings of this study provide an important contribution to the development of learning methodology in early

childhood education and open opportunities for further research in optimizing numeracy learning through contextual and meaningful play approaches.

References

- Adnan, A., Nurani, Y., & Wulan, S. (2026). Model konseptual guided play berbasis pasar mini untuk meningkatkan literasi numerasi pada anak usia dini. *Jurnal Pendidikan Anak Usia Dini*, 7(2), 1578–1589. <https://doi.org/10.37985/murhum.v7i2.1863>
- Anggraini, D. (2019). Penerapan metode bermain peran (role playing) dalam mengembangkan kognitif anak usia 5-6 tahun. *JECED: Journal of Early Childhood Education and Development*, 1(2), 104–114.
- Apriyansyah, C. (2022). Upaya meningkatkan kemampuan mengenal angka 0-9 melalui media loose part di kelompok A PAUD Bismilah. *JPTI (Jurnal Pendidikan Anak Usia Dini Taman Indonesia)*, 1(2), 51–59.
- Budiarti, E. (2025a). Menstimulasi kewirausahaan anak usia dini melalui kegiatan market day di TK ABA 22 Cisalak Cimanggis Kota Depok. *Jurnal Mutiara Pendidikan*, 5(1), 84–93.
- Budiarti, E. (2025b). Pengembangan pohon baca huruf Hijaiyah dalam meningkatkan kemampuan membaca awal Alquran anak usia dini di Raudhatul Athfal Jakarta Utara. *Jurnal Studi Guru Dan Pembelajaran*, 8(2), 810–822.
- Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.
- Dewayani, S. (2021). *Panduan penguatan literasi dan numerasi di sekolah*. Kementerian Pendidikan dan Kebudayaan.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Fauziyah, C., & Rakhmawati, N. I. S. (2023). Pengaruh game numerasi (GANU) menggunakan pendekatan STEAM terhadap kemampuan numerasi anak usia 5–6 tahun. *JP2M (Jurnal Pendidikan dan Pembelajaran Matematika)*, 9(2), 231–238. <https://doi.org/10.29100/jp2m.v9i2.4419>
- Gopalan, M., Rosinger, K., & Ahn, J. B. (2020). Use of quasi-experimental research designs in education research: Growth, promise, and challenges. *Review of Research in Education*, 44(1), 218–243. <https://doi.org/10.3102/0091732X20903302>
- Hamidah, S., Asih, R. A., Hakim, E. A., & Ariani, N. (2025). Deep learning pedagogy to boost motivation and early numeracy–literacy in Indonesian early childhood education. *Research and Development in Education*, 5(2), 922–937. <https://doi.org/10.22219/raden.v5i2.42601>
- Hasanah, U. (2025). Meningkatkan kemampuan dasar literasi dan numerasi melalui kegiatan market day bagi anak usia dini di SPS Melati II Desa Margasari. *An Nafah: Jurnal Pengabdian Masyarakat*, 3(1), 44–52.
- Hasni, N. F. (2021). *Implementasi model pembelajaran bermain peran (role playing) untuk meningkatkan kemampuan komunikasi matematis siswa di MTs* [Undergraduate thesis, UIN AR-RANIRY].

- Hazimah, N. (2023). Analisis faktor yang mempengaruhi rendahnya tingkat pemahaman numerasi siswa kelas 5 SDN 192 Ciburuy. *EL-Muhbib Jurnal Pemikiran Dan Penelitian Pendidikan Dasar*, 7(1), 10–19.
- Imamah, N. (2025). Pendidikan bahasa Inggris pada anak usia dini. <http://Nurilimamah.blogspot.com>
- Iman, B. N. (2022). Budaya literasi dalam dunia pendidikan. *Proceedings Umsurabaya*, 1(1).
- Ismawati, D., & Puspita, Y. (2024). Inovasi pembelajaran literasi numerasi untuk anak usia dini di era digital. *Indonesian Research Journal on Education*, 4(3), 1542–1548.
- Istiadah, S., & Afandi, A. (2025). Implementasi model ATIK untuk meningkatkan literasi numerasi pada anak usia 5-6 tahun di TK Mambaul Ulum. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 10(02), 378–391.
- Jannah, R., & Nurmawanti, I. (2024). Pengaruh model pembelajaran problem based learning (PBL) berbasis experiential learning terhadap kemampuan numerasi siswa kelas IV. *Journal of Classroom Action Research*, 6(1), 119–127.
- Jayanti, E. (2023). *Numerasi pembelajaran matematika SD berbasis E-Learning*. Bening Media Publishing.
- Johnson, E. B. (2002). *Contextual teaching and learning: What it is and why it's here to stay*. Corwin Press.
- Kemendikbudristek. (2022). *Petunjuk teknis penyelenggaraan PAUD holistik integratif di satuan PAUD*. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.
- Khasanah, I., & Purnamasari, I. (2023). Role-playing methods: Efforts to stimulate the development of early childhood numeracy literacy. *Journal of Social Research*, 2(4), 1074–1078. <https://doi.org/10.55324/josr.v2i4.776>
- Masitoh, S. (2018). Blended learning berwawasan literasi digital suatu upaya meningkatkan kualitas pembelajaran dan membangun generasi emas 2045. *Proceedings of the ICECRS*, 1(3), v1i3-1377.
- Mastikawati, E. (2022). Strengthening early childhood learning outcomes through authentic assessment of students. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(5), 4547–4556.
- Mu'jizah, U., & Ahsani, E. L. F. (2025). Penerapan game based learning berbantuan permainan market class untuk mengembangkan literasi numerasi siswa kelas V MI Nabaul Ulum. *Jurnal Riset Pembelajaran Matematika Sekolah*, 9(1), 86–96. <https://doi.org/10.21009/jrpms.091.10>
- Nainggolan, A. M., & Daeli, A. (2021). Analisis teori perkembangan kognitif Jean Piaget dan implikasinya bagi pembelajaran. *Journal of Psychology Humanlight*, 2(1), 31–47.
- Novita, S., Anindhita, V., Wijayanti, P. A. K., Santoso, L. A. B., La Batavee, H., Tampubolon, A. F. J., & Syafitri, A. N. (2023). Relationship between numeracy and vocabulary skills in Indonesian preschool children and the impacts of learning environments. *International Journal of Early Childhood*, 1–18. <https://doi.org/10.1007/s13158-023-00356-z>

- Nurhayati, L., Djoehaeni, H., Mariyana, R., & Rahaju, I. (2024). Pengaruh project based learning terhadap kemampuan literasi numerasi anak usia dini. *Aulad: Journal on Early Childhood*, 7(2), 616–625. <https://doi.org/10.31004/aulad.v7i2.645>
- Padmakrisya, M. R. (2024). Literasi matematika dan konstruktivisme sosial. *AKSIOMA: Jurnal Matematika Dan Pendidikan Matematika*, 15(1), 27–38.
- Pardede, O. B. (2024). Faktor yang memengaruhi rendahnya literasi numerasi pada kelas rendah di SD Negeri Duri Kepa 11 Jakarta Barat. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, 10(04), 121–128.
- Patilima, H., & Oktafera, O. (2024). Interesting learning methods innovation for early childhood through market day activities. *International Conferences on Early Childhood Education Proceedings*, 2(1), 81–86.
- Pradana, L. N. (2025). *Membangun kecakapan numerasi sejak dini: Konsep, praktik, dan refleksi untuk sekolah dasar*. CV. AE MEDIA GRAFIKA.
- Priyanti, N. (2023). Pengaruh pendekatan pembelajaran diferensiasi terhadap kemampuan literasi baca, tulis dan numerasi pada anak usia dini. *Jurnal Ilmiah Potensia*, 8(2), 398–498. <https://doi.org/10.33369/jip.8.2.398-498>
- Priyanti, N. (2025). Peningkatan kompetensi guru PAUD dalam stimulasi literasi anak usia dini. *Jubaedah: Jurnal Pengabdian Dan Edukasi Sekolah*, 5(1), 61–72.
- Purnama, N. R. S. (2023). Studi korelasi penerapan project market day dengan model pembelajaran role playing terhadap literasi numerasi. *EMTEKA: Jurnal Pendidikan Matematika*, 4(2), 339–349.
- Putri, F. Z. R., & Khotimah, N. (2024). The influence of outdoor learning on the ability of numeration literacy of children aged 4-5 years at TK PKK Bakalan. *PAUD Teratai*, 13(1). <https://doi.org/10.26740/paudteratai.v13n1.p%25p>
- Rahim, A. (2023). Strategi peningkatan keterampilan literasi dan numerasi pada anak usia dini. *Journal Sains and Education*, 1(3), 72–79.
- Rahmadeni, F. (2022). Urgensi pengenalan konsep literasi numerasi pada anak usia dini. *ARITHMETIC: Academic Journal of Math*, 4(1), 79–92.
- Ratnasari, E. M. (2020). Outdoor learning terhadap literasi numerasi anak usia dini. *ThufuLA: Jurnal Inovasi Pendidikan Guru Raudhatul Athfal*, 8(2), 182.
- Risnanosanti, M. P. (2025). *Perkembangan peserta didik: Teori, konsep, dan implementasi dalam pembelajaran*. PT Indonesia Delapan Krasi Nusa.
- Ruba'iyah, S., Zahro, I., & Adhim, F. (2024). Upaya meningkatkan kemampuan numerasi anak usia dini dengan metode pembelajaran kolaboratif usia 5-6 tahun di TK Darut Tauhid Balung. *Efektor*, 11(2), 73–84.
- Sa'bani, A. H. N., & Diana, D. (2024). Keterlibatan orang tua terhadap kemampuan literasi dan numerasi anak pada transisi PAUD-SD. *Jurnal Pelita PAUD*, 8(2), 447–453. <https://doi.org/10.33222/pelitapaud.v8i2.3853>
- Sabrina, M. (2024). Analisis faktor-faktor yang mempengaruhi kemampuan literasi numerasi siswa sekolah dasar. *Artikel Penelitian di Sekolah Dasar: Menyusuri Inovasi dan Temuan Terkini*, 49.
- Sudarti, S. (2022). Penerapan pembelajaran literasi numerasi pada anak usia dini. *Seminar Nasional Pembelajaran Matematika*, 130–139.

- Vasoya, N., Vansdadiya, R., & Patel, K. (2023). Effective strategies for promoting foundational literacy and numeracy in early childhood education. *Journal of Social Sciences and Psychology*, 4(1), 92–95. <https://doi.org/10.3844/jssp.2023.92.95>
- Wahyuni, I. (2022). Analisis kemampuan literasi numerasi berdasarkan gaya belajar pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(6), 5840–5849.
- Watini, S. (2019). Pendekatan kontekstual dalam meningkatkan hasil belajar sains pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 3(1), 82–90.
- Watini, S. (2020). Implementasi model pembelajaran sentra pada TK Labschool STAI Bani Saleh Bekasi. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 4(1), 110–123. <https://doi.org/10.31004/obsesi.v4i1.190>
- Watini, S. (2022). Penerapan model ATIK untuk meningkatkan literasi numerasi anak usia dini melalui media permainan ular tangga raksasa. *EDUKASIA: Jurnal Pendidikan Dan Pembelajaran*, 3(2), 157–167.
- Yuliantina, I. (2023). Mengembangkan kemampuan literasi dan numerasi sejak anak usia dini. *Jurnal Pendidikan Dan Konseling (JPDK)*, 5(2), 537–540. <https://doi.org/10.31004/jpdk.v5i2.12840>
- Zhang, D., & Chen, R. (2023). A pilot movement integrity with intelligent play program (MIIP): Effects on math performance and enjoyment for preschoolers in China. *Child & Youth Care Forum*, 52(3), 703–719.