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Early Childhood Mathematics Concept Development: A Content Analysis

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Abstract

Mathematics education in early childhood is an important foundation in developing children's logical and numerical thinking skills from an early age. However, in practice, learning mathematics at the early childhood education level is still often done conventionally without considering the characteristics of child development. This research aims to theoretically examine the basic concepts, learning strategies, and factors that influence early childhood mathematics education through a literature study approach. This research uses a qualitative method with a content analysis approach by collecting and analyzing various relevant scientific articles that discuss mathematics education in early childhood. The data analysis technique was carried out through descriptive content analysis by identifying the main themes in the literature, such as the play while learning approach, integrative thematic learning, the role of the teacher, and learning environment support. The results of the study show that mathematics education in early childhood should be done in a concrete, fun and contextual way, involving manipulative media and meaningful play activities. In addition, the involvement of teachers, parents and the surrounding environment plays a major role in supporting the success of learning. This study provides a theoretical basis that can be used as a reference for educational practitioners and researchers in developing mathematics learning strategies that are in accordance with the developmental stages of early childhood.

INTRODUCTION

Early childhood is known as the golden age, which is the golden period of growth and development that takes place very rapidly, both physically, cognitively, socially, and emotionally (Nurasyiah & Atikah, 2023; Surono & Ifendi, 2021). In this phase, children have an extraordinary ability to absorb various information, so it is the right time to introduce various basic concepts, including mathematical concepts. Mathematics education in early childhood does not aim to memorize formulas, but to build an initial understanding of numbers, patterns, shapes, space, as well as the ability to think logically and analytically (Agusti et al., 2018).

In the context of Indonesian education, attention to numeracy literacy continues to increase, especially since the emergence of national assessments that

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emphasize the importance of critical thinking skills from an early age (Febriani et al., 2023). Unfortunately, in practice, mathematics learning for early childhoodis often conventional and doesn't fully take into account children's developmental characteristics, such as the principle of playing while learning, thematic approaches and active involvement of children.

Various developmental theories, such as those of Piaget, Vygotsky, and Bruner, provide a strong foundation that early childhood cognitive development is closely related to mathematical activities that are appropriate to their developmental stages (Bujuri, 2018; Ulfa & Na'imah, 2020). Therefore, it is important to examine in depth the concepts and approaches in early childhood mathematics education through existing scientific sources. Based on the Scopus database, previous research uses several keywords that refer to research on development of learning in early childhood, such as; Early childhood, mathematics, concept, as shown in Figure 1 below:

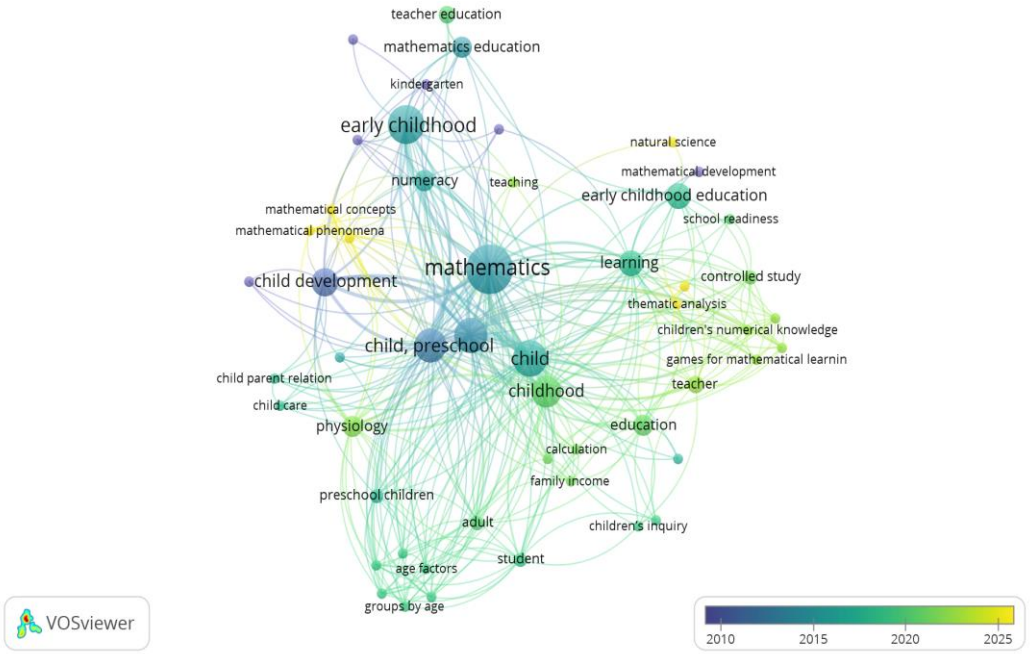

Fig 1. The keywords referring to early childhood, mathematics, concept by the world's researchers (Scopus database)

Based on studies conducted by researchers related to the development of learning in early childhood is one of the topics that continues to grow in recent years (2010-2025) but related to the development of learning in early childhood, especially mathematics is still very little found. Therefore, this article aims to theoretically examine the basic concepts, development strategies, and factors that influence early childhood mathematics education through literature studies from various scientific sources. With this approach, a comprehensive picture is expected to be obtained that can serve as a reference for educational practitioners, researchers, and policy makers in developing effective mathematics learning that is in accordance with the child's developmental stage.

METHODS

This research uses a qualitative method with a content analysis approach, which is a research approach carried out by collecting, reviewing, and analyzing information from various relevant literature sources without conducting direct field data collection (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005; Snelson, 2016). Literature study was chosen because the main purpose of this research is to explore and understand various concepts, theories, approaches, and practices of mathematics

education for early childhood from a scientific point of view that have been discussed in various scientific works (Pringgar & Sujatmiko, 2020; Sueni, 2019).

The data analysis technique used was content analysis, which aims to identify the main themes, important patterns, and gaps in the existing literature review (Subagiya, 2023). The data were analyzed descriptively by grouping the findings into several categories of discussion, such as: basic concepts of mathematics for early childhood, learning approaches, and supporting factors that influence the success of mathematics learning at an early age (Julaiha et al., 2023). Through this method, the research is expected to produce a theoretically deep understanding of early childhood mathematics education and contribute to the development of more targeted educational practices.

RESULT AND DISCUSSION

A literature review shows that mathematics education in early childhood is an important part of forming the basis of logical and numerical thinking skills, which are the foundation for mathematics learning at the next level (Ariyana, 2020). Young children are in a stage of rapid cognitive development, so the approach to mathematics learning at this age must be adapted to their developmental characteristics (Nainggolan & Daeli, 2021). Mathematics learning in early childhood is not intended for memorizing formulas or understanding abstract concepts, but rather for building initial experiences in recognizing numbers, patterns, shapes, sizes, and concepts of relationships in a concrete way through meaningful daily activities (Prastika, 2021).

Various theories of child development support the importance of introducing mathematical concepts at an early age (Novitasari et al., 2023). Piaget's theory states that young children are in the preoperational stage, characterized by the ability to think symbolically but not yet capable of performing complex logical operations (Priyono et al., 2021). Therefore, mathematics learning should be conducted through concrete, visual, and manipulative experiences (Novitasari et al., 2023). In this context, real objects, educational games, and teaching aids greatly assist children in understanding mathematical concepts gradually and enjoyably (Novitasari et al., 2023). Vygotsky added the importance of social interaction in the learning process of children, especially in the context of mathematics (Novitasari et al., 2023). Children can master new concepts with the help of adults or peers, which they will then gradually be able to absorb independently.

The results of the literature analysis also show that the most effective strategy in early childhood mathematics learning is the play-based learning approach (Febriani et al., 2020). Structured play activities provide children with the space to explore mathematical concepts in a fun and stress-free way (Julianto, 2020). The integrative thematic approach has also proven to be effective because it incorporates mathematical elements into various aspects of children's lives, such as counting while singing, grouping toys by color and shape, and measuring the height of objects using non-standard units. This makes mathematics learning more contextual and easier for children to understand (Rasmani et al., 2022).

Teachers play a crucial role in guiding the mathematics learning process that aligns with children's age and needs (Himmatul, 2017). Teachers are not merely content deliverers but also facilitators who can create a learning environment rich in mathematical stimulation (Triana et al., 2023). In addition to teachers, the surrounding environment also has a significant influence on children's mathematical development. The availability of teaching aids, educational games, and parental support in counting activities at home are external factors that are very supportive (Fatimah, 2023). Collaboration between teachers, parents, and the environment is key to creating a conducive and enjoyable learning atmosphere.

However, various challenges are still encountered in the implementation of early childhood mathematics education. Many early childhood education teachers have not received specialized training on mathematics teaching approaches that are appropriate for children's developmental characteristics (Fatimah, 2023). Additionally, many teaching methods still emphasize memorization of numbers without considering conceptual understanding. Limitations in learning materials, insufficient use of educational games, and low numeracy literacy within the family environment also pose challenges that need to be addressed (Ismawati & Puspita, 2024). Early childhood mathematics education must be designed based on an understanding of children's cognitive development, using approaches that are enjoyable, concrete, and contextual. Support from teachers, the learning environment, and active parental participation are key factors in optimizing early childhood mathematics learning.

CONCLUSION

Early childhood mathematics education plays a crucial role in laying the foundation for logical and numerical thinking skills that will develop as children grow. The introduction of mathematical concepts cannot be done abstractly but must be based on concrete approaches that align with children's cognitive development stages. The use of manipulative media, educational games, and a play-based learning approach are effective methods in helping children understand concepts such as numbers, patterns, shapes, and sizes in a meaningful way. In this process, the role of the teacher as a facilitator is crucial, as is the involvement of the learning environment and support from parents at home.

In order for the early mathematics learning process to be optimal, it is important to pay attention to the quality of educators' competencies. It is necessary to improve teachers' knowledge and skills through training that focuses on learning strategies appropriate to children's characteristics. In addition, educational institutions need to provide facilities that support children's active and enjoyable exploration of mathematical concepts. Equally important is the collaboration between schools and families in creating a positive learning environment at home, which is a supporting factor that should be strengthened. Further empirical studies on the implementation of these strategies in the field can provide a more concrete picture of their effectiveness in the context of early childhood education.

REFERENCES

Agusti, F. A., Zafirah, A., Engkizar, E., Anwar, F., Arifin, Z., & Syafril, S. (2018). The Implantation of Character Values Toward Students Through Congkak Game for Mathematics Instructional Media. *Jurnal Penelitian Pendidikan*, *35*(2), 132–142. https://doi.org/10.15294/jpp.v35i2.13947

Ariyana, I. K. S. (2020). Pembelajaran Konsep Pola Untuk Anak Usia Dini dalan Kaitannya dengan Problem Solving. *Widya Kumara Jurnal Pendidikan Anak Usia Dini*, *1*(1), 22–32. https://doi.org/10.55115/widyakumara.v1i1.579

Bujuri, D. A. (2018). Analisis Perkembangan Kognitif Anak Usia Dasar dan Implikasinya dalam Kegiatan Belajar Mengajar. *LITERASI (Jurnal Ilmu Pendidikan)*, *9*(1), 37. https://doi.org/10.21927/literasi.2018.9(1).37-50

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*(1), 107–115. https://doi.org/10.1111/j.1365-2648.2007.04569.x

Fatimah, F. (2023). Analisis Faktor Penyebab Anak Usia Dini Mengalami Kesulitan dalam Berhitung di TK Siaga Muda Kec Percut Sei Tuan. *Journal Ashil: Jurnal Pendidikan Anak Usia Dini*, *3*(2), 1–10. https://doi.org/10.33367/piaud.v3i2.4012

Febriani, A., Miftahurrahmah, M., Pajaria, S. A., & Nurhaliza, S. (2020). Six Motivations for Students to Take Tutoring. *International Journal of Multidisciplinary Research of Higher Education (IJMURHICA)*, *3*(3), 121–129. https://doi.org/https://doi.org/10.24036/ijmurhica.v3i3.192

Febriani, A, Wiza, R., & Adlin Binti Wan Aminudin, W. S. (2023). Profile Analysis of Gifted Student Selection in Excellent Schools in Indonesia. *International Journal of Multidisciplinary Research of Higher Education*, *6*(4), 188–195. https://doi.org/10.24036/ijmurhica.v4i4.161

Himmatul, F. (2017). Peran Guru Dalam Mengembangkan Kecerdasan Emosional Anak Usia Dini. *Proseding Seminar Naional Unirow Tuban*, *2*(1), 52–61. https://doi.org/10.31004/jpdk.v5i2.12504

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277–1288. https://doi.org/10.1177/1049732305276687

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. https://doi.org/10.31004/irje.v4i3.1530

Julaiha, S., Ramli, A., Oktaviany, V., Sudadi, S., Malik, L. R., & Anwar, H. C. (2023). Analisis Pengaruh Manajemen Pendidikan Terhadap Motivasi Belajar Pada Anak Usia Dini. In *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini* (Vol. 7, Issue 3, pp. 2659–2670). https://doi.org/10.31004/obsesi.v7i3.4507

Julianto, T. A. (2020). Metode Menghafal dan Memahami al-Qur'an bagi anak usia dini melalui Gerakan Isyarat ACQ. *IQRO: Journal of Islamic Education Juli*, *3*(1), 2622–3201. https://doi.org/10.24256/iqro.v3i1.1439

Nainggolan, A. M., & Daeli, A. (2021). Analisis Teori Perkembangan Kognitif Jean Piaget dan Implikasinya bagi Pembelajaran. *Journal of Psychology "Humanlight,"* *2*(1), 31–47. https://doi.org/10.51667/jph.v2i1.554

Novitasari, E., Asmarani, P. R., Azizah, N., & Nisa, L. (2023). Perancangan Ape Mistery Box Dalam Pembelajaran Matematika Anak Usia Dini. *MURANGKALIH: Jurnal Pendidikan Anak Usia Dini*, *4*(01), 1–11. https://doi.org/10.35706/murangkalih.v4i01.9214

Nurasyiah, R., & Atikah, C. (2023). Karakteristik Perkembangan Anak Usia Dini. *Khazanah Pendidikan*, *17*(1), 75. https://doi.org/10.30595/jkp.v17i1.15397

Prastika, Y. D. (2021). Hubungan Minat Belajar Dan Hasil Belajar Pada Mata Pelajaran Matematika Di Smk Yadika Bandar Lampung. *Jurnal Ilmiah Matematika Realistik*, *2*(1), 26–32. https://doi.org/10.33365/ji-mr.v2i1.772

Pringgar, R. F., & Sujatmiko, B. (2020). Penelitian Kepustakaan (Library Research) Modul Pembelajaran Berbasis Augmented Reality pada Pembelajaran Siswa. *Jurnal IT-EDU*, *05*(01), 317–329. https://doi.org/10.26740/it-edu.v5i1.37489

Priyono, F. H., Rahmawati, A., & Pudyaningtyas, A. R. (2021). Kemampuan Berpikir Simbolik Pada Anak Usia 5-6 Tahun. *Kumara Cendekia*, *9*(4), 212. https://doi.org/10.20961/kc.v9i4.53280

Rasmani, U. E. E., Nurjanah, N. E., Widiastuti, Y. K. W., Mujiyati, S., & Agustina, P. (2022). Upaya Meningkatkan Pembelajaran Tematik Integratif pada Guru Pendidikan Anak Usia Dini melalui Pelatihan dan Pendampingan E-Learning. *International Journal of Community Service Learning*, *6*(1), 61–68. https://doi.org/10.23887/ijcsl.v6i1.41000

Snelson, C. L. (2016). Qualitative and mixed methods social media research: A review of the literature. *International Journal of Qualitative Methods*, *15*(1). https://doi.org/10.1177/1609406915624574

Subagiya, B. (2023). Eksplorasi Penelitian Pendidikan Agama Islam melalui Kajian Literatur: Pemahaman konseptual dan Aplikasi Praktis. *Ta'dibuna: Jurnal Pendidikan Islam*, *12*(3), 304–318.

https://doi.org/10.32832/tadibuna.v12i3.14113
Sueni, N. M. (2019). Metode, Model dan Bentuk Model Pembelajaran (Tinjauan Pustaka). *Wacana: Majalah Ilmiah Tentang Bahasa, Sastra Dan Pembelajarannya, 19*(1), 3–3. https://doi.org/10.46444/wacanasaraswati.v19i1.35
Surono, S., & Ifendi, M. (2021). Pendidikan Islam Klasik : Model Dan Karakteristik. *Thawalib | Jurnal Kependidikan Islam*, *2*(2), 79–94. https://doi.org/10.54150/thawalib.v2i2.23
Triana, T. P., Idawati, S. I., & Munawaroh, H. (2023). Strategi Pembelajaran Matematika Berdasarkan Karakteristik Anak Usia Dini. In *AL IHSAN: Jurnal Pendidikan Islam Anak Usia Dini* (Vol. 4, Issue 2, p. 092). https://doi.org/10.69552/alihsan.v4i2.2146
Ulfa, M., & Na'imah, N. (2020). Peran Keluarga dalam Konsep Psikologi Perkembangan Anak Usia Dini. *Aulad : Journal on Early Childhood*, *3*(1), 20–28. https://doi.org/10.31004/aulad.v3i1.45