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Introduction To Basic Mathematical Concepts Through Learning Media

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ABSTRACT

Understanding fundamental mathematical concepts is essential for developing students' logical reasoning, critical thinking, and problem-solving abilities. This study employs a literature review methodology to analyze foundational mathematical concepts—such as numbers, arithmetic operations, geometry, algebra, and statistics—and their impact on students' learning and cognitive development. The findings indicate that interactive tools, cultural contexts, and hands-on learning media significantly enhance students' comprehension and retention of these basic concepts. Studies reviewed include applications of traditional games, visual aids, and realistic mathematics approaches, which help bridge abstract concepts with everyday life, thus fostering a deeper, more applicable understanding of mathematics. This research provides insights for educators to utilize varied, engaging approaches that support students' foundational knowledge, encouraging better academic outcomes and practical skills. The findings suggest that contextual and interactive methods in early mathematics education are crucial for cultivating a robust foundation for further learning.

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1. INTRODUCTION

Mathematics is a vast and intricate discipline encompassing various branches, each contributing uniquely to developing complex patterns and numerical approaches for solving diverse problems [1], [2]. Arithmetic is the foundational branch at its core, focusing on the basic operations of addition, subtraction, multiplication, and division, which are critical for everyday calculations and understanding numerical relationships. Building upon this foundation, algebra introduces variables and symbols, allowing for the formulation of equations and the exploration of relationships between quantities, thereby facilitating the solution of more abstract problems. Geometry, another fundamental branch, delves into the properties and relationships of shapes and spaces, employing visual reasoning and spatial

understanding to address real-world applications such as architecture and engineering. Finally, calculus emerges as a powerful tool for analyzing change and motion, employing concepts such as limits, derivatives, and integrals to tackle complex problems in physics, economics, and beyond. These branches of mathematics collectively form the bedrock for understanding advanced concepts and foster critical thinking and problem-solving skills applicable across various fields of study and professional practices. The interplay among these branches illustrates the cohesive nature of mathematics as a discipline, where each area informs and enhances the others, ultimately contributing to a comprehensive understanding of the mathematical landscape [3], [4], [5].

As technological and scientific advancements accelerate, so does the development of mathematics, which increasingly integrates with other fields to solve interdisciplinary challenges. In educational contexts, establishing a firm grasp of fundamental mathematical principles becomes even more critical for students, forming the groundwork for more advanced studies in various fields [6]. However, many students report difficulties and frustration with mathematics, often attributed to a lack of understanding of these foundational principles. Addressing these gaps can significantly improve students' mathematical confidence and comprehension [7].

Therefore, this study aims to analyze and highlight the importance of a solid foundation in basic mathematics, emphasizing its role in fostering critical thinking and analytical skills necessary for academic and everyday problem-solving. By thoroughly examining foundational topics such as numbers, operations, geometry, algebra, statistics, and probability, this research employs a literature review methodology to gather insights from credible and relevant sources. The objective is to provide a comprehensive overview of basic mathematical principles that can serve as a valuable resource for students, educators, and others in the field, contributing to a more robust understanding of mathematical foundations essential for continued educational success.

2. METHOD

The methodology employed in this study is a literature review approach, which systematically analyzes existing research on the fundamental concepts of mathematics. This literature review encompasses a series of activities, including data collection from journals, articles, and books, along with processes of reading, note-taking, and organizing data in a structured, analytical, and critical manner. The goal is to objectively synthesize insights that highlight the role of basic mathematical concepts in enhancing students' logical critical thinking and their ability to connect mathematical principles to real-life situations.

In this study, the literature review method follows a process similar to other empirical studies but differs in data sources and collection techniques. Data is derived from relevant journal articles, research reports, academic volumes, and other publications focusing on the variables under investigation. Each source is meticulously reviewed and analyzed to ensure a comprehensive understanding of the fundamental mathematical principles being studied.

The collected data undergoes a rigorous analytical process to generate objective insights into effective teaching and learning practices for foundational mathematics concepts. By synthesizing findings across multiple sources, this study avoids reliance on isolated data points, instead integrating insights from various credible studies to form a holistic view. The ultimate aim is to derive practical recommendations to enhance students' foundational mathematical knowledge, equipping them with essential critical thinking and application skills.

3. RESULTS AND DISCUSSION

Mathematics is a subject that encompasses various basic concepts that are important to understand. This includes basic mathematical operations such as addition, subtraction, multiplication, and division. In addition, understanding various types of numbers, such as integers and decimals, is necessary. Basic geometric concepts such as lines and triangles are integral parts of mathematics. Also, basic algebraic concepts such as variables and linear equations and statistical concepts such as triangles, triangles, and models are essential to understand. The application of mathematics covers a wide range of fields, including science, technology, and business. In science, statistics is used to analyze experimental data, while algebra is used to develop mathematical models for system simulation. In technology, algebra is used in software development, while statistics is used in market analysis and trend prediction. In business, statistics is used in market analysis and risk management, while algebra is used in business planning. Understanding mathematics broadens our horizons about the world and improves our ability to think critically and analyze situations better. Thus, a solid mathematics education provides a solid foundation for developing an individual's intellectual and professional abilities.

3.1 Results

Based on the review of 25 journal articles on the basic concept of mathematics, it has been proven to achieve the goal of understanding basic mathematics lessons. The review of the articles is described as follows:

Article 1, Research by Ningsih [8], entitled "*Efektivitas Pelaksanaan Pelmbellajaran Matematika Anak Usia Dini Dengan Menggunakan Alat Pelrmainan Eldulkatif Di TK Ullil Alba*b" This journal focuses on the implementation of early childhood mathematics lessons using Elementary Game Tools (APEl) in Ulil Albab Kindergarten. The aim is to evaluate how effective the use of APEL is in improving children's understanding of basic mathematical concepts. The study uses a qualitative approach with observation and interview methods. Data were collected from direct observation in the classroom and interviews with students' parents and parents. The study results showed that using APLs such as number blocks, number cards, and construction toys can increase children's interest in learning. Children improved number recognition, understanding of number sequences, and other basic mathematical concepts.

Article 2, Research by Kurino & Rahman [9], entitled "*Eksplorasi Etnomatematika Rumah Adat Panjalin Pada Materi Konsep Dasar Geometri di Sekolah Dasar*." This article explores the application of mathematics from traditional house architecture in

Panjalin to teach basic geometry concepts to elementary school students. A qualitative descriptive approach explores how geometry elements in Panjalin traditional houses can be used as learning materials. Data was collected through literary studies and direct observation of traditional houses. The results of this study show that the Panjalin traditional house has various geometry models, such as triangles, circles, and symmetry, that can be used as tools to teach basic geometry concepts. Using local cultural contexts helps students understand these concepts more concretely and relevantly. Integrating mathematics in learning can enrich students' learning experiences and develop their understanding of geometry. This model also promotes appreciation for cultural heritage.

Article 3, research Delvi [10], entitled "*Pengembangan Media Pembelajaran Puzzle Angka untuk Meningkatkan Kemampuan Mengenal Lambang Bilangan*." This research aims to develop a number puzzle learning media to improve children's recognition of number symbols. This research uses the R&D (Research and Development) model, which includes media development, testing, and evaluation stages. The developed media was tested on early childhood children to see its effectiveness. The trial results showed that number puzzles can improve children's ability to recognize and understand number symbols. This puzzle is designed with attractive images and bright colors to attract children's interest. Effective number puzzle learning improves children's ability to recognize number symbols. This puzzle also increases children's motivation and participation in the learning process.

Article 4, Research by Afrida et al. [11], entitled "*Mengembangkan Kemampuan Mengenal Konsep dan Lambang Bilangan Menggunakan Kombinasi Model Kearipan*," This article discusses the development of the ability to recognize concepts and number symbols through the use of a combination of learning models based on local wisdom. The research uses a qualitative approach with data collection through observation, interviews, and cross-documentation studies. The local wisdom used includes traditional games and folk tales related to numbers. Using local wisdom in learning helps children understand the concept of numbers in a more contextual and meaningful way. Children are more likely to understand and remember the concept of numbers through stories and games that are familiar to them. Integrating local wisdom in learning can improve children's understanding of the concept and symbols of numbers and preserve local culture.

Article 5, Research by Hamidah et al. [12] entitled "*Desain Lembar Kerja Anak Berbasis Realistic Mathematika Education (RME) untuk Mengenalkan Konsep Bilangan Anak Usia 5 – 6 Tahun*" This research aims to design worksheets based on Realistic Mathematics Education (RMEL) which are influential in introducing number concepts to 5-6 year old children. The research uses the R&D design method with worksheet development, testing, and evaluation stages. This worksheet connects mathematical concepts with real-life situations children experience daily. The worksheets allow children to learn number concepts through real-life contexts, such as counting circles or toys. Children show increased understanding and can apply several concepts in real-life situations.

Article 6, Research by Gusmanti et al. [13], entitled "*Peningkatan Kemampuan Mengenal Konsep Matematika Permulaan melalui Permaian Kotak Pintar dengan Media*

Tutup Botol di TK Ananda Kota Payakumbuh Sumatera Barat" This article examines the effectiveness of using intelligent box games with Meldia Tultulp Bottle to improve basic mathematical concept understanding skills in Ananda Kindergarten. The study used the experiment model with a pre-post design. The model used is a smart box containing a bottle of Tultulp with numbers and mathematical symbols. The study results showed a significant increase in children's ability to recognize basic mathematical concepts such as number recognition and simple addition operations. Bottled media attracted children's attention and made it easier for them to understand mathematical concepts.

Article 7, Research by Wahid & Samta [14], entitled "*Permainan Tradisional Dakon Sebagai Media Pembelajaran Untuk Meningkatkan Kecerdasan Matematika Anak Usia Dini*." This article discusses using the traditional Dakon game to improve mathematical intelligence in early childhood children. Dakon is a traditional game that involves calculation and strategy. This study uses a qualitative approach with a participatory observation and interview method. Children are taught to play Dakon, and the development of their mathematical skills is observed. Playing Dakon helps children understand the concept of numbers, addition, and simple division. This game also teaches strategy and planning, which are essential in developing cognitive skills. As a learning medium, it significantly improves children's mathematical intelligence. This game also helps preserve local culture.

Article 8, Research by Nur'aini [15], entitled "*Peningkatan Kemampuan Matematika Melalui Aritmatika di Taman Kanak-Kanak*." This research evaluates the improvement of mathematical skills of children in kindergarten through basic arithmetic lessons. The research uses a qualitative approach with the experiment method. Playing activities and practicing questions teach Children basic arithmetic, such as addition and subtraction. The results show a significant improvement in children's arithmetic skills after following the lessons. Children are faster in recognizing numbers and understanding basic mathematical operations. Arithmetic lessons at the kindergarten level effectively improve children's basic mathematical skills. This method helps children develop a solid mathematical foundation from an early age.

Article 9, Research by Simamora et al. [16] entitled "*Edukasi Permainan Edukatif Untuk Mengembangkan Kemampuan Motorik Anak Dalam Mengenal Bilangan Matematika*." This journal focuses on developing children's motor skills through the education of early childhood games designed to introduce mathematical numbers. The study used the early childhood game model with a pretest-posttest design. Early childhood games involve physical activities such as jumping, throwing, and number recognition. The results of this study show that interactive games help children develop motor skills and number concepts. Children improve motor coordination skills and number understanding after playing interactive games. Interactive games are effective in simultaneously developing children's motor and cognitive skills. This integration provides a comprehensive and enjoyable learning experience for children.

Article 10, research by Rohmalina et al. [17], entitled "*Pendekatan Open-Ended dalam Mempengaruhi Kemampuan Mengenal Konsep Bilangan Anak Usia Dini*." This article evaluates the effectiveness of the Opel-Elndeld approach in teaching several

concepts in early childhood education. The study used the Opel-Elndeld approach model, where children were given mathematical problems that did not have a single correct answer and could be solved in various ways. The results of this study are that the open-ended approach allows children to explore various ways to solve problems, which increases their creativity and critical thinking skills. Children demonstrate a deeper understanding of numbers and can apply it in various contexts. The open-ended approach effectively increases children's understanding of numbers and encourages exploration and innovation in learning. This method also promotes flexible thinking and creative solutions.

Article 11, Research by Rivai & Rahmat [18], entitled "*Pelatihan Pembuatan Media Pembelajaran Matematika Untuk Pemahaman Konsep Dasar Matematika Bagi Mahasiswa Jurusan S1 Pendidikan Guru Sekolah Dasa*r." This article explains the training for elementary school education (PGSD) undergraduate students at Gorontalo State University (ULNG) in mathematics lesson rounding. This training aims to improve students' abilities in understanding and teaching basic mathematics concepts through innovative learning media. This study used a participatory model in the form of training and workshops. Students were directly involved in developing the learning media, from design to implementation. Data were collected through observation, interviews, and questionnaires after training completion to assess its effectiveness. The training results showed a significant increase in students' understanding of basic mathematical concepts and ability to design effective learning media. Students became more creative in developing teaching aids and using technology in learning. This training effectively improves the competence of PGSD students in rounding out the basic concepts of mathematics learning. Students not only understand the basic concepts of mathematics better but are also able to apply their understanding in interesting and intellectual contexts.

Article 12, Research by Stiawan & Mustaqimah [19], entitled "*Pembelajaran Mengenal Konsep Bilangan Matematika pada Anak*," discusses the model and approach to teaching number concepts to children. The main focus is on introducing several practical and interesting concepts for early childhood. The research uses a qualitative approach with observation and interviews. Data were collected from various sources, including teachers, children, and the elderly. Various learning methods, such as visual aids, games, and stories, were used to see the effectiveness of introducing the concept of numbers. The results showed that children were more likely to understand the concept of numbers through interactive models and visual aids. For example, pictures, stories, and games increased children's understanding of numbers and number sequences. Interactive and visual-based learning methods were very effective in introducing the concept of numbers to children. Children were more likely to be interested and able to remember the concepts taught through this approach.

Article 13, Research by Sariyanti [20] entitled "*Pemanfaatan Media Pohon Angka Untuk Mengenal Konsep Bilangan pada Anak Usia Dini*" This journal evaluates the use of Number Tree Media to help early childhood children learn number concepts. Number Tree is a visual aid that introduces numbers and number sequences to children. The study used the Number Tree Model with a pretest-posttest design. Children were introduced to the Number Tree and learning activities involving counting and grouping numbers. Data were

collected through observation and evaluation of children's understanding of numbers before and after using the media. The study results showed a significant increase in children's ability to understand the concept of numbers after using the Number Tree media. Children showed an increased understanding of number sequences, counting, and grouping numbers. The use of the Number Tree media is effective in helping children understand the concept of numbers. This media provides an exciting and easy-to-understand way for children to learn about numbers and number sequences.

Article 14, Research by Putri & Dewi [21] entitled "*Stimulasi Kemampuan Mengenal Konsep Bilangan Anak Usia Dini Melaluli Permainan Matematika Montessori*." This article discusses using the Montessori model in teaching number concepts to early childhood children. The Montessori model is known for its focus on stimulating children's cognitive development through specially designed games and activities. The study used the Montessori model with a pretest-posttest design. Children were introduced to various Montessori mathematical games designed to introduce the concept of numbers, such as stairs and number rods. Data were collected by observing and evaluating children's number and number-order abilities and intelligence. The results showed that Montessori mathematical games improved children's understanding of numbers. Children significantly improved their number recognition, multiplication, and simple addition skills. Montessori mathematics proved effective in stimulating children's ability to recognize numbers. This attachment provides a fun, intellectual learning experience that aligns with the child's cognitive development.

Article 15, Research by Putri & Herlinda [22] entitled "*Mengenalkan Konsep Bilangan Melalui Media Audio Visual Pada Anak Usia 5-6 Tahun*." This journal explores using visual media to introduce number concepts to 5-6-year-old children. Visual media was chosen because of its ability to attract children's attention and convey information in a way that is easy to understand. The study used the visual media model with a pretest-posttest design. Children were taught number concepts through videos and animations designed to teach numbers and basic mathematical operations. Data were collected by observing and measuring children's understanding of numbers and intelligence. The study showed a significant increase in children's understanding of number concepts after using audiovisual media. Children recognized numbers faster and understood basic mathematical concepts such as addition and subtraction through videos and animations. Audiovisual media proved effective in introducing number concepts to children. Media attracts attention and helps children understand mathematical concepts interactively and enjoyably.

Article 16, Research by Anggraini & Pujiastulti [23] entitled "*Peranan Permainan Tradisional Engklek dalam Mengembangkan Kemampuan Matematika di Sekolah Dasar*." This journal examines how the traditional Elngklelk game can be used as a learning tool to develop mathematical skills in elementary schools. Elngklelk is a popular jumping game in Indonesia and involves counting numbers and grouping. The study used the elkspelling method with a pretest-posttest design. Elementary school students were introduced to the game of Elngklelk and then evaluated their mathematical skills and intelligence. Data were collected through observation, tests, and interviews. The results showed that the game of Elngklelk contributed significantly to improving students' mathematical skills, especially

in counting, grouping numbers, and recognizing patterns. Students involved in the game showed a better understanding of basic mathematical concepts. Elngklelk is an effective and enjoyable medium for teaching mathematics in elementary schools. This game not only helps in the development of mathematical skills but also promotes traditional cultural values.

Article 17, Research by Firdaus & Nisa [24], entitled "*Pengaruh Metode Bermain Berbantuan Alat Peraga Papan Stik Terhadap Kecerdasan Logika Matematika Siswa Sekolah Dasar*," This article discusses the influence of using stick boards as teaching aids in mathematics learning to improve elementary school students' logical-mathematical intelligence. Stick boards are used to help students understand mathematical concepts through physical manipulation. The study used an experimental approach with a control and experimental group design. Students were divided into two groups; one used the stick board in the lesson, and the other did not. Data were collected through tests of mathematical logic skills and intelligence. The results showed that students who used the stick board significantly increased their mathematical logic skills compared to those who did not use the teaching aids. Using the stickboard helped students visualize and manipulate mathematical concepts, which increased their understanding.

Article 18, Research by Aisyah [25] entitled "*Efektivitas Penggunaan Media Jam Pada Pembelajaran Mengenal Waktu Siswa Kelas II SDN Banyuajuh 02*" This journal evaluates the effectiveness of using clock media in time concept learning to introduce time concept to grade II students at SDN Banyulajulh 02. Clock media is used to help students understand the concept concretely. The study uses a time concept learning model with a pretest-posttest design. Students were taught the concept of time using the clock media, and their understanding was evaluated for accuracy and intelligence. Data were collected through time concept comprehension tests and observations. The study results showed a significant increase in students' understanding of time after using the clock media. Students were more able to understand how to read time and calculate time duration with the help of this media.

Article 19, Research by Riani & Maryani [26] entitled "*Penggunaan Alat Peraga dalam Pengenalan Konsep Matematika pada Anak Usia Dini di TK Al-Falah Kota Cilegon*." This article discusses the use of teaching aids in introducing mathematical concepts to early childhood children at Al-Falah Kindergarten, Cilelgon City. Teaching aids help children understand basic mathematical concepts such as numbers and numbers. The study used a qualitative method with participatory observation and interviews. The teaching aids used include number blocks, geometry blocks, and simple counting tools. Data were collected from observations of children's learning activities and interviews with teachers and people who are deaf or hard of hearing. The results showed that the use of teaching aids was effective in helping children understand basic mathematical concepts. Children who used teaching aids showed a better increase in understanding compared to those who did not use teaching aids.

Article 20, Research by Mulyawati et al. [27] entitled "*Upaya Meningkatkan Kemampuan Menghitung melalui Media Konkret Koin Warna (Kancing) pada Mata Pelajaran Matematika Madrasah Ibtidaiyah.*" This journal evaluates using concrete coin

color or button media to improve students' calculation skills in mathematics subjects in Elementary Madrasah. Concrete media is used to help students understand the concept of calculation and basic mathematical operations. The study uses the experiment model with a pretest-posttest design. Students were introduced to the color coin media to practice counting, and their counting skills were evaluated first and second after using the media. Data were collected through counting skills tests and observations. Results showed a significant improvement in students' counting skills after using the color coin media. The media helped students visualize the counting process and better understand mathematical operations.

Article 21, Research by Paramansyah et al. [28] entitled "*Upaya Meningkatkan Kemampuan Mengenal Lambang Bilangan Melalui Kegiatan Bermain Kartu Angka pada Anak Kelompok A di SPS Dahlia Jatisampurna Bekasi*." This article discusses using card number playing activities to improve the recognition of number symbols in group A children at SPS Dahlia Jatisampurna Belkasi. Card numbers are a visual aid to introduce and improve children's understanding of number symbols. The study uses the card learning model with a pretest-posttest design. Children were taught to recognize number symbols through playing activities with number cards, and their understanding of numbers and intelligence were evaluated. Data were collected through observation and number recognition tests. The results showed a significant increase in children's ability to recognize number symbols after using number cards. Children were faster at recognizing and remembering number symbols after card-playing activities.

Article 22, Research by Melisari et al. [29] entitled "*Analisis Kesalahan Siswa dalam Menyelesaikan Soal Pemahaman konsep Matematika Sekolah Dasar Pada Materi Bangun Datar*." This article evaluates the errors made by elementary school students in solving problems related to the concept of flat shapes in mathematics. This study continues to identify and analyze the factors that cause these errors and provides recommendations for improving learning. The study uses a qualitative descriptive model with error analysis. Data were collected through questionnaires given to students and analyzed to identify errors, such as procedural, conceptual, and interpretation errors. Additional data were obtained through interviews with students and teachers to understand the background of the errors. The results showed that students' errors in solving flat geometry problems were caused by errors in understanding basic concepts, procedural errors in solution steps, and difficulties in transferring knowledge from theory to practical applications. Conceptual errors, such as misunderstanding the properties of plane shapes, and procedural errors, such as errors in calculations and step sequences, often occur.

Article 23, Research by Kurniadi et al. [30] entitled "*Penguatan Konsep Matematika Melalui Alat Peraga Matematika Permainan Di SDN Cikuda Jatinangor*." This journal discusses the development of mathematics concepts through mathematics teaching aids in in-game teaching at SDN Cikulda Jatinangor. The teaching aids include various tools and games to help students understand basic mathematics concepts. The research uses a calculation-learning model with a pretest-posttest design. Students were given a pretest to assess their initial understanding of mathematical concepts. Then, they were involved in learning using mathematical modeling tools and were given a posttest to

evaluate the improvement in understanding. The results showed that mathematical modeling tools significantly improved students' understanding of basic mathematical concepts. Students who used the modeling tools showed a significant improvement in understanding the concepts compared to students who learned using the conventional model. Teaching aids such as blocks, number cards, and intellectual games help students visualize and understand mathematical concepts more enjoyably and interestingly.

Article 24, Research by Amalina et al. [31] entitled *"Penerapan Pendekatan Matematika Realistik terhadap Kemampuan Pemahaman Konsep Pengukuran pada Anak Usia 5-6 Tahun*" This journal evaluates the implementation of the realistic mathematics approach (RMA) to improve the understanding of the concept of education in 5-6 year old children. RMA is a learning approach that uses real-world situations to help students understand mathematical concepts. The study used the RMA model with a pretest-posttest design. Children are taught the concept of learning through activities based on PMR, such as long, short, and volumetric learning using everyday tools. Children's understanding is evaluated after the implementation of PMR using tests and observations. After implementing PMR, the study results showed a significant increase in children's understanding of learning. Children are more able to understand and apply the concept of learning in everyday situations. The use of real-world situations and concrete tools helps children to connect theory with practice and improve their ability to carry out learning.

Article 25, Research by Putri & Nasution [32] entitled "*Kemampuan Pemahaman Konsep Matematis Siswa MTs dalam Menyelesaikan Masalah Matematika pada Materi Bentuk Aljabar.*" This article evaluates the abilities of Madrasah Tsanawiyah (MTs) students in understanding and solving mathematical problems related to algebra subjects. This study continues to identify the difficulties faced by students in understanding algebra concepts and offers strategies to improve their understanding. The study uses a descriptive model with qualitative and quantitative analysis. Data were collected through a questionnaire on understanding algebra concepts and student interviews. Analysis was conducted to identify students' errors and difficulties in understanding and solving algebra problems. The study results showed that many students experienced difficulties in understanding basic algebra concepts, such as using variables, algebraic operations, and solving equations. These difficulties were caused by a lack of understanding of basic concepts and a lack of practice applying algebra in various problem contexts. Students often make mistakes in the solution steps and are often confused about using algebraic symbols and notation.

3.2 Discussion

The findings of this study highlight the importance of understanding basic mathematical concepts, such as operations, types of numbers, geometric shapes, algebraic principles, and statistical reasoning, which are foundational for students' critical and logical thinking skills. This aligns with prior research, including Ningsih [8], which showed that interactive learning tools like Elementary Game Tools (APEl) enhanced young children's understanding of numerical order and basic mathematical operations. Similarly, Kurino and Rahman [9] demonstrated that integrating cultural elements, such as

the architecture of Panjalin traditional houses, enriches students' comprehension of geometry by providing familiar, context-based learning experiences. These approaches indicate that integrating real-world applications and cultural context can support students in internalizing mathematical concepts more effectively.

Additionally, the literature emphasizes the role of concrete teaching aids in reinforcing abstract mathematical concepts, as seen in studies by Putri & Dewi [21] and Sariyanti et al. [20], where the use of visual aids like the "Number Tree" proved effective in improving children's understanding of numerical sequences and grouping. The results of this study, which found a notable improvement in students' basic mathematical understanding through applied and interactive methods, further support the effectiveness of such tools in enhancing concept retention and comprehension among young learners. As documented by previous studies, the integration of interactive media, including traditional games, puzzles, and Montessori methods, emphasizes that children's engagement and motivation are closely linked to their learning outcomes.

Moreover, Hamidah et al. [12] research on using Realistic Mathematics Education (RME) reinforces the value of context-driven learning. The RME approach, as noted in this study, allows children to connect mathematical theories with real-life scenarios, leading to deeper conceptual understanding. Similarly, this study's findings demonstrate that students' grasp of basic mathematical concepts can improve when mathematical principles relate to tangible, everyday experiences.

This research also adds to the discussion by underscoring the role of mathematical games and interactive media in facilitating learning. Studies by Rivai & Rahmat [18] and Wahid & Samta [14] support the idea that traditional games like Dakon can enhance early mathematical intelligence, particularly in operations like addition and subtraction. This resonates with the current study's findings, which observed that students who engage in such game-based learning activities develop a stronger foundation in basic arithmetic and number recognition.

4. CONCLUSION

The discussion above concludes that many students have difficulty understanding basic mathematical concepts, such as plane figures and algebra. This error is often caused by a lack of understanding of the basic concepts and errors in solving the problems. The errors include inadequate practice and a lack of review of the basic concepts. Therefore, essential mastery is needed to understand the basic concepts through a more concrete and varied approach, such as using exercise equipment, intellectual media, and an approach based on experience. The use of teaching aids and learning media in the form of games has proven to be effective in improving students' understanding of mathematical concepts. Teaching aids help students visualize abstract concepts more concretely and intellectually, thus making it easier for them to understand and apply abstract concepts. The teaching aids vary, from visual aids such as blocks and number cards to audiovisual media and traditional games. This shows that teaching aids can be adapted according to the needs and learning contexts to achieve optimal results. The journals discussed show that a more intellectual, concrete, and contextual approach to mathematics learning can improve

students' understanding of mathematical concepts. Efforts to improve fundamental understanding, use of teaching aids, and realistic approaches must be improved to achieve more effective and comprehensive learning goals.

REFERENCES

[1] N. Natalia, S. Wahid, and A. Muchyidin, "Pengembangan Media Pembelajaran Matematika Berbasis Web Menggunakan Aplikasi Educandy untuk Meningkatkan Motivasi Belajar Siswa," *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, vol. 7, no. 1, pp. 38–48, 2024.

[2] N. Inayah, A. Muchyidin, and T. Toheri, "Analysis of Mathematics Content Knowledge of Mathematics Teachers Based on Bloom's Taxonomy Revision," *Educational Insights*, vol. 2, no. 1, pp. 79–87, 2024.

[3] D. Pratidiana, R. Rifa'i, and D. Priyani, "Analysis of Mathematical Abstraction Ability of Grade Viii Students in Cartesian Coordinate Material," *Mapan*, vol. 9, no. 1, p. 178, 2021, doi: 10.24252/mapan.2021v9n1a12.

[4] Е. В. Кузнецова, "Probabilistic Ideas and Methods in Undergraduate Mathematics: Axiological Aspects," *International Electronic Journal of Mathematics Education*, vol. 14, no. 2, 2019, doi: 10.29333/iejme/5720.

[5] J. Franklin, "Discrete and Continuous: A Fundamental Dichotomy in Mathematics," *Journal of Humanistic Mathematics*, vol. 7, no. 2, pp. 355–378, 2017, doi: 10.5642/jhummath.201702.18.

[6] R. G. Brockett and R. Hiemstra, *Self-direction in Adult Learning: Perspectives on Theory, Research and Practice*. Oxfordshire: Routledge, 1991.

[7] K. Rohman, T. Turmudi, D. Budimansyah, and E. Syaodih, "Misapprehension of mathematics among teachers, parents, and elementary school students," *Journal of Education and Learning (EduLearn)*, vol. 17, no. 4, pp. 598–603, Nov. 2023, doi: 10.11591/edulearn.v17i4.20632.

[8] E. W. Ningsih, "Efektivitas Pelaksanaan Pelmbellajaran Matematika Anak Usia Dini Dengan Menggunakan Alat Pelrmainan Eldulkatif Di TK Ullil Albab," *AL IHSAN: Jurnal Pendidikan Islam Anak Usia Dini*, vol. 3, no. 1, 2022.

[9] Y. D. Kurino and R. Rahman, "Eksplorasi Etnomatematika Rumah Adat Panjalin Pada Materi Konsep Dasar Geometri di Sekolah Dasar," *Jurnal Cakrawala Pendas*, vol. 8, no. 1, pp. 268–275, Jan. 2022, doi: 10.31949/jcp.v8i1.1937.

[10] N. M. I. Asri Devi, "Pengembangan Media Pembelajaran Puzzle Angka untuk Meningkatkan Kemampuan Mengenal Lambang Bilangan," *Jurnal Ilmiah Pendidikan Profesi Guru*, vol. 3, no. 3, p. 416, Nov. 2020, doi: 10.23887/jippg.v3i3.28331.

[11] S. Afrida, A. R. Agusta, and D. A. Pratiwi, "Mengembangkan Kemampuan Mengenal Konsep dan Lambang Bilangan Menggunakan Kombinasi Model Kearipan," *Jurnal Inovasi, Kreatifitas Anak Usia Dini (JIKAD)*, vol. 2, no. 1, p. 52, Feb. 2022, doi: 10.20527/jikad.v2i1.4924.

[12] N. H. Hamidah, D. A. M. Lidinillah, and H. Y. Muslihin, "Desain Lembar Kerja Anak Berbasis Realistic Mathematika Education (RME) untuk Mengenalkan Konsep Bilangan Anak Usia 5 – 6 Tahun," *Agapedia*, vol. 5, no. 1, pp. 1–9, 2021.

[13] V. Gusmanti, H. Herman, and A. Mardiana, "Peningkatan Kemampuan Mengenal Konsep Matematika Permulaan melalui Permaian Kotak Pintar dengan Media Tutup Botol di TK Ananda Kota Payakumbuh Sumatera Barat," *JURNAL PEMIKIRAN DAN PENGEMBANGAN PEMBELAJARAN*, vol. 3, no. 4, pp. 77–83, Dec. 2021, [Online]. Available: https://www.ejournal-jp3.com/index.php/Pendidikan/article/view/194

[14] A. Wahid and S. R. Samta, "Permainan Tradisional Dakon Sebagai Media Pembelajaran Untuk Meningkatkan Kecerdasan Matematika Anak Usia Dini," *Sentra Cendekia*, vol. 3, no. 2, p. 61, Jun. 2022, doi: 10.31331/sencenivet.v3i2.2148.

[15] N. Malik and S. Marlina, "Peningkatan Kemampuan Matematika Melalui Aritmatika di Taman Kanak-Kanak," *Pendekar : Jurnal Pendidikan Berkarakter*, vol. 3, no. 2, pp. 22–27, 2020.

[16] M. I. S. Simamora, I. Maharani, Y. N. Harahap, N. R. Rizqi, and D. J. Nasution, "Edukasi Permainan Edukatif Untuk Mengembangkan Kemampuan Motorik Anak Dalam Mengenal Bilangan Matematika," *JALIYE: Jurnal Abdimas, Loyalitas, dan Edukasi*, vol. 1, no. 2, pp. 50–56, Dec. 2022, doi: 10.47662/jaliye.v1i2.384.

[17] R. Rohmalina, E. Aprianti, and R. H. Lestari, "Pendekatan Open-Ended dalam Mempengaruhi Kemampuan Mengenal Konsep Bilangan Anak Usia Dini," *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, vol. 5, no. 2, pp. 1409–1418, Nov. 2020, doi: 10.31004/obsesi.v5i2.805.

[18] S. Rivai and A. Rahmat, "Pelatihan Pembuatan Media Pembelajaran Matematika Untuk Pemahaman Konsep Dasar Matematika Bagi Mahasiswa Jurusan S1 Pendidikan Guru Sekolah Dasar," *Dikmas: Jurnal Pendidikan Masyarakat dan Pengabdian*, vol. 3, no. 1, pp. 57–68, 2023.

[19] D. Stiawan and N. Mustaqimah, "Pembelajaran Mengenal Konsep Bilangan Matematika pada Anak," *CIRCLE: Jurnal Pendidikan Matematika*, vol. 1, no. 2, pp. 172–182, 2021.

[20] S. La-sule, R. Wondal, and N. Mahmud, "Pemanfaatan Media Pohon Angka Untuk Mengenal Konsep Bilangan pada Anak Usia Dini," *Julrnal Ilmiah Cahaya Pauld*, vol. 3, no. 1, pp. 23–35, 2021.

[21] A. Y. Putri and S. Dewi, "Stimulasi Kemampuan Mengenal Konsep Bilangan Anak Usia Dini Melaluli Permainan Matematika Montessori," *Jurnal Pendidikan Tambusai*, vol. 4, no. 1, pp. 488–498, 2020.

[22] W. Putri, Herwina, and S. Herlinda, "Mengenalkan Konsep Bilangan Melalui Media Audio Visual Pada Anak Usia 5-6 Tahun," *Jurnal Talenta : Journal of Early Childhood Education*, vol. 13, no. 1, pp. 44–57, Jun. 2022, [Online]. Available: http://ejournal.stkipaisyiyahriau.ac.id/index.php/talenta/article/view/284

[23] G. Anggraini and H. Pujiastuti, "Peranan Permainan Tradisional Engklek dalam Mengembangkan Kemampuan Matematika di Sekolah Dasar," *JUMLAHKU: Jurnal Matematika Ilmiah STKIP Muhammadiyah Kuningan*, vol. 6, no. 1, pp. 87–101, Jun. 2020, doi: 10.33222/jumlahku.v6i1.952.

[24] F. M. Firdaus and K. Nisa, "Pengaruh Metode Bermain Berbantuan Alat Peraga Papan Stik Terhadap Kecerdasan Logika Matematika Siswa Sekolah Dasar," *JPIn: Jurnal Pendidik Indonesia*, vol. 1, no. 2, pp. 64–73, Jul. 2020, doi: 10.47165/jpin.v1i2.28.

[25] S. Aisyah, "Efektivitas Penggunaan Media Jam Pada Pembelajaran Mengenal Waktu Siswa Kelas II SDN Banyuajuh 02," *JOURNAL OF EDUCATION FOR ALL*, vol. 1, no. 4, pp. 317–324, Dec. 2023, doi: 10.61692/edufa.v1i4.76.

[26] D. Riani and K. Maryani, "Penggunaan Alat Peraga dalam Pengenalan Konsep Matematika pada Anak Usia Dini di TK Al-Falah Kota Cilegon," *Kiddo: Jurnal Pendidikan Islam Anak Usia Dini*, vol. 3, no. 1, pp. 56–68, Feb. 2022, doi: 10.19105/kiddo.v3i1.5211.

[27] M. Mulyawati, T. A. Tantowie, and D. N. Fuadi, "Upaya Meningkatkan Kemampuan Menghitung melalui Media Konkret Koin Warna (Kancing) pada Mata Pelajaran Matematika Madrasah Ibtidaiyah," *Bestari | Jurnal Studi Pendidikan Islam*, vol. 16, no. 2, p. 221, Mar. 2020, doi: 10.36667/bestari.v16i2.407.

[28] A. Paramansyah, A. Zamakhsari, and E. Ernawati, "Upaya Meningkatkan Kemampuan Mengenal Lambang Bilangan Melalui Kegiatan Bermain Kartu Angka pada Anak Kelompok A di SPS Dahlia Jatisampurna Bekasi," *Tarbiatuna: Journal of Islamic Education Studies*, vol. 3, no. 1, pp. 43–55, Sep. 2022, doi: 10.47467/tarbiatuna.v3i1.2176.

[29] M. Melisari, A. Septihani, A. Chronika, B. Permaganti, Y. Jumiati, and N. Fitriani, "Analisis Kesalahan Siswa dalam Menyelesaikan Soal Pemahaman konsep Matematika Sekolah Dasar Pada Materi Bangun Datar," *Jurnal Cendekia : Jurnal Pendidikan Matematika*, vol. 4, no. 1, pp. 172–182, Feb. 2020, doi: 10.31004/cendekia.v4i1.182.

[30] E. Kurniadi, N. Gusriani, B. Subartini, and H. Napitupulu, "Penguatan Konsep Matematika Melalui Alat Peraga Matematika Permainan Di SDN Cikuda Jatinangor," *BERNAS: Jurnal Pengabdian Kepada Masyarakat*, vol. 1, no. 4, pp. 561–568, Oct. 2020, doi: 10.31949/jb.v1i4.535.

[31] A. Amalina, F. Yanti, and J. Warmansyah, "Penerapan Pendekatan Matematika Realistik terhadap Kemampuan Pemahaman Konsep Pengukuran pada Anak Usia 5-6 Tahun," *Aulad: Journal on Early Childhood*, vol. 5, no. 2, pp. 306–312, Aug. 2022, doi: 10.31004/aulad.v5i2.378.

[32] A. Putri and E. Y. P. Nasution, "Kemampuan Pemahaman Konsep Matematis Siswa MTs dalam Menyelesaikan Masalah Matematika pada Materi Bentuk Aljabar," *Plusminus: Jurnal Pendidikan Matematika*, vol. 3, no. 1, pp. 127–138, Mar. 2023, doi: 10.31980/plusminus.v3i1.1229.

https://doi.org/10.58421/misro.v4i1.290