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Effectiveness of Smart Counting in Improving Addition and Subtraction Skills in Early Childhood

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Abstract
Mathematics is a fundamental aspect that must always be developed. Mathematical ability is crucial for early childhood because it can develop logical conceptual understanding and problem-solving skills. In this case, mathematical skills in early childhood not only strengthen numerical understanding but also broader cognitive understanding. This study used a quantitative method with an experimental approach involving one pretest-posttest group, without a control group.This study aims to evaluate the effectiveness of the Smart Counting method in improving understanding of addition and subtraction operations in early childhood. Using a quantitative approach with a pre-experimental design, the study involved 30 participants from RA Assyafiq, West Bandung Regency. Results showed a significant improvement in basic maths comprehension, with a mean pretest of 51.87 and posttest of 63.73 ($p < 0.05$). The Smart Counting method, which combines interactive technology and educational games, is proven to make learning more concrete and fun. Nonetheless, challenges such as the digital divide and lack of teacher training need to be addressed to maximise the effectiveness of this method. This research is expected to contribute to the development of innovative learning methods for early childhood, as well as encourage collaboration between the government, educational institutions, teachers and parents in its implementation.

Keywords: *Smart Counting; Early Childhood;*

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Introduction

Mathematics is an important aspect of early childhood cognitive development, especially in helping children understand logical concepts and solve problems[1]. However, introducing mathematics to young children can often be challenging, as basic concepts such as addition and subtraction are often considered abstract by children. The cognitive abilities of children at this age are still developing. Children at this stage of development are in a critical phase where they begin to build an understanding of basic mathematical concepts. According to the National Association for the Education of Young Children[2], early experiences in mathematics can help children develop the logical and analytical thinking skills needed to solve problems[3]. Basic mathematical skills not only serve as tools for solving numerical problems, but also contribute to broader cognitive development.

Research shows that children who have a strong understanding of basic maths concepts tend to have better critical thinking skills, as well as the ability to connect different ideas and concepts [4]. This is important because critical and analytical thinking are skills that are needed in many aspects of life, including further education and the world of work [5].Therefore, an intuitive and engaging learning approach is needed. Children are more likely to understand lessons if they are presented in a concrete, enjoyable manner that suits their learning style. Therefore, innovations in learning methods, such as the use of interactive technology, are highly relevant to supporting their understanding of basic mathematical concepts.

Global issues related to the effectiveness of using Smart Counting to improve understanding of addition and subtraction operations in early childhood include the challenge of learning basic mathematics that is often perceived as abstract by children due to cognitive

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[1] Wulan Fauzia, *Perkembangan Kognitif Anak Usia Dini* (Feniks Muda Sejahtera, 2023); Wantri Novita et al., "Penerapan Teori Perkembangan Kognitif Oleh Jean Piaget Terhadap Kemampuan Memecahkan Masalah Siswa SD/MI," *HYPOTHESIS: Multidisciplinary Journal Of Social Sciences* 2, no. 01 (2023): 122–34, https://doi.org/https://doi.org/10.62668/hypothesis.v3i2; Heni Purwulan, "Kajian Perkembangan Kognitif Dan Psikologi Anak Pada Tingkat Sekolah Dasar Kelas Rendah," *Jurnal Jendela Pendidikan* 4, no. 04 (2024): 375–82, https://doi.org/https://doi.org/10.57008/jjp.v4i04.995.

[2] Kyla and Eftim, "Fluoride Exposure and Children's IQ Scores: A Systematic Review and Meta-Analysis.," *JAMA Pediatrics* 27719 (2025), https://doi.org/10.1001/jamapediatrics.2024.5542.

[3] Eko Prayetno and Munirul, "The Relationship Between Fluency in Speaking Arabic and Self- Confidence to Presentation Skills," *Jurnal Kajian Keislaman* 11 No. 2 (, no. 2 (2024): 439–52, https://doi.org/10.24952/multidisipliner.v11i2.13661.

[4] Eko Prayetno et al., "Application of Geogebra in Mathematics Learning Using a Realistic Mathematics Education Model," *JTL: Journal of Teaching and Learning* 1 No 2 Dec, no. 2 (2024): 121–34.

[5] Adnan Adnan, Anis Zohriah, and Abdul Muín, "Evaluasi Kinerja Tenaga Pendidik," *JIIP - Jurnal Ilmiah Ilmu Pendidikan* 7, no. 2 (2024): 1463–68, https://doi.org/10.54371/jiip.v7i2.3446.

developmental limitations. Technology-based learning such as Smart Counting can make concepts more concrete and interactive, but its implementation faces obstacles such as the digital divide, lack of teacher training, and lack of parental support.

In this case, UNESCO notes that many children in developing countries do not have access to digital devices [6]. while the OECD shows low teacher training in using educational technology. In addition, limited parental understanding and concerns about the negative impact of digital devices also hinder the effectiveness of this method [7]. Organisations such as UNICEF and the World Bank confirm that innovations such as Smart Counting can support children's cognitive development if supported by adequate infrastructure, structured teacher training and collaboration with parents. With an inclusive approach, this method has great potential to improve early childhood maths skills globally [8].

Furthermore, good maths skills at an early age can influence children's academic achievement at higher levels [9]. Research by [10] shows that numeracy skills in preschool children have a significant relationship with their academic achievement in primary school and beyond. Children who have a strong mathematical foundation are more likely to succeed in other subjects, such as science and technology, which often require a good understanding of maths. [11]. In addition, fun and interactive maths learning can increase children's motivation

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[6] Manos Antoninis et al., "Global Education Monitoring Report 2023: Technology in Education: A Tool on Whose Terms?," 2023, https://doi.org/10.54676/UZQV8501.

[7] Nang Sagawah Win Bo, "OECD Digital Education Outlook 2023: Towards an Effective Education Ecosystem," *Hungarian Educational Research Journal*, 2024, https://doi.org/https://doi.org/10.1556/063.2024.00340.

[8] Eko Prayetno et al., "Contemporary Islamic Sects in Indonesia," *Jurnal Al Burhan* 4(2), 2024, no. 2 (2024): 113–25, https://doi.org/https://doi.org/10.58988/jab.v4i2.342.

[9] Anita Andriani et al., "Measuring Faith with Numbers: Can Islamic Religious Education Exams Assess Spiritual Understanding?," *Bustanul Ulum Journal of Islamic Education* 3, no. 1 (2025): 37–59, https://doi.org/https://doi.org/10.62448/bujie.v3i1.170; Ibnu Imam Al Ayyubi et al., "The Influence of Gadget Use on Early Childhood Social Interaction: A Study on the Decline of Interest in Traditional Play," *Banun: Jurnal Pendidikan Islam Anak Usia Dini* 3, no. 1 (2025): 23–33, https://journal.albadar.ac.id/index.php/BANUN/article/view/322; Ibnu Imam Al Ayyubi et al., "The Influence of Manipulative Media Usage on Students' Understanding of Fraction Operations in Elementary Schools," *Noumerico: Journal of Technology in Mathematics Education* 3, no. 1 (2025): 11–25, https://doi.org/https://doi.org/10.33367/jtme.v3i1.6700; Ibnu Imam Al Ayyubi et al., "Teori Perkembangan Kognitif Jean Piaget Dalam Pembelajaran Anak Usia Dini," *AlMaheer: Jurnal Pendidikan Islam* 2, no. 2 (2024): 83–90, https://doi.org/https://doi.org/10.63018/jpi.v2i02.26; Ibnu Imam Al Ayyubi et al., "Equilibrium of Faith and Logic: Integrating Islamic Moral Values and Mathematics Education in Various Contexts," *IJEMR: International Journal of Education Management and Religion* 1, no. 2 (2024): 127–44, https://doi.org/https://doi.org/10.71305/ijemr.v1i2.167.

[10] Yuni (2024)

[11] Nurhikmah and Eko Prayetno, "Equilibrium of Faith and Logic : Integration of Islamic Moral Values and Mathematics Education at the Junior High School Level in Various Contexts," *IJEMR: International Journal of Education Management and Religion* 1 No 2 Jul, no. 2 (2024): 127–44.

and interest in learning. When children engage in engaging maths activities, they are more likely to develop positive attitudes towards maths, which can continue into adulthood. This is particularly important, given that many children experience maths anxiety which can hinder their ability to learn and achieve in this area [12].

Thus, the importance of mathematics learning in early childhood cannot be overlooked. Investing in maths education at this early stage will have a positive long-term impact on children's cognitive, academic and attitudinal development towards learning [13]. Therefore, there is a need for innovative and effective approaches to maths teaching, such as the use of interactive technology, to ensure that all children have the opportunity to develop the maths skills necessary for future success [14].

One innovative approach that is gaining traction is Smart Counting, a technology- and game-based learning method for teaching addition and subtraction operations. This approach uses digital tools such as interactive apps, tablets or smartboards, designed to visualise numbers and mathematical operations in a concrete way. By combining visual, audio and physical activity elements, Smart Counting provides a fun and easy-to-understand learning experience. It also encourages children to learn through play, thus increasing their interest and motivation towards maths. In addition, Smart Counting offers an adaptive learning experience, where materials can be customised to each child's level of understanding, making it one of the effective solutions in early childhood education. Of course, the following is a revision to include new research :

Previous research conducted by (Adawiyah dkk., 2025) with the title 'Development of Learning Media Based on Math Playground Interactive Games for Early Childhood Numeracy Skills' has a similar focus with this research. The results showed that interactive game-based learning media can improve early childhood numeracy skills. However, the study has several limitations, including the lack of testing other mathematical concepts besides numeracy and the lack of variety in the teaching methods used. In addition, the study did not

[12] Dian Satria Charismana, Heri Retnawati, and Happri Novriza Setya Dhewantoro, "Motivasi Belajar Dan Prestasi Belajar Pada Mata Pelajaran Ppkn Di Indonesia: Kajian Analisis Meta," *Bhineka Tunggal Ika: Kajian Teori Dan Praktik Pendidikan PKn* 9, no. 2 (2022): 99–113, https://doi.org/10.36706/jbti.v9i2.18333.

[13] Eko Prayetno and Khofifah, "The Concept of Islamic Education : A Comparative Study of Ibn Katsir ' s and Al-Misbah ' s Tafsir of QS . Al-Anbiya ' : 7," *Edulab: Majalah Ilmiah Laboratorium Pendidikan* 9, No. 1, no. 1 (2024): 51–66, https://doi.org/10.14421/edulab.2024.91.04.

[14] Ana Mufidah et al., "Pendampingan Pembelajaran Metode Penelitian Gabungan (Mixed Method) Di IAIS Lumajang," *Jurnal Pengabdian Masyarakat Akademisi* 3, no. 1 (2024): 53–69, https://doi.org/10.54099/jpma.v3i1.871.

evaluate how the use of game-based learning media affects children's understanding in the context of individual and group learning. These shortcomings provide an important basis for further research that covers a wider range of mathematical concepts and involves various approaches to learning.

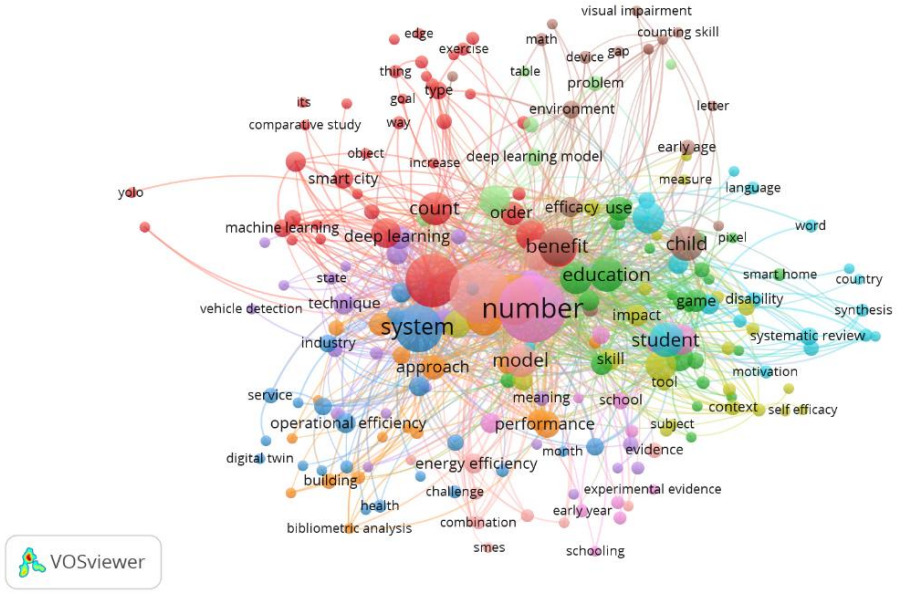


Figure 1. VOSviewer

Based on the analysis of data visualization using VOSviewer, it was found that research on the effectiveness of *Smart Counting* in improving the understanding of addition and subtraction operations in early childhood has not been widely explored. The dominant keywords in the mapping indicate a primary focus on education, children's skills, and technology-based systems, but do not specifically address the *Smart Counting* method or innovative approaches to learning basic arithmetic operations. Additionally, the connection between game-based learning and the understanding of fundamental arithmetic concepts remains limited, suggesting that there is still room for the development of more interactive and effective methods to enhance early childhood numeracy skills.

The novelty of this research lies in the integration of technology into basic mathematics learning through the *Smart Counting* approach, aiming to improve children's understanding of addition and subtraction more effectively than conventional methods. This study also contributes to filling research gaps by exploring how intelligent systems can be optimized in early childhood education, particularly in the context of enhancing numeracy skills. By developing a more engaging and adaptive technology-based approach, this research has the

potential to provide an innovative solution for supporting early childhood mathematics learning and offering new insights into the application of technology in education.

This study aims to evaluate the effectiveness of using Smart Counting in improving understanding of addition and subtraction operations in early childhood. The main focus of the research is to identify the extent to which this method is able to help children connect abstract concepts with concrete experiences in learning mathematics. In addition, this research also aims to address the obstacles identified in previous studies, such as the importance of the teacher's role in guiding the use of technology and the need for a sustainable implementation strategy. Thus, this research is expected to make a significant contribution to the development of innovative learning methods suitable for early childhood.

Research Methods

This research uses a quantitative approach with experimental method and pre-experimental design with one group pretest-postest type.

Table 1. Research design

Pretest	Treatment	Postest
O_1	X	O_2

Description:

O_1 : Initial test before treatment

X : Treatment with the application of smart counting

O_2 : Final test after treatment

The experimental research in question involves one group without a control group to measure the pretest and posttest of treatment in the same group. The group in question is a group that receives treatment or treatment in the use of Smart Counting on Understanding Addition and Subtraction Operations in Early Childhood. This research was conducted at RA Assyafiq West Bandung Regency with a population of all students in RA Assyafiq and a sample of 30 students with sampling techniques using purposive sampling.

The data analysis technique in this study aims to process numerical data using statistical methods to test hypotheses with descriptive statistical analysis and inferential statistical analysis assisted by the SPSS version 26 application. The data analysis process in the quantitative approach includes data preparation, assumption testing, selecting data analysis

techniques, conducting data analysis using the SPSS application, and interpreting research results associated with research hypotheses and theoretical context. Descriptive statistical analysis is used to describe data graphically and numerically by calculating the mean value, standard deviation, and frequency distribution to display the number of occurrences of data in a particular category. The mean value is a measure of central tendency that shows the middle value of a set of data, while the standard deviation is intended to show how dispersed or varied the data is from the mean value, where the greater the value of the standard deviation, the greater the spread of the data and the smaller the value of the standard deviation, the closer the data is to the mean value.

Then the inferential statistical analysis used in this study uses the paired sample t-test to compare the average pretest and postest in one group with validity and reliability that has been tested. Furthermore, the N-Gain test was conducted to measure the effectiveness of an intervention by calculating the increase in pretest and posttest results. The N-Gain test is very helpful in assessing the effectiveness of a treatment and is used for pre-experiment research where pretest and postest are the main evaluation tools. The steps of implementing the N-Gain Test include collecting pretest and postest data, calculating the N-Gain score, and analysing the category of N-Gain results into low, medium, or high levels. The data processing stages in the paired sample t-test include data containing interval or ratio data scales with paired data groups, then testing the normality of the data using Kolmogorov-Smirnov. If the data is normally distributed then proceed with a parametric statistical test using the t test, but if the data is not normally distributed then proceed with a non-parametric statistical test using the Wilcoxon test.

Results and Discussion

Data from the pretest and posttest results in the application of Smart Counting to Understanding Addition and Subtraction Operations in Early Childhood were first analysed using descriptive statistical tests presented in the following table.

Table 2. Descriptives

	Pretest	Postest
Mean	51.87	63.73
Std. Deviation	9.933	12.28
Minimum	40	43
Maximum	73	80

Based on Table 2 above, it can be seen that the pretest results have an average value of 51.87 with a standard deviation value of 9.933 where the maximum and minimum values are 73 and 40. While the postest results have an average value of 63.73 with a standard deviation value of 12.28 where the maximum and minimum values are 80 and 43. Based on this, the range value on the pretest and posttest is 33 and 37. So that the application of Smart Counting to Understanding Addition and Subtraction Operations in Early Childhood shows a significant increase. However, to make more specific generalisations, inferential statistical tests are needed as follows.

Table 3. Tests of Normality

	Statistic	Sig.
Pretest	.151	.077
Postest	.138	.149

Based on Table 3 above, it can be seen that the significance value on the pretest and postest is 0.077 and 0.149. from these data it is obtained that the significance value for the pretest and postest is greater than 5%, so based on the decision-making criteria H0 is accepted. So it can be concluded that the pretest and postest data on the application of Smart Counting to Understanding Addition and Subtraction Operations in Early Childhood are normally distributed.

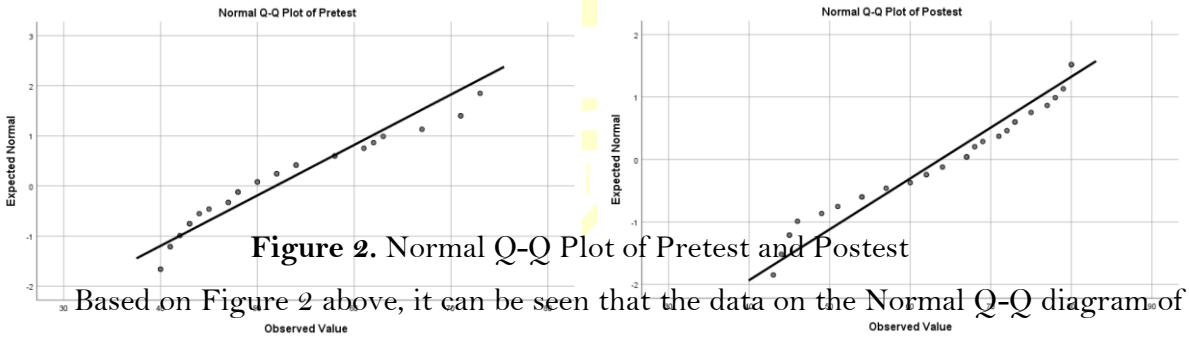


Figure 2. Normal Q-Q Plot of Pretest and Postest

Based on Figure 2 above, it can be seen that the data on the Normal Q-Q diagram of Pretest and Postest in the Use of Smart Counting on Understanding Addition and Subtraction Operations in Early Childhood spreads around the diagonal line and only a few points are far from the line, so the data can be said to be normally distributed. Because the data is normally distributed, it is continued with parametric statistical tests using the t test or what is often referred to as the paired sample t test.

Table 4. Paired Samples Correlations

	Correlation	Sig.
Pretest & Postest	.710	.000

Based on Table 4 above, it can be seen that the significance value is 0.000 <0.05, so based on the decision-making criteria H0 is rejected, so it can be said that there is a relationship between the pretest and posttest in the use of Smart Counting on Understanding Addition and Subtraction Operations in Early Childhood.

Table 5. Correlation Values

Coefficient Interval	Strength of Relationship
0,00 – 0,19	Very Low
0,20 – 0,39	Low
0,40 – 0,59	Moderate
0,60 – 0,79	Strong
0,80 – 1,00	Very Strong

While the val of Correlation is 0.710 and is in the interval 0.60-0.79 based on the interpretation guidelines in Table 5 above, it can be said that the relationship between the use of Smart Counting on Understanding Addition and Subtraction Operations in Early Childhood in pretest and posttest can be said to be strong.

Table 6. Paired Samples Test

	t	Sig. (2-tailed)
Pretest - Postest	-7.446	.000

Based on Table 6 above, it can be seen that the significance value (2-tailed) for pretest and posttest is 0.000. From this data, it is obtained that the significance value is <0.05 so it can be concluded that there is a significant difference based on before and after the treatment on the use of Smart Counting on Understanding Addition and Subtraction Operations in Early Childhood. Furthermore, the N-Gain test was conducted to see how much effectiveness on the use of Smart Counting on Understanding Addition and Subtraction Operations in Early Childhood.

Table 7. N-Gain Test

Minimum	Maximum	Mean	Std. Deviation
.03	.63	.2497	.1679

Berdasarkan Tabel 7 di atas terlihat bahwa nilai maksimal dan minimal sebesar 0.63 dan 0.03 dengan nilai rata-rata sebesar 0.2497. Adapun nilai dari standar deviasi nilai N-Gain sebesar 0.1679. Berdasarkan hal tersebut dapat dikatakan bahwa Penggunaan Smart Counting terhadap Pemahaman Operasi Penjumlahan dan Pengurangan pada Anak Usia Dini memiliki efektivitas yang rendah.

Based on the results of the above description and the results of the data analysis that has been conducted, this study shows that the application of the use of Smart Counting to the understanding of addition and subtraction operations in early childhood has a significant impact, although its effectiveness can be categorised as low. The results of the pretest and posttest showed an increase in the average score from 51.87 in the pretest to 63.73 in the posttest, which indicates that the use of Smart Counting makes a positive contribution to children's understanding in learning basic mathematical operations.

Smart Counting is an innovative learning approach that combines interactive technology, visual aids and game-based activities to facilitate children's understanding of basic maths concepts, especially in addition and subtraction operations. The method is designed to create a learning experience that is fun, engaging and appropriate to the cognitive developmental stages of early childhood. By utilising visual and interactive elements, children can more easily understand number concepts through concrete representations. This approach also involves activities that encourage children to actively participate in learning, so they don't just passively receive information. In addition, Smart Counting integrates children's various learning styles, such as visual, auditory and kinesthetic, which makes learning more holistic and effective.

In Smart Counting, the concepts of numbers and mathematical operations that are often abstract to young children are transformed into a more concrete and easily understood form. For example, by using visualisations such as images, animations or physical objects (such as blocks, number cards or digital apps), children can see the direct relationship between numbers and quantities. The technology used usually includes software-based educational apps, tablets or smartboards, which are specifically designed to facilitate interactive learning. This approach integrates different elements of learning, such as:

1. Visualisation

Visualisation is one of the key elements in the Smart Counting method that plays an important role in helping children understand mathematical concepts. (Hermawan & Hadi,

2024; Rahmah dkk., 2024). Young children tend to learn better when they can see concrete representations of numbers and mathematical operations. For example, the number 5 can be visualised in the form of five pictures of apples or blocks, so that children can understand that the number represents a certain amount. By using tools such as interactive apps or number cards with illustrations, children not only learn to count, but also connect numbers to real objects that they recognise in their daily lives.

This visual approach helps reduce the abstraction of numbers, which is often a challenge for young children. When children can see how numbers increase or decrease through pictures, they more easily understand the concepts of addition and subtraction. For example, in the operation 3 + 2, children can see that three apples plus two apples make five apples. Thus, they not only count the numbers, but also understand the meaning of the operation. In addition, visualisation allows children to learn independently, as they can observe and understand mathematical patterns without the need for complex verbal explanations. This makes learning more interesting, intuitive and relevant to children's cognitive development. Children can see representations of numbers in the form of pictures or real objects, making it easier to understand mathematical concepts.

2. Interactivity

Interactivity is one of the main elements in the Smart Counting method that encourages children to actively engage in the learning process. Through digital games or manipulation of physical objects, children are not only recipients of information, but also directly participate in understanding mathematical concepts. For example, in Smart Counting-based digital games, children can drag and drop pictures of objects such as apples or blocks to complete addition or subtraction operations. This kind of activity not only makes learning more interesting, but also helps children understand concepts through hands-on experience.

This interactive approach provides space for children to experiment and solve problems independently. Children can try different ways to reach the right answer, making the learning process more meaningful and personalised. In addition, interactivity also improves children's concentration as they feel actively involved in the learning activities. The presence of game elements, such as rewards or challenges in the app, also increases children's motivation to continue learning. Furthermore, the manipulation of physical objects, such as moving blocks or number cards, allows children to develop fine motor skills while learning maths. This

combination makes interactivity an important component of the Smart Counting method to ensure children not only understand the concepts, but also enjoy the learning process.

3. Multisensory

The Smart Counting method utilises a multisensory approach to enhance the effectiveness of early childhood learning. This approach involves multiple senses, such as sight, hearing and physical movement, to help children understand maths concepts more deeply. For example, when learning addition operations, children can see animations of objects adding up, listen to voice explanations of the operation, and actively move objects on the screen of a digital device. By combining visual, audio and physical activity elements, this method makes learning more engaging and makes it easier for children to process information effectively.

The multisensory approach also supports children's various learning styles. Children with visual learning styles can be helped through graphical representations, while children who are more auditory will better understand concepts through sound narration. On the other hand, kinesthetic learners can internalise mathematical concepts through physical activities, such as arranging or moving objects. By engaging multiple senses, Smart Counting increases children's active participation, makes learning more fun, and helps them understand the material in a more meaningful and relevant way.

4. Educational Games

Educational games play an important role in the Smart Counting method, aiming to make learning maths more interesting and fun for children. In this approach, basic maths concepts, such as addition and subtraction, are delivered through games designed to actively engage children. Children are exposed to various mathematical challenges in the form of games, such as solving puzzles or following clues in story-based games that integrate numbers. This allows children to learn not only theoretically, but also practically in a fun and contextualised atmosphere.

The use of educational games has great benefits in maintaining children's focus and enthusiasm for learning. Games designed with elements such as competition, rewards or achievements can motivate children to keep trying and achieve learning targets. In addition, games allow children to learn both individually and in groups, which also hones their social and collaboration skills. Thus, learning maths becomes more than just number crunching, but an experience that involves creativity, problem solving and social interaction, which makes children more interested and excited about the learning process.

The advantage of Smart Counting is its ability to adapt to various learning styles of children, whether they are more visual, auditory or kinesthetic. In addition, this method provides an adaptive learning experience, where children can learn according to their own level of understanding. With this approach, it is expected that children will not only be able to calculate, but also understand the meaning behind the mathematical operations they learn. This is important to build a strong foundation for learning more complex maths in the future.

Benefits of Smart Counting in Child Development

The Smart Counting method provides significant benefits not only in helping children understand basic maths concepts, but also in supporting various aspects of a child's development holistically. One of the main benefits is on cognitive development. Through activities designed to introduce addition and subtraction operations, children are encouraged to think logically, recognise patterns and understand the relationship between numbers. This process stimulates their brain development, especially in terms of critical and analytical thinking skills. By integrating visual, audio and physical manipulation elements, children can also learn abstract concepts in a more concrete way, making it easier for them to internalise mathematical knowledge effectively.

In addition to cognitive development, Smart Counting also contributes to the improvement of fine motor skills. Activities such as moving objects on the screen of a digital device or arranging number cards involve coordination between the eyes and hands, which is very important in early childhood motor development. Children not only learn about numbers, but also practice manipulative skills that will be beneficial in everyday activities, such as writing or drawing. Furthermore, this method hones children's problem-solving skills. As they face mathematical challenges in interactive games, children learn to analyse problems, try different approaches and find the right solution. This process not only helps them in maths, but also builds a foundation of creative and adaptive thinking skills.

Another important impact is the increase in children's confidence in learning. Smart Counting is designed with game elements and positive feedback that keeps children happy and motivated. When children successfully complete a maths task or challenge, they feel a sense of achievement that provides an emotional boost to continue learning. Even when they make mistakes, the system is designed to provide hints or help without pressure to help them learn from their mistakes in a positive way. In this way, children not only learn maths, but also build an optimistic and confident attitude towards future learning challenges.

In addition, Smart Counting supports the development of children's social skills, especially when used in the context of group learning. Through interactive games that involve collaboration, children learn to work together, share ideas and listen to their peers' opinions. This process not only strengthens their understanding of mathematical concepts, but also teaches important social skills such as communication and tolerance. In a supportive atmosphere, children can learn together and help each other, creating a more enjoyable and meaningful learning experience.

Another benefit is the flexibility of this method which can be customised to suit the individual needs of the child. Children who have different learning styles, such as visual, auditory or kinesthetic, can benefit from Smart Counting through elements designed to support each learning style. Even for children with special needs, this method can be customised to provide an inclusive learning experience. With features that allow personalisation, Smart Counting ensures that every child can learn at their own pace and ability, without feeling overwhelmed.

Finally, Smart Counting also supports long-term learning by making children feel that maths is fun and interesting. By creating positive experiences from an early age, children will have a strong foundation to continue learning maths in the future. Not only do they acquire basic maths skills, but they also build a love for learning as a whole, which will be an important asset to their development later in life.

Adapting Smart Counting for Different Levels of Children

Smart Counting is an innovative approach designed to provide a friendly and flexible learning experience that meets the needs of children with varying levels of ability. The method's strength lies in its ability to tailor learning materials to individual needs, both for children who grasp maths concepts quickly and for those who require additional time and support. With interactive technology and visual aids, Smart Counting provides an inclusive and effective learning experience, helping each child develop at their own pace [15].

[15] Ahmad Jazuly et al., "Innovation of Adaptif Technology Based on Internet of Things for Inclusive Student," *Logic Jurnal Rancang Bangun Dan Teknologi* 22, no. 2 (2022): 134–38, https://doi.org/10.31940/logic.v22i2.134-138; Xiujie Yang and Xiangzhi Meng, "Visual Processing Matters in Chinese Reading Acquisition and Early Mathematics," *Frontiers in Psychology* 11 (2020), https://doi.org/10.3389/fpsyg.2020.00462; Naufal Ishartono et al., "The Quality of Mathematics Teaching Aids Developed by Mathematics Pre-Service Teachers in Indonesia," *Jurnal Varidika* 1, no. 1 (2022): 14–27, https://doi.org/10.23917/varidika.v1i1.18034; Babatomiwa Omonayajo, Fadi Al-Turjman, and Nadire Çavuş, "Interactive and Innovative Technologies for Smart Education," *Computer Science and Information Systems* 19, no. 3 (2022): 1549–64, https://doi.org/10.2298/csis210817027o.

For children who are faster learners, Smart Counting offers more complex challenges to keep them progressing. Features within the app or learning tool allow children to choose higher levels of difficulty after completing basic tasks. For example, they can move from counting simple objects to solving story problems that require deeper understanding. This strategy not only keeps children's interest high, but also helps them hone their logical and analytical thinking skills, which are essential for long-term learning.

In contrast, children who take longer to grasp maths concepts can be helped with a structured, step-by-step approach. Smart Counting often uses concrete visual representations, such as blocks, coins or pictures, to explain the relationship between numbers and objects. This approach makes it easier for children to understand abstract concepts in a more tangible way. In addition, the feedback system integrated in this method provides additional explanations and step-by-step guidance when children experience difficulties, keeping them motivated and confident in their learning.

For children with special needs, such as those with developmental disabilities or learning difficulties, Smart Counting also offers a range of inclusive solutions. By integrating multisensory elements, such as a combination of sound, colour and movement, this method can help children with certain disabilities to understand mathematical concepts. For example, children with hearing impairments can use animations or engaging visualisations to learn numbers, while children with visual impairments can rely on clear voice guidance to understand addition or subtraction operations.

It also supports personalised learning through features that can be tailored to a child's individual needs. Teachers or assistants can set specific learning profiles for each child, including the level of difficulty, type of activity, and learning objectives to be achieved. With the data generated by the Smart Counting app, teachers can monitor children's progress in real-time, identify areas that need more attention, and provide more targeted interventions. This approach ensures that each child gets the attention they need, making learning more effective and enjoyable. In addition, Smart Counting encourages children to learn independently through interactive features designed to motivate exploration. Children can choose activities that match their interests, explore new concepts, and complete challenges at their own pace. This freedom helps them feel more confident and motivated to keep learning. This self-directed approach also teaches children about responsibility and independence in the learning process, skills that will serve them well in the future.

For children with concentration challenges, such as those with ADHD (Attention Deficit Hyperactivity Disorder), Smart Counting offers a dynamic activity that captures their attention. Interactive games that involve physical movement or manipulation of digital objects help to maintain children's focus, while making learning fun. Well-designed game elements also encourage children to stay engaged, even in longer learning sessions. The overall, flexibility and adaptability of Smart Counting makes it an effective method to support the learning of children with varying levels of ability. With an approach that values diversity and individual needs, Smart Counting ensures that every child has an equal opportunity to develop. This method not only helps children understand maths, but also builds confidence, motivation to learn and a positive attitude towards learning overall.

The Role of Teachers and Caregivers in Helping Children Use Smart Counting

Although Smart Counting is designed to provide a self-directed learning experience, the role of the teacher or mentor is crucial in ensuring the effective use of this method. Teachers act as facilitators who help children recognise and understand the tools and applications used in learning [16]. They can provide initial instructions on how to access and use the app or digital device, and explain how the visual, audio and interactive elements of the app work. Teachers' knowledge of how these technologies work is essential for children to learn smoothly without confusion. Teachers can also supervise children's learning to ensure they follow the right steps and don't feel trapped.

In addition, teachers or assistants play a role in providing direction and support throughout the learning process. Young children often need help in overcoming technical challenges or understanding the concepts being learnt. For example, if a child is struggling to manipulate objects on the screen or understand a maths operation, the teacher can provide further explanation, introduce other methods or provide additional examples to clarify the concept. Teachers can also organise children's study time so that they don't feel overwhelmed,

[16] Anne Voskamp, Els Kuiper, and Monique Volman, "Teaching Practices for Self-Directed and Self-Regulated Learning: Case Studies in Dutch Innovative Secondary Schools," *Educational Studies* 48, no. 6 (2020): 772–89, https://doi.org/10.1080/03055698.2020.1814699; Kenneth Gyamerah, "Emergency Remote Teaching Amid Global Distress: How Did Teacher Educators Respond, Cope, and Plan for Recovery?," *Discover Global Society* 2, no. 1 (2024), https://doi.org/10.1007/s44282-024-00053-9; Anna Keller, "Emphasising Self-Directed Learning in VET-Schools: Teachers' Convictions and Role Negotiations," *International Journal for Research in Vocational Education and Training* 12, no. 1 (2025): 1–19, https://doi.org/10.13152/ijrvet.12.1.1; Xiaoquan Pan and Wei Chen, "Modeling Teacher Supports Toward Self-Directed Language Learning Beyond the Classroom: Technology Acceptance and Technological Self-Efficacy as Mediators," *Frontiers in Psychology* 12 (2021), https://doi.org/10.3389/fpsyg.2021.751017.

and provide encouragement to keep them motivated and feel successful in every small achievement they make.

The teacher's role also includes providing constructive and positive feedback, which is very important in the child's learning process. The feedback given by the teacher should not only be limited to telling whether the child's answer is right or wrong, but should also include an explanation of the steps that need to be corrected. Positive feedback, such as giving praise when children successfully solve a problem correctly, can boost their confidence and motivate them to continue learning. Conversely, if children make mistakes, teachers can provide hints or prompting questions that help children to find their own answers, without feeling disappointed or frustrated.

In the context of group learning, teachers can utilise Smart Counting to encourage collaboration between children. By forming small groups, children can share ideas, discuss and solve problems together. This collaboration not only helps them understand maths concepts in a deeper way, but also develops their social skills, such as communication and cooperation. The teacher's role is to direct the discussion, ensure every child is involved, and provide additional support when needed. In this way, the teacher not only teaches maths, but also facilitates the development of social skills that are so important for young children.

Parents' Role in Supporting Smart Counting Learning

The role of parents is very important in supporting the success of Smart Counting learning at home. Parents are not only a companion in the learning process, but also the main motivator that helps children feel confident and motivated. One of the ways that can be done is by accompanying children when using the Smart Counting application or tool. This assistance provides a sense of security for children while helping them understand how to use the technology correctly. With parental guidance, children can make the most of the app's features to improve their understanding of maths concepts.

In addition, parents can also help create a conducive learning atmosphere at home. A learning environment that is comfortable, free from distractions and full of emotional support will help children focus more when learning to use Smart Counting. For example, parents can set a regular study schedule for their children, so that they have dedicated time to practice maths without being distracted by other activities. A fun and supportive atmosphere can also encourage children to be more enthusiastic in learning maths concepts through this method.

Giving appreciation for every progress your child makes is another important form of support. Praise, whether verbal such as 'Well done!' or 'You're great!' or non-verbal such as a smile or a hug, can boost a child's confidence. By feeling appreciated, children will be more motivated to keep learning and trying. Parents can also give small rewards, such as stickers or extra playtime, as a form of appreciation for their child's efforts. This not only makes children feel appreciated but also strengthens the emotional bond between parents and children.

Furthermore, parents can act as facilitators by providing tools or materials to support Smart Counting learning. For example, they can provide devices such as tablets or laptops that are required to access the app, as well as ensuring that the devices are functioning properly. In addition, parents can also complement the learning with physical aids, such as number cards, blocks or other educational toys that can be used in conjunction with the app. By providing adequate resources, parents help their children to optimise their learning.

Parents can also act as a liaison between children and teachers in Smart Counting learning. By communicating regularly with the teacher, parents can learn about their child's progress, understand the challenges faced, and find solutions together. Teachers can provide advice to parents on how to best assist children at home, so that learning done at school can be continued effectively at home. Good collaboration between parents and teachers will have a positive impact on children's development.

Integrating Smart Counting into daily activities is also one of the roles that parents can play. For example, parents can involve children in simple activities such as counting the number of fruits when shopping or dividing food into equal portions. These activities not only strengthen children's understanding of mathematical concepts but also make them realise that maths is part of everyday life. This approach helps children to better understand the relevance of their learning and encourages the application of concepts in real contexts.

In addition, parents can teach important values such as perseverance and patience through Smart Counting learning. When children face difficulties, parents can encourage them not to give up and help them find solutions. By modelling a positive attitude, parents teach children that mistakes are part of the learning process and that success requires effort. These values are not only useful in learning maths but also in other aspects of life.

Ultimately, parental involvement in Smart Counting learning not only helps children understand maths concepts but also strengthens the emotional connection between parents

and children. By being an active and supportive companion, parents create a fun and meaningful learning experience for their child. This role provides a strong foundation for children to continue learning confidently, develop their potential, and enjoy lifelong learning.

Implementation of Smart Counting in early childhood learning in Indonesia

Facing a range of significant challenges. One of the main challenges is limited access to technology, especially in remote or rural areas. Many schools and families in these areas lack the necessary devices, such as tablets or computers, as well as adequate internet access. This creates a digital divide that exacerbates educational inequality, with children in less developed areas unable to experience the benefits of technology that could improve their learning. Research shows that the inability to access education technology can hinder efforts to introduce technology-based learning equitably across Indonesia [17]. Therefore, the government and educational institutions need to make more efforts to address this inequality to make Smart Counting accessible to all children, regardless of their geographical location. Teacher readiness is also a major obstacle in the implementation of Smart Counting. Not all teachers have sufficient knowledge or skills to utilise education technology effectively. Research shows that teachers in areas with limited access to technology often find it difficult or lack confidence in using interactive learning applications or tools.

Without comprehensive training and ongoing support, these teachers will struggle to optimise the use of Smart Counting in their classrooms. Therefore, it is important to provide intensive and structured training, which not only teaches how to use the technology, but also effective teaching strategies. By providing training to teachers, we ensure that they have the skills needed to provide an optimal learning experience for children. In addition, parents' understanding and support for Smart Counting is often an obstacle to its implementation. Some parents may not fully realise the benefits of this method or even be concerned about the negative impacts of technology, such as potential gadget addiction.

[17] Norsamsinar Samsudin, "The Digitalization Technology for Sustainable Rural Entrepreneurship: A Structured Review," *Journal of Advanced Research in Applied Sciences and Engineering Technology* 42, no. 1 (2024): 14–30, https://doi.org/10.37934/araset.42.1.1430; Xiangning Zhang, "The Digital Divide: Class and Equality Education," *SHS Web of Conferences* 157 (2023): 4027, https://doi.org/10.1051/shsconf/202315704027; Josef Kuo-Hsun, "The Digital Divide at School and at Home: A Comparison Between Schools by Socioeconomic Level Across 47 Countries," *International Journal of Comparative Sociology* 62, no. 2 (2021): 115–40, https://doi.org/10.1177/00207152211023540; Yalalem Assefa, "Rethinking the Digital Divide And Associated Educational In(Equity) in Higher Education in the Context Of Developing Countries: The Social Justice Perspective," *International Journal of Information and Learning Technology* 42, no. 1 (2024): 15–32, https://doi.org/10.1108/ijilt-03-2024-0058.

Research shows that parental involvement is crucial in supporting children's learning at home. Parents who understand the benefits of Smart Counting will be more likely to provide positive support, such as accompanying their children while using the app or praising their progress. Therefore, educational campaigns aimed at parents should be implemented to increase their understanding of the benefits of Smart Counting in helping children learn in a fun way.

To overcome the limited access to technology, the government and educational institutions can provide subsidies or assistance in the form of learning devices such as tablets or laptops to schools in remote areas. In addition, there is a need to invest in the development of technological infrastructure, such as the provision of a stable and affordable internet network, so that children in all regions can access Smart Counting without obstacles. The equitable provision of technology will not only reduce the digital divide, but also open up wider opportunities for children to get quality learning. With this step, we can ensure that Smart Counting can be implemented equally across Indonesia, reducing educational inequality and providing greater opportunities for all children. On the other hand, effective teacher training is a key step in supporting the successful implementation of Smart Counting.

A comprehensive training programme needs to be developed to give teachers a deep understanding of the use of technology in learning, as well as how to integrate interactive applications in an engaging and effective way. The training should also include teaching on how to motivate students and manage the classroom with technology. Teachers who are skilled and confident in using technology will be better able to utilise Smart Counting to help children understand mathematical concepts in a more fun and understandable way.

With continuous training, teachers will become more proficient in utilising technology, which in turn will improve the quality of education in the classroom. To increase parental support, there is a need for more planned and structured educational efforts. For example, through seminars, workshops or social media campaigns that can provide clear information on the benefits of Smart Counting in helping children learn maths in a fun way. Parents can also be given guidance on how they can assist their children in using the app at home, as well as how to provide positive support to encourage children to learn more.

With active parental involvement, children will feel more motivated to use Smart Counting to its full potential, which also strengthens the relationship between parents and children and creates a positive learning environment at home. For areas where technology is

still limited, other alternatives need to be considered to ensure that children can still benefit from Smart Counting. For example, this learning method can be implemented using simple physical aids, such as number cards, blocks, or manual games designed to replicate the interactive concepts found in digital applications.

Children in technology-challenged areas can still learn through a fun and game-based approach. It also shows that Smart Counting can be customised to local conditions and does not always rely on digital devices, allowing for a more flexible implementation that can be adapted according to the needs and capabilities of the local area. The successful implementation of Smart Counting requires solid collaboration between various parties, including the government, schools, teachers, parents, and technology providers. Without good collaboration, the challenges will not be effectively addressed. By addressing technology access issues, improving teacher training, and engaging parents and communities, we can ensure that Smart Counting can be implemented successfully across Indonesia. An inclusive and sustainable approach will help create equal learning opportunities for all children, so that they can develop basic maths skills in a fun and effective way, regardless of their background or geographical location.

Conclusion

The conclusion of this article is that the Smart Counting method is effective in improving young children's understanding of addition and subtraction operations. This approach, which is based on interactive technology, educational games and multisensory elements, is able to make abstract maths concepts more concrete and fun for children. In addition to improving cognitive abilities, the method also has a positive impact on children's social skills, fine motor skills and learning motivation. However, the implementation of this method faces challenges, including limited access to technology, lack of teacher training, and limited parental understanding. With good collaboration between the government, educational institutions, teachers and parents, these challenges can be overcome so that the Smart Counting method can be implemented inclusively and sustainably in various regions. The successful implementation of this method has the potential to have a significant long-term impact on the development of early childhood education.

Bibliography

Adnan, Adnan, Anis Zohriah, and Abdul Muín. "Evaluasi Kinerja Tenaga Pendidik." *JIIP - Jurnal Ilmiah Ilmu Pendidikan* 7, no. 2 (2024): 1463–68. https://doi.org/10.54371/jiip.v7i2.3446.

Ana Mufidah, Novi Puspitasari, Khanifatul Khusna, and Imam Suroso. "Pendampingan Pembelajaran Metode Penelitian Gabungan (Mixed Method) Di IAIS Lumajang." *Jurnal Pengabdian Masyarakat Akademisi* 3, no. 1 (2024): 53–69. https://doi.org/10.54099/jpma.v3i1.871.

Andriani, Anita, Ibnu Imam Al Ayyubi, Niken Siti Nur Apriyanti, and Siti Rahmawati. "Measuring Faith with Numbers: Can Islamic Religious Education Exams Assess Spiritual Understanding?" *Bustanul Ulum Journal of Islamic Education* 3, no. 1 (2025): 37–59. https://doi.org/https://doi.org/10.62448/bujie.v3i1.170.

Antoninis, Manos, Benjamin Alcott, Samaher Al Hadheri, Daniel April, Bilal Fouad Barakat, Marcela Barrios Rivera, Yekaterina Baskakova, Madeleine Barry, Yasmine Bekkouche, and Daniel Caro Vasquez. "Global Education Monitoring Report 2023: Technology in Education: A Tool on Whose Terms?," 2023. https://doi.org/10.54676/UZQV8501.

Assefa, Yalalem. "Rethinking the Digital Divide And Associated Educational In(Equity) in Higher Education in the Context Of Developing Countries: The Social Justice Perspective." *International Journal of Information and Learning Technology* 42, no. 1 (2024): 15–32. https://doi.org/10.1108/ijilt-03-2024-0058.

Ayyubi, Ibnu Imam Al, Ai Sri Masfuroh, Firda Noerzanah, and Anis Khan. "The Influence of Gadget Use on Early Childhood Social Interaction: A Study on the Decline of Interest in Traditional Play." *Banun: Jurnal Pendidikan Islam Anak Usia Dini* 3, no. 1 (2025): 23–33.

Ayyubi, Ibnu Imam Al, Firda Noerzanah, Anna Herlina, Siti Halimah, and Siti Sa'adah. "Teori Perkembangan Kognitif Jean Piaget Dalam Pembelajaran Anak Usia Dini." *AlMaheer: Jurnal Pendidikan Islam* 2, no. 2 (2024): 83–90. https://doi.org/https://doi.org/10.63018/jpi.v2i02.26.

Ayyubi, Ibnu Imam Al, Eko Prayetno, Desti Jamaliah, and Nabila Mumtazah. "Equilibrium of Faith and Logic: Integrating Islamic Moral Values and Mathematics Education in Various Contexts." *IJEMR: International Journal of Education Management and Religion* 1, no. 2 (2024): 127–44. https://doi.org/https://doi.org/10.71305/ijemr.v1i2.167.

Ayyubi, Ibnu Imam Al, Siti Rahmawati, Siti Hajar Trimulyati, and Teti Setiawati. "The Influence of Manipulative Media Usage on Students' Understanding of Fraction Operations in Elementary Schools." *Noumerico: Journal of Technology in Mathematics Education* 3, no. 1 (2025): 11–25. https://doi.org/https://doi.org/10.33367/jtme.v3i1.6700.

Bo, Nang Sagawah Win. "OECD Digital Education Outlook 2023: Towards an Effective Education Ecosystem." *Hungarian Educational Research Journal*, 2024. https://doi.org/https://doi.org/10.1556/063.2024.00340.

Charismana, Dian Satria, Heri Retnawati, and Happri Novriza Setya Dhewantoro. "Motivasi Belajar Dan Prestasi Belajar Pada Mata Pelajaran Ppkn Di Indonesia: Kajian Analisis Meta." *Bhineka Tunggal Ika: Kajian Teori Dan Praktik Pendidikan PKn* 9, no. 2 (2022): 99–113. https://doi.org/10.36706/jbti.v9i2.18333.

Fauzia, Wulan. *Perkembangan Kognitif Anak Usia Dini*. Feniks Muda Sejahtera, 2023.

Gyamerah, Kenneth. "Emergency Remote Teaching Amid Global Distress: How Did Teacher Educators Respond, Cope, and Plan for Recovery?" *Discover Global Society* 2, no. 1 (2024). https://doi.org/10.1007/s44282-024-00053-9.

Ishartono, Naufal, Ikhsan D Setyono, Ade R Maharani, and Suliadi F Sufahani. "The Quality of Mathematics Teaching Aids Developed by Mathematics Pre-Service Teachers in Indonesia." *Jurnal Varidika* 1, no. 1 (2022): 14–27. https://doi.org/10.23917/varidika.v1i1.18034.

Jazuly, Ahmad, Laili A Yaum, Khusna Y Udhiyanasari, and Renalatama Kismawiyati. "Innovation of Adaptif Technology Based on Internet of Things for Inclusive Student." *Logic Jurnal Rancang Bangun Dan Teknologi* 22, no. 2 (2022): 134–38. https://doi.org/10.31940/logic.v22i2.134-138.

Keller, Anna. "Emphasising Self-Directed Learning in VET-Schools: Teachers' Convictions and Role Negotiations." *International Journal for Research in Vocational Education and Training* 12, no. 1 (2025): 1–19. https://doi.org/10.13152/ijrvet.12.1.1.

Kuo-Hsun, Josef. "The Digital Divide at School and at Home: A Comparison Between Schools by Socioeconomic Level Across 47 Countries." *International Journal of Comparative Sociology* 62, no. 2 (2021): 115–40. https://doi.org/10.1177/00207152211023540.

Kyla, and Eftim. "Fluoride Exposure and Children's IQ Scores: A Systematic Review and Meta-Analysis." *JAMA Pediatrics* 27719 (2025).

https://doi.org/10.1001/jamapediatrics.2024.5542.

Novita, Wantri, Aisyah Safitri, Masykuria Lutfhia Ananda, Aulia Ersyliasari, and Amrina Rosyada. "Penerapan Teori Perkembangan Kognitif Oleh Jean Piaget Terhadap Kemampuan Memecahkan Masalah Siswa SD/MI." *HYPOTHESIS: Multidisciplinary Journal Of Social Sciences* 2, no. 01 (2023): 122–34. https://doi.org/https://doi.org/10.62668/hypothesis.v3i2.

Nurhikmah, and Eko Prayetno. "Equilibrium of Faith and Logic : Integration of Islamic Moral Values and Mathematics Education at the Junior High School Level in Various Contexts." *IJEMR: International Journal of Education Management and Religion* 1 No 2 Jul, no. 2 (2024): 127–44.

Omonayajo, Babatomiwa, Fadi Al-Turjman, and Nadire Çavuş. "Interactive and Innovative Technologies for Smart Education." *Computer Science and Information Systems* 19, no. 3 (2022): 1549–64. https://doi.org/10.2298/csis210817027o.

Pan, Xiaoquan, and Wei Chen. "Modeling Teacher Supports Toward Self-Directed Language Learning Beyond the Classroom: Technology Acceptance and Technological Self-Efficacy as Mediators." *Frontiers in Psychology* 12 (2021). https://doi.org/10.3389/fpsyg.2021.751017.

Prayetno, Eko, and Khofifah. "The Concept of Islamic Education : A Comparative Study of Ibn Katsir ' s and Al-Misbah ' s Tafsir of QS . Al-Anbiya ' : 7." *Edulab: Majalah Ilmiah Laboratorium Pendidikan* 9, no. 1 (2024): 51–66.

Prayetno, Eko, Ai Sri Masfuroh, Raed Awadh Saeed Al-ghatnaini, and Tasnim Saelaemae. "Application of Geogebra in Mathematics Learning Using a Realistic Mathematics Education Model." *JTL: Journal of Teaching and Learning* 1, no. 2 (2024): 121–34.

Prayetno, Eko, Zulfi Mubaraq, Ahmad Kholil Nur, and Raed Awadh Saeed Al-. "Contemporary Islamic Sects in Indonesia." *Jurnal Al Burhan* 4, no. 2 (2024): 113–25.

Prayetno, Eko, and Munirul. "The Relationship Between Fluency in Speaking Arabic and Self- Confidence to Presentation Skills." *Jurnal Kajian Keislaman* 11, no. 2 (2024): 439–52. https://doi.org/10.24952/multidisipliner.v11i2.13661.

Purwulan, Heni. "Kajian Perkembangan Kognitif Dan Psikologi Anak Pada Tingkat Sekolah Dasar Kelas Rendah." *Jurnal Jendela Pendidikan* 4, no. 04 (2024): 375–82. https://doi.org/https://doi.org/10.57008/jjp.v4i04.995.

Samsudin, Norsamsinar. "The Digitalization Technology for Sustainable Rural Entrepreneurship: A Structured Review." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 42, no. 1 (2024): 14–30. https://doi.org/10.37934/araset.42.1.1430.

Voskamp, Anne, Els Kuiper, and Monique Volman. "Teaching Practices for Self-Directed and Self-Regulated Learning: Case Studies in Dutch Innovative Secondary Schools." *Educational Studies* 48, no. 6 (2020): 772–89. https://doi.org/10.1080/03055698.2020.1814699.

Yang, Xiujie, and Xiangzhi Meng. "Visual Processing Matters in Chinese Reading Acquisition and Early Mathematics." *Frontiers in Psychology* 11 (2020). https://doi.org/10.3389/fpsyg.2020.00462.

Yuni, Pantiwati. "Hakekat Asesmen Autentik Dan Penerapannya Dalam Pembelajaran Biologi." *Jurnal Edukasi Matematika Dan Sains* 1, no. 1 (2024): 18–27.

Zhang, Xiangning. "The Digital Divide: Class and Equality Education." *SHS Web of Conferences* 157 (2023): 4027. https://doi.org/10.1051/shsconf/202315704027.