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The Effectiveness of the Gasing Method Based on Multiplication Dice Games on Improving Elementary School Students' Mathematics Learning Outcomes

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A B S T R A C T

Low mathematics achievement at the primary school level in Indonesia remains a fundamental educational problem, as reflected in the 2023 National Assessment data, which shows that more than 60% of students have not yet reached the minimum numeracy competency standard. This condition highlights the urgent need for innovative, adaptive, and engaging learning approaches that can improve students' conceptual understanding of mathematics. This study aims to examine the effectiveness of the GASING (Easy, Fun, and Interesting) method combined with multiplication dice games in improving primary school students' mathematics learning outcomes. This research employed a qualitative approach using a Systematic Literature Review (SLR) method guided by the PRISMA framework. Data were collected from 31 relevant scientific articles published between 2015 and 2025 and analysed using thematic coding and descriptive analysis to identify key research patterns. The findings indicate that the GASING method improves students' understanding of basic mathematical concepts while creating a more interactive and enjoyable learning environment. In addition, multiplication dice games increase students' motivation, engagement, and active participation in mathematics learning. In conclusion, the integration of the GASING method and multiplication dice games represents an effective strategy for improving mathematics learning outcomes and fostering meaningful learning experiences for prima.

1. Introduction

Mathematics is one of the basic subjects that plays an important role in the education system, especially at the primary school level. Mathematics plays a crucial role in developing students' logical, systematic and analytical thinking skills.

However, mathematics learning in Indonesia still faces serious challenges. According to the 2023 National Assessment Report released by the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek), it is known that more than 60% of primary school students throughout Indonesia have not yet reached the minimum standard of numeracy competence. These findings indicate that most students have difficulty understanding basic mathematical concepts such as number operations, simple logical reasoning, and the application of basic arithmetic in everyday contexts (Kemendikbudristek, 2023).

These low achievements cannot be separated from conventional learning approaches. In many schools, the methods used are still teacher-centred, one-way, and lack interaction. Teachers more often give lectures and mechanical exercises without encouraging active student participation or connecting the material to the children's concrete experiences (Sary & Ristiana, 2019). This overly abstract and non-contextual learning makes it difficult for students to develop a meaningful understanding of the mathematics material being studied. In addition, limitations in the use of innovative learning media that are appropriate for children's characteristics also exacerbate the situation. As a result, students view mathematics as a boring, rigid, and difficult subject to understand, which even causes anxiety in learning. As a solution to this problem, various alternative approaches have been developed and applied in mathematics learning. One prominent approach is the GASING (Easy, Fun, and Enjoyable) method, initiated by Prof. Yohanes Surya. This method promotes learning from concrete to abstract, utilises various visual aids, and emphasises the importance of systematic stages in understanding mathematical concepts (Sunarti, 2021). This approach places students as active subjects of learning through intensive practice, repetition, and the use of educational games to reinforce concepts. This approach is in line with the research by Chasanah et al. (2025).

The GASING method is designed to overcome barriers to learning mathematics by providing a fun, applicable, and multisensory learning experience. This approach is not only applied in big cities but has also been used in various 3T (Underdeveloped, Frontier, and Outermost) regions and has been proven to significantly improve student learning outcomes (Gultom & Usman, 2024). One concrete medium that is effectively integrated into the GASING approach is educational games such as multiplication dice. In the context of GASING, dice are not just a play tool, but a learning instrument that stimulates interaction between students, strengthens memory, and instils mathematical concepts in a fun and participatory way (Rahayu & Wulandari, 2023). This statement aligns with research by Setyaningsih and Arini (2025), which shows that the use of educational game-based learning media. This game provides learning variations that spark curiosity, foster healthy competition, and increase students' intrinsic motivation to learn mathematics. This is in line with the development of the Fun Mathematic Board educational game by Agya et al. (2025). The use of other educational media such as Ludo boards, dice, number cards, and simple traditional games has also proven effective in enlivening the classroom atmosphere and increasing student engagement. According to Arfaiza et al. (2024), The application of game-based learning in mathematics education can significantly improve students' cognitive learning outcomes. Sani et al. (2025).

students' emotional and cognitive engagement in educational games contributes to the achievement of more optimal learning objectives. This is supported by various studies that found that the application of the GASING method combined with educational games can significantly improve learning outcomes, logical thinking skills, and student motivation (Devi, 2024; Johnson & Smith, 2023). Research by Angriani et al. (2025) proves that interactive game-based learning tailored to students' learning characteristics can significantly improve cognitive abilities. Furthermore, research by Hartanti et al. (2026) proves that the application of game-based mathematics learning can overcome difficulties in learning multiplication and improve the learning outcomes of primary school students. However, most studies examining the success of the GASING method are still limited to individual case studies or small-scale experiments. There are not many studies that systematically and comprehensively synthesise the available scientific evidence. The absence of a systematic review has led to an information gap that makes it difficult for teachers, researchers, and policymakers to evaluate the overall effectiveness of the GASING method. In the context of evidence-based education transformation, the need for systematic studies is crucial. With this approach, learning strategies such as GASING can be designed and developed in a measurable manner and implemented widely with proven effectiveness.

Therefore, this article aims to compile a systematic literature review (SLR) that identifies, evaluates, and synthesises the results of studies that have discussed the application of the GASING method in primary school mathematics learning. Special emphasis is also given to the integration of educational games such as multiplication dice, which are part of GASING practice. The SLR method was chosen because it is able to provide a comprehensive overview of research trends, significant findings, as well as obstacles and supporting factors for the implementation of GASING in various school contexts. In addition, this study is expected to provide data-based information on the effectiveness of GASING compared to conventional methods in improving learning outcomes, retention of understanding, and the development of logical thinking skills in students. By reviewing scientific articles published between 2015 and 2025, both domestic and international, this study is expected to contribute to enriching the theoretical basis of constructivist and behaviourist-based mathematics learning. On the other hand, the results of this study can also be used as a practical reference in designing innovative learning strategies for teachers, school principals, and basic education policy makers in Indonesia. Thus, the main objective of this article is to systematically analyse the effectiveness of applying the GASING method based on mathematical games, especially multiplication dice games, in improving primary school students' mathematics learning outcomes, as well as to describe the theoretical and practical implications that can be drawn from the results of this study.

2. Methodology

This study uses a qualitative approach with a Systematic Literature Review (SLR) research type, which is a systematic literature review method that aims to identify,

assess, and interpret all relevant research related to a specific research question, topic, or phenomenon (Snyder, 2019). This method allows researchers to collect existing empirical evidence from various scientific sources, which is then critically analysed to answer the focus of the study with an in-depth and structured approach. The selection of the SLR method is considered appropriate in the context of this study because it can provide a comprehensive evaluation of the effectiveness of the GASING method in mathematics learning based on the results of previous studies. By reviewing various published scientific articles, SLR provides a strong foundation for compiling a comprehensive synthesis of the practices and results of using the GASING method, especially when combined with dice games as a learning medium. This approach allows for cross-study comparisons and reveals consistent and significant patterns or findings. patterns or findings. In its implementation, this study follows a systematic protocol based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, which has been widely adopted in scientific studies to ensure transparency and accountability in the literature review process. The PRISMA protocol covers several main stages, namely literature identification, study selection, data extraction, and synthesis of results. These stages are carried out systematically to minimise bias and increase the validity of the study results.

The initial step was carried out through the process of identifying articles from various reliable scientific databases, such as Google Scholar, Scopus, ScienceDirect, Directory of Open Access Journals (DOAJ), and Garuda Ristek-BRIN. These databases were selected because they provide access to national and international scientific journals covering the disciplines of education, educational psychology, and mathematics learning. In addition, the diversity of sources allows for broader literature mapping and represents various research contexts. To ensure that the analysed literature remains relevant and of high quality, the following inclusion criteria were applied: (1) articles published between 2015 and 2025, to ensure the recency of the studies; (2) written in Indonesian or English to support understanding of the local and global contexts; (3) the focus of the discussion is related to the GASING method, mathematical game media, or elementary school student learning outcomes; and (4) it is an empirical study, either quantitative or qualitative. These criteria aim to ensure that only articles that meet methodological and topic relevance standards are included in the synthesis. Exclusion criteria were established to filter out articles that did not meet the eligibility requirements for analysis, including: (1) articles that were purely theoretical without any implementation in the field, (2) studies that examined education levels beyond primary school, such as junior high school or senior high school, and (3) articles that were not available in full text, making it impossible to conduct a comprehensive review.

The literature selection process was carried out in three main stages: first, screening based on titles and abstracts to identify topic suitability; second, reviewing the full text of articles that passed the initial stage; and third, evaluating the quality of articles through critical appraisal techniques. This quality assessment considered the clarity of the problem formulation, the research methods used, the validity of the data, and the scientific contribution to the topic under review. This process aims

to filter articles that are not only relevant but also credible and suitable as sources for analysis. analysis was the selected scientific articles. Therefore, purposive sampling was used, which is the deliberate selection of data sources based on topic suitability and content quality. This technique is commonly used in SLR to ensure that the data analysed truly represents the object of study. During the data collection stage, the researcher extracted information from the methods, results, and discussion sections of each selected article that discussed the application of the GASING method or the use of dice games in mathematics learning. This process used a pre-designed data extraction sheet to maintain consistency in recording and ease of analysis. This sheet included important elements such as article identity (title, author, year of publication), research objectives, research methods, game media used (if any), observed learning outcome indicators, and the main conclusions of each article.

Furthermore, the collected data was analysed using a thematic coding approach, which is the process of grouping research findings based on specific themes or categories that frequently appear in various studies. Several main themes were identified, including: the effectiveness of the GASING method on learning outcomes, increased student motivation, the impact of using game media, and teacher involvement in implementing the method. Through this technique, researchers can explore the relationship between variables and trace the similarities and differences in the results between studies. In addition to thematic analysis, a simple quantitative descriptive analysis was also conducted to provide an overview of the characteristics of the articles studied. For example, counting the number of articles based on the year of publication, the research methods used (quantitative, qualitative, mixed), and the geographical distribution of the research. This analysis is useful for revealing research trends and their distribution in the context of primary education. trends and their distribution in the context of primary education. To ensure the validity of the analysis results, triangulation between articles was carried out, namely comparing the results of various studies with similar contexts and findings. This strategy aims to ensure the consistency and reliability of the synthesis. Meanwhile, reliability is maintained by recording and documenting the entire process of searching, selecting, and extracting data in a transparent, systematic, and repetitive manner in accordance with the adapted PRISMA protocol.

One of the main challenges in this SLR process was the diversity of methodologies between the articles reviewed. Some studies used an experimental quantitative approach, while others were qualitative or action studies. Therefore, methodological categorisation was carried out to differentiate and direct the synthesis process to remain focused and proportional. These categories made it easier for readers to understand the context of the results and methodologies of each article. During the analysis process, several articles were also found to contain potential methodological biases, such as sample limitations, the subjective influence of teacher intervention, or limited implementation time. Articles with such weaknesses were not necessarily eliminated but were explained in the discussion section as research limitations in order to maintain the objectivity and transparency of the study results. In conducting this SLR, no special software such

as NVivo or Atlas.ti was used. Instead, it was done manually with the help of simple software such as Microsoft Excel and Word. Tables were used to record and map important data from each article, as well as to compile relevant thematic categories. This approach was in line with the main objective of the study, which was to obtain a comprehensive and evidence based understanding of the effectiveness of the GASING method and its potential when combined with dice games in improving mathematics learning in primary schools. Through this SLR, it is hoped that a valid and reliable synthesis can be obtained, contributing both theoretically to the development of mathematics pedagogy and practically to the implementation of more innovative and enjoyable learning.

3. Results and Discussion

General Description of the Studies Reviewed

Based on the results of the systematic literature review (SLR) of the initial 100 articles, a total of 31 scientific articles that met all the inclusion criteria—namely, published between 2015 and 2025, focused on primary school level, and discussed the GASING method, game media, and were empirical studies, both quantitative and qualitative—a number of preliminary findings were obtained that could describe the general profile of the research. In terms of the number of articles, there were 31 articles that were systematically reviewed. These articles were published between 2015 and 2025, indicating the continuity of researchers' interest in the theme of mathematics learning innovation. This shows that the GASING approach and game-based media are beginning to be widely tested in various local contexts. The results of the data extraction from the selected articles are presented in Figure 1

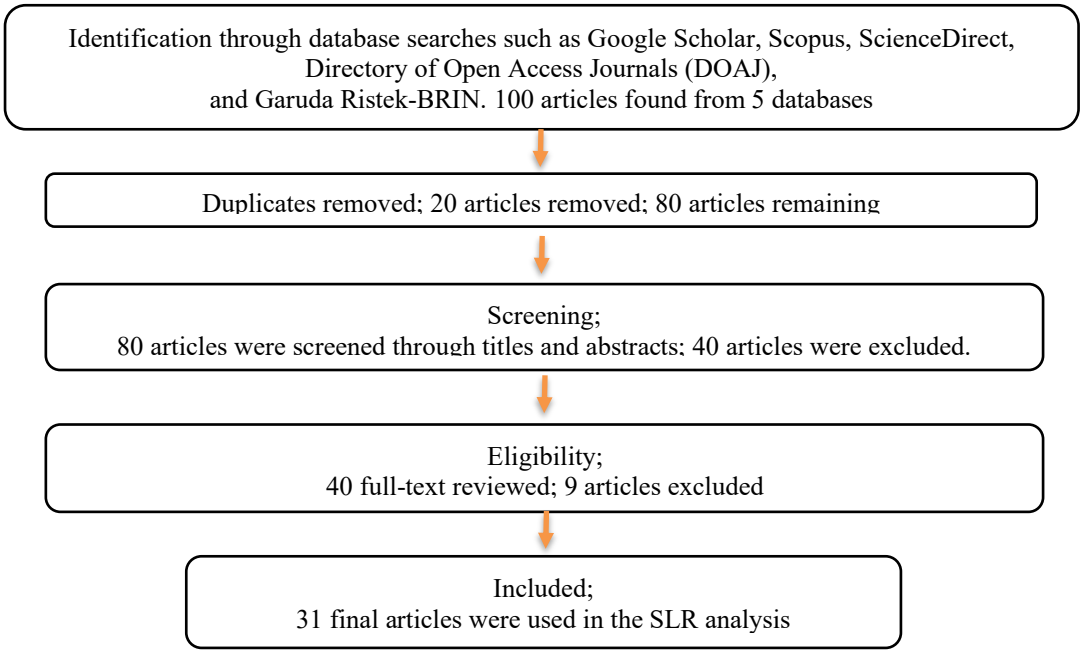

Figure 1. The Studies Reviewed

Key Findings

Effectiveness of the GASING Method

The GASING (Easy, Fun, and Enjoyable) method has been proven effective in improving students' understanding of basic mathematical concepts, including topics such as number operations, geometry, and measurement. This approach systematically guides students from the concrete to the abstract stage, making mathematical concepts easier to understand and apply. For example, Gultom & Usman (2024) reported that the application of GASING to sixth-grade primary school students resulted in a significant increase in average scores, from 64 to 85. These figures demonstrate the tangible impact of the GASING approach on higher and more meaningful learning outcomes. Educational Games: Dice and Ludo. Educational games, particularly media such as multiplication dice and Ludo boards, also have a positive influence on building student motivation and learning activity. Research by Arfaiza et al. (2024) using the Ludo Magnet Mathematics medium noted an increase in student engagement and understanding of fraction concepts that were previously considered difficult. This game not only provides a fun learning atmosphere but also allows students to interact directly with the learning material in a contextual manner. Combination of GASING and Games The combinative approach between the GASING method and game media proved to have the most significant impact compared to the application of a single method. Devi (2024) stated that the integration of traditional games in the GASING model was able to produce higher student engagement and statistically significant achievement scores. This combination creates a participatory learning environment, encouraging students to think critically and solve challenges collaboratively.

Supporting Factors for Effectiveness

Several key factors supporting the effectiveness of the GASING method and educational games were identified in this study. First, the use of visualisation and concretisation strategies, such as number blocks, illustrative images, and physical activities, significantly facilitates students' transition from concrete to abstract understanding. This is in line with Sunarti's (2021) opinion, which emphasises the importance of visual representation in mathematics learning at the elementary level. Second, active student involvement during the learning process is a key element in creating a deep learning experience. Game models such as Ludo and snakes and ladders based on dice not only stimulate motor activity but also encourage direct reflection on the results obtained by students in the game. Widyaningrum (2022) confirms that this kind of involvement contributes to increased student attention and retention of material.

Challenges and Limitations Identified

Despite yielding positive results, several challenges and limitations were also identified in this study. One of the main challenges is the limited sample size. Most studies were conducted in only one class or one school, which limits the generalisability of the results nationally. In addition, there is still a lack of teacher

training in understanding and applying the GASING approach and developing learning-based games. Untrained teachers tend to revert to conventional methods, so the potential of GASING cannot be fully optimised. Another obstacle is the lack of standardisation of game media. Some teachers make their own game tools without a systematic design or consistent rules, which risks reducing the effectiveness of the media.

Discussion and Critical Analysis Interpretation of Findings

The results of this systematic review show that the findings from various studies are very much in line with constructivist theory, which emphasises the importance of concrete and active experiences in building knowledge. The GASING method provides a strong bridge from real experiences to abstract understanding, while educational games reinforce the behaviouristic dimension by providing direct reinforcement through positive feedback repetition in a pleasant atmosphere. Thus, this combinative approach is able to activate the cognitive and affective aspects of students simultaneously, which is very much needed in basic mathematics learning. The characteristics of the selected articles used in this study are summarized as shown in Table 1.

Table 1. Article Analysis

No	Article Title	Author	Research Method	Research Findings	Supporting and Inhibiting Factors	Relevance to the Topic
1	Application of the GASING Method Based on Dice Games in Arithmetic Operations Learning	Sari, D.P., & Wijaya, A. (2023)	Quasi-experimental; pretest-posttest; 60 third-grade students	The GASING method + dice increased arithmetic operation learning outcomes by 78%	Supporting factors: concrete materials, enjoyable atmosphere; Challenges: lengthy preparation time	Highly relevant: focus on GASING + dice for mathematics learning outcomes
2	The Effectiveness of Mathematics Learning Using Number Dice Media on Second-Grade Primary School Students	Pratama, R.A., et al. (2022)	Action research, 2 cycles; observation and tests	Improvement in learning outcomes from 65% to 85% after the implementation of number dice	Supporting factors: active engagement, high motivation; Challenges: classroom management	Relevant: focus on dice games and learning outcomes
3	Implementation of the GASING Method in Enhancing Number Concept	Lestari, M., & Handayani, S. (2024)	Descriptive quantitative; 45 first-grade students	GASING significantly improved understanding of number concepts ($p<0.05$)	Supporting factors: systematic stages, teaching aids; Obstacles: teacher	Relevant: the GASING method for understanding mathemati

	Understanding				readiness	cal concepts
4	Game-Based Learning with Digital Dice for Basic Mathematics	Johnson, K.L., & Smith, M. (2023)	Mixed method; 120 student; pre-post design	Game-based learning increased engagement and achievement by 67%	Supporting factors: interactive technology; Barriers: limited access to technology	Relevant: game-based learning with dice for mathematics
5	The Effect of the GASING Method on Primary School Students' Motivation to Learn Mathematics	Nurrahman, F., & Kurnia, T. (2022)	Correlational quantitative; 80 students; motivation scale	GASING enhances learning motivation with a correlation coefficient of 0.72	Supporting factors: enjoyable learning; Barriers: consistency in implementation	Relevant: GASING for mathematics learning motivate n
6	Learning Multiplication Operations Using Modified Dice Games	Rahayu, E.S., & Wulandari, P. (2023)	Experiment; control group design; 70 students	The experimental group showed an 83% improvement in learning outcomes compared to 62% in the control group	Supporting factors: creative modifications, healthy competition; Challenges: variation in student abilities	Relevant: dice games for mathematical operatios
7	Analysis of the Effectiveness of the GASING Method in Basic Geometry Learning	Santoso, B., et al. (2024)	Quasi-experimental; mixed method; 90 students	GASING effectively improves geometry comprehension with an effect size of 0.85	Supporting factors: concrete visualisation; Barriers: complexity of the material	Relevant: GASING for geometry learning
8	Implementation of Game-Based Learning to Improve Numeracy	Thompson, J.R., & Davis, L. (2022)	Action research; 3 cycles; 35 students	Improvement in numeracy skills from level 2 to level 4 in 3 cycles	Supporting factors: authentic assessment; Challenges: individual differences	Relevant: games for improving numeracy
9	The GASING Method and Manipulative Teaching Aids in Fraction Learning	Wardani,K.,& Susilo, H. (2023)	Quantitative experiment; 65 fourth-grade students	Combination of GASING + manipulatives improves fraction learning Outcomes by 79%	Supporting factor: hands-on learning; Limitation: limited teacher understanding	Relevant: GASING with manipulatives for fraction concepts
10	The Use of Dice in Teaching	Martine,C., & Lopez, R. (2022)	Qualitative descriptiv	Students demonstrated better	Supporting factor: experiential	Relevant: dice for probability

	Simple Probability to Primary School Students		e; cas e study; 25 students	understandin g of probability Through dice experiments	learning; Challenge: conceptual abstraction	learning
11	The GASING Strategy for Overcoming Difficulties in Learning Mathematics	Putri, A.N., & Rahman,S. (2024)	Mixed method; 55 students with learning difficultie s	GASING effectively overcomes 75% of students' mathematics learning difficulties	Supporting factor: individualised approach; Limitation: time-intensive	Relevant: GASING for addressing learning difficulties
12	Educational Dice Games as an Interactive Mathematics Learning Medium	Wilson, D.K., & Brown, A. (2023)	Experime nt; randomis ed control trial; 100 students	Dice games significantly improve interaction and learning outcomes	Supporting factors: peer interaction; Barriers: classroom management	Relevant: dice as an interactive learning tool
13	The Effectiveness of the GASING Method in Developing Logical Thinking Skills	Indrawat i, L., & Setiawa,D. (2022)	Quantitat ive causal-comparat ive; 75 students	GASING develops logical thinking skills with significance $p<0.01$	Supporting factors: structured thinking; Barriers: assessment complexity	Relevant: GASING for logical thinking skills
14	Game-Based Mathematics Learning: A Case Study on the Use of Dice	Anderson, P.M., et, al. (2024)	Qualitativ e case studies; in-depth observati on	Dice games Create a conducive and enjoyable learning environment	Supporting factors: positive learning environment; Obstacles: curriculum alignment	Relevant: case study of dice games in mathemati cs
15	Analysis of Success Factors in the Implementation of Dice Games in Mathematics	Chen, L.W., & Kim, S.H. (2024)	Survey research; 200 primary school teachers	Identification of 8 key factors for the successful implementatio n of dice games	Supporting factors: teacher training, student engagement; Barriers: resource constraints	Relevant: factors in the implement ation of dice games
16	The Impact of Game-Based Learning on Learning Objective Achievement and Motivation in Mathematics	Blaženk a Divjak and Damir Tomić (2011)	Literature review (32 internatio nal studies, 1995– 2010)	The majority of studies show a positive effect of games on learning and motivation in mathematics	Systematic, in-depth analysis, data-driven, Relevant to contemporary teaching Does not include recent data, (post-2010),	Relevant: Games on learning outcomes
17	The Influence of Game-Based Learning in Mathematics Education on Students'	Peter Vankúš (2021)	Asystemati c review based on PRISMA of 57 scientific	84% of studies showed positive effects on affect (motivation, attitude,	Systematic, robust methodology, focus on the non-cognitive domain Does	Relevant: educationa l mathemati cs games

	Affective Domain		journals	engagement)	not include non- journal data,	
18	The Effect of Game-Based Learning on Students' Mathematics Achievement	Ümit Tokac, Elena Novak, Christop her G. Thomps on (2019)	Meta-analysis (24 studies, 39 effect sizes)	Small but significant effect: mathematics games > traditional learning	Specific focus, robust methodology, in-depth moderator analysis	Relevant: Education al games and mathemati cal achieveme nt
19	Online learning and game-based learning for mathematics	Athanasi os Drigas & Marios Pappas (2015)	narrative review of a number of internatio nal studies	Educational games generally improve students' performance, attention, and motivation	Comprehensi ve, contextual, reviewing many types of games and methods	Relevant: mathemati cs educationa l games
20	The Effect of Game-Based Learning on Attitudes and Mathematics Achievement in Primary School	Kyli White & Leah P. McCoy (2019)	Classroo m action research	Significant improvement in attitudes and achievement (from 55.95% to 96.14%)	Comprehensi ve, practice-based, strong data	Relevant: mathemati cs games improving achieveme nt
21	Digital Game-Based Learning in Mathematics Education at Primary Schools	Nguyen Thi Nga, et al. (2024)	Systemat ic literature review	Arithmetic dominance, focus on effectiveness, high motivational learning outcomes	Comprehensi ve, systematic, practically and theoretically relevant	Relevant: digital mathemati cs games
22	Effect of Game- Based Learning on Students' Mathematics Higher Order Thinking Skills	Anggoro et al. (2024)	Meta-analysis (13 studies, 42 effect sizes)	Small effect (g = 0.134), positive but susceptible to publication bias	Methodologic al rigour, PRISMA, complete	Relevant: Digital mathemati cs games
23	Validity & Practicality of Learning Media Mathematics Logic Based on Quiz Whizzer	Syah, Rachma wati, Siswant o, et al. (2024)	ADDIE Develop ment Model	Practicality percentage: 84.93% → classified as Very Practical in the category	Combining expert validation and student response	Relevant: 's mathemati cs teaching materials
24	Game-based learning media in a material unit system based on the analysis of results for children with	J.Juhanai ni, Alya Jilan Rizqita, Muham mad Rafi Wirdan Assyakh ir Tandu Bela, et al.	*Design-Based Researc h (DBR)* Approac h	The success of developing learning media and educational games based on Android technology	Development ofAndroid-based educational game learning media	Relevant: mathemati cs games

	learning difficulties in mathematics					
25	Enhancing Mathematical Skills: The Effectiveness of Game-Based Learning	Juzzel Amor C. Cayang an Eziel Mae E. Ursabia (Universi ty) (2024)	"Data was collected through question naires"	Game-based learning was found to be effective in improving students' mathematics skills.	The topic of game-based learning in mathematics is highly relevant	Relevant: mathemati cs games
26	Development of Android-Based Educational Games to Increase Primary School Students' Interest in Learning Mathematics	Iva Sarifah and colleagu es	ADDIE model	This study successfully developed an Android- based educational game	This article explicitly targets increasing interest	Relevant: Mathemati cs educationa l games
27	Development of AR-Based Mathematics Educational Games for Primary School Learning	Ruhiat Susanto and Moham mad Edy Nurtama m	A quasi-experime ntal design was used	AR games can increase student engagement and understandin g of mathematics	The use of Augmented Reality (AR) for mathematics learning in schools	Relevant: Mathemati cs educationa l games
28	Traditional Indonesian Engklek Game as an Educational Tool in Primary School Mathematics Learning ( )	Fiska Ariyanti Ariska et al	Bibliomet ric analysis.	Mapping the development of scientific literature related to the use of traditional hopscotch games as educational tools	Focus on Traditional Games	Relevant: Mathemati cal games
29	The Influence of Educational Games in Mathematics Learning	Ratu Nastriya h Mu'mina tul Hasana h and Sri Andayan i (2022)	A review, focusing on the process of collecting and analysing literature	Provides a comprehensiv e overview of the role of educational games in mathematics	The use of educational games in mathematics learning	Relevant: Mathemati cs educationa l games
30	Development of Travel Game Media for Learning Multiplication and Division of Fractions in	Delia Indrawat i and Siti Partini Suardim an	*Researc h and Develop ment* (*R&D*)	The *travel game* media is deemed suitable for use in mathematics learning	Focus on Specific Material	Relevant: Mathemati cs educationa l games

	Grade V Mathematics					
31	Improving learning motivation using Dakabi media (multiplication and division dice) among third-grade students at SDN Dukuh Kupang 1/448 Surabaya	Dhea Prisca Imanda Agnesa, Diah	Classroom Action Research	shows an increase in students' learning motivation in mathematics	Learning motivation is key in the educational process	Relevant: Mathematics Dice Game

Implications for Learning

The practical implications of these findings indicate that teachers need to be provided with special training to integrate game media into lesson plans (RPP) and school syllabuses. This training is important so that teachers are able to select, modify, and evaluate the effectiveness of game media appropriately. On the other hand, primary schools need to provide supporting facilities, such as standardised game tools, interactive learning spaces, and flexible time for active and project based learning. This will help create a learning ecosystem that encourages exploration and full engagement from students.

Limitations of the Review

This review also has methodological limitations that need to be considered. One of these is limited access to paid articles, which meant that several relevant studies from reputable journals such as Scopus and ScienceDirect could not be included in the analysis. In addition, most of the studies were conducted in Java and Sumatra, so geographical diversity was underrepresented. These limitations affect the generalisability of the findings to broader national conditions

4. Conclusion

This study aimed to systematically analyse the effectiveness of the GASING (Easy, Fun, and Enjoyable) method integrated with multiplication dice games in improving mathematics learning outcomes among primary school students. Based on the synthesis of empirical studies reviewed through a systematic literature review approach, the findings demonstrate that the integration of the GASING method and game-based learning media constitutes a promising pedagogical strategy for strengthening mathematics learning in primary education. The GASING method provides a structured learning framework that enables students to develop conceptual understanding gradually, beginning with concrete experiences and progressing toward abstract reasoning. This approach encourages active learning, conceptual clarity, and logical thinking, which are essential components in the

development of foundational mathematical competence at the primary school level. At the same time, the use of multiplication dice games contributes to the creation of an engaging and participatory classroom environment. Through interactive learning activities, students are encouraged to collaborate, explore mathematical ideas, and develop a more positive attitude toward mathematics learning.

Overall, the synthesis of the reviewed studies indicates that the combination of the GASING method and educational game media can support more meaningful and student-centred mathematics learning. The approach not only enhances students' conceptual understanding but also promotes motivation, engagement, and active participation in the learning process. Despite these positive outcomes, several challenges remain, particularly in terms of teacher readiness, the availability of structured learning media, and the need for systematic training in implementing innovative instructional approaches. Therefore, future efforts should focus on strengthening teacher professional development and expanding the integration of game-based and concept-oriented mathematics learning strategies in primary school contexts.

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