



## Development Of Unscrew Game Media To Train Students' Abstract Thinking

Siti Khadijah Lubis<sup>1a \*</sup>, Alfin Siregar<sup>2b</sup>

<sup>1,2</sup> Universitas Islam Negeri Sumatera Utara, Indonesia

<sup>a</sup>siti303222040@uinsu.ac.id, <sup>b</sup>alfinsiregar@uinsu.ac.id

### Article History:

Accepted :

31-07-2026

Revised:

17-08-2026

Accepted :

25-09-2026

### Keywords:

*Screw opening game; Abstract thinking; Learning media; Elementary school students; Development research.*

### \*Correspondence Address:

[siti303222040@uinsu.ac.id](mailto:siti303222040@uinsu.ac.id)

### Abstract:

The abstract thinking abilities of second-grade elementary school students tend to be diverse and hampered by monotonous learning patterns without physical manipulative media. This study aims to develop a valid and practical Unscrew game media to stimulate the abstract thinking abilities of second-grade students at MIN 1 Medan City. The method used is Research and Development (R&D) with reference to the Sugiyono development model. Data were collected through interview guidelines, student needs questionnaires, material expert validation sheets, and user practicality response questionnaires, which were analyzed using quantitative and qualitative descriptive techniques. The results showed that the Unscrew game media met the criteria of very feasible with a material validation score reaching 96%. The level of product practicality was categorized as very good based on student responses of 94.5% and teacher responses of 88%. The main contribution of this study is the availability of valid and practical tactile-motor-based classical guidance media to stimulate the cognitive abilities of elementary school students. The implication is that direct physical motor involvement is indicated to have strong potential to bridge children's abstract mental operations at the concrete operational development stage. However, the study faced significant limitations in time allocation, initial intensive guidance, and a limited number of units. Therefore, it is recommended that teachers implement planned time management, schools facilitate product duplication in class, and future researchers develop adaptive difficulty variations.

This article is an open access article under [the CC-BY-SA license](#).  
license.





## Introduction ( مقدمة )

Education is essentially a systematic and planned process to optimally develop students' potential, encompassing cognitive, affective, and psychomotor aspects. In this process, the cognitive aspect plays a crucial role because it is directly related to the ability to think, analyze, and solve everyday problems. Therefore, the development of higher-order thinking skills, one of which is abstract thinking, namely the competence to understand non-visual concepts such as symbols, patterns, and cause-and-effect relationships, is a primary learning objective. This ability is an important foundation for elementary school students to understand complex material at the next level. In line with this, Law Number 20 of 2003 concerning the National Education System and the Independent Curriculum regulations explicitly mandate an interactive, inspiring, and challenging learning process to facilitate students' independent thinking from an early age. In its implementation, the success of the Independent Curriculum in elementary schools requires active learning strategies that can boost student engagement and academic performance (Pratiwi et al., 2026).

However, initial observations and interviews with second-grade teachers at MIN 1 Medan City revealed a gap between regulations and reality. Students' abstract thinking skills have not yet developed optimally and are highly variable; the majority of students struggle with logical reasoning, connecting patterns, and solving problems. This condition is exacerbated by monotonous learning patterns without adaptive manipulative media, which triggers low concentration and boredom in children. Conversely, students' enthusiasm for learning increases significantly when involved in concrete physical activities that allow them to directly manipulate objects. This phenomenon reinforces Jean Piaget's (1950) theory of cognitive development, which states that elementary school-aged children are in the concrete operational stage, where their abstract mental operations still require a bridge in the form of physical objects or experiences. Obstacles to cognitive development and learning boredom are not only the instructional domain of classroom teachers but also part of the responsibility of Guidance and Counseling (BK) services in schools (Piaget, 2001). Through classical guidance, counseling practitioners are obliged to facilitate the achievement of students' cognitive, academic, and socio-emotional developmental tasks so as not to hinder their future studies.

Several previous studies have attempted to stimulate various aspects of child development through concrete game-based media approaches. In the realm of social-emotional guidance, the integration of educational snakes and ladders media has proven effective in stimulating children's social skills and emotional regulation through interactive group play activities (Hasfaraini & Kusumawati, 2026). On the other hand, cognitive and academic stimulation in elementary schools is also attempted through group problem-solving strategies (Pratiwi et al., 2026), the use of word puzzles to stimulate critical thinking (Safitri & Wicaksono, 2026), the application of Make a Match puzzles to boost lower grade learning motivation (Luthfiyah et al., 2025), and the development of "sugam" puzzle game media for understanding higher grade science concepts (Defi et al., 2021). Furthermore, the use of mathematical puzzle media in quasi-experimental designs has proven effective and practical for bridging the visualization of concrete objects in improving the understanding of basic addition concepts for second grade elementary school students (Indriani & Suriani, 2024). In addition, specific cognitive abilities such as computational thinking are being trained through quiz board games integrated with unplugged coding activities (Firdaus & Paksi, 2026). In addition to elementary school levels, card game-based media such as Question Cards have also been proven effective in improving critical thinking skills at the secondary school level (Lailia, 2019). Furthermore, game-based strategy learning has been proven to train children's

logical and analytical reasoning (Rahayu et al., 2025).

However, there is a significant research gap. The majority of previous game-based media developments still focus on macro social-emotional aspects, visualization of generic exact materials, or enhancement of one-dimensional affective domains. There is no tactile strategy-based game media specifically designed to train multidimensional abstract thinking simultaneously (visual representation, logical-spatial reasoning, and indirect pattern understanding as emphasized by (R. K. Putri et al., 2025), especially for classical guidance services for second-grade elementary school students. This gap underlies the novelty of this research through the development of the "Unscrew" game media. The novelty of this product lies in the integration of manipulative wooden sticks with structured pattern visualizations that require students to perform physical-tactile activities while simultaneously carrying out abstract mental operations such as projecting spatial changes and strategizing actions according to game rules.

Based on this background, this study aims to develop a valid and practical Unscrew game media to train the abstract thinking skills of second-grade students of MIN 1 Medan City through the Sugiyono Research and Development (R&D) method. This product is expected to provide theoretical contributions in enriching the variety of children's cognitive stimulation media, as well as practical contributions for class teachers and BK teachers in providing adaptive classical guidance services for children's concrete operational development.



## Method ( منهج )

### Types, Designs, and Research Procedures

This research is a Research and Development (R&D) study that aims to produce a learning media product and test its feasibility and practicality in the field. The development design refers to the Sugiyono model which is systematically adapted into 5 main stages to adjust to the limitations of limited trials. The use of this R&D approach is in line with the development of similar educational board game media in elementary schools which has been proven to be able to produce a structured, tested product (Firdaus & Paksi, 2026). The structured development procedure includes:

1. Potential and Problems: Identifying obstacles to students' abstract thinking through initial observations and in-depth interviews with class teachers.
2. Information Gathering: Conducting a literature review on the characteristics of concrete operational cognitive skills and mapping the dimensions of abstract thinking skills.
3. Product Design: Designed the initial draft of the Unscrew game media, developed tactile playing rules, determined the specifications of the structured wooden stick material, and created a user guide.
4. Design Validation & Revision: Testing the feasibility of the product through expert assessment and making improvements based on the improvement suggestions provided.
5. Limited Product Trial: Implementing media in the classroom to see the practical response of users directly.

### Subject, Time, Place, and Research Instruments

This research was conducted at MIN 1 Medan City with a series of activities lasting for four months, starting from April to July 2026. The research subjects were selected in a targeted manner

consisting of 2 expert validators (1 expert on child development guidance and counseling material and 1 expert on learning media), 1 second-grade teacher as a practitioner, and 28 second-grade elementary school students as subjects of limited product trials.

Data were collected using structured instruments including teacher needs analysis interview guides, student needs questionnaires, expert validation sheets, and user practicality response questionnaires. The combined design of data collection instruments through validation sheets and layered response questionnaires adopted standardized R&D product measurements to map product feasibility from the perspective of validators and real users in the field (Nadia et al., 2025). The questionnaire for students was specifically developed using simple language to measure their reasoning responses across four main dimensions: visual representation, logical reasoning, spatial reasoning, and children's cognitive strategies.

### Validity Test and Data Analysis

To ensure the quality of the product content, the Unscrew game media underwent a validation stage by material experts and media experts. The assessment focused on the suitability of the cognitive material, clarity of instructions, depth of strategy content, and safety for children's tactile-kinesthetic activities. Data were analyzed using quantitative and qualitative descriptive techniques. Qualitative input in the form of criticism and suggestions was used as the basis for operational revisions to the media. Meanwhile, quantitative data from the percentage scores of the validation sheet and practicality questionnaire were converted using the following criteria assessment scale:

1. Percentage 81% – 100%: Very Valid / Very Practical Criteria (Very Feasible without revision)
2. Percentage 61% – 80%: Valid / Practical Criteria (Feasible with minor revisions)
3. Percentage 41% – 60%: Fairly Valid / Fairly Practical Criteria (Fairly Feasible)
4. Percentage < 40%: Invalid / Impractical Criteria (Not suitable for use)

The final product is declared to have passed and is ready for use if it meets the minimum limits for the "Valid" and "Practical" categories with a score percentage above 61%.

## Results ( نتائج )

### 1. Field Needs Analysis (Teacher Interview)

Based on an in-depth interview with one second-grade homeroom teacher (N=1) at MIN 1 Medan City, data obtained showed that students' reasoning and abstract thinking abilities in the classroom were still highly diverse. Teachers identified the main challenges for lower-grade students as difficulties in analyzing, reasoning, connecting components, and solving conceptual problems. This condition was exacerbated by monotonous learning patterns that easily made students bored. However, teachers observed that students' enthusiasm for learning increased significantly when involved in physical activities based on games or concrete interactive media.

### 2. Student Needs Analysis Questionnaire (Independent Cognitive Perception)

A needs questionnaire was distributed to 28 second-grade students (N=28) to map their independent perceptions of the game's potential to stimulate four cognitive dimensions. It is important to note that these data reflect students' perceptions and levels of interest

in the media, not the results of an experimental measurement of abstract thinking skills. The questionnaire results showed:

- 1) Visual Representation Dimension: A total of 62.5% (17 students) stated that they strongly agreed and 33.9% (9 students) agreed that visualizing objects helped them understand problems.
- 2) Logical Reasoning Dimension: As many as 78% (22 students) stated that they strongly agreed and 20% (6 students) agreed that the game helped them recognize rule patterns.
- 3) Spatial Reasoning Dimension: As many as 66% (18 students) stated that they strongly agreed and 34% (10 students) agreed that media activities train the ability to imagine changes in the position of objects.
- 4) Cognitive Strategy Dimension: As many as 62.5% (17 students) stated that they strongly agreed and 37.5% (11 students) agreed that the Unscrew game trains independence in determining problem-solving steps.
- 5) Media General Response: As many as 93% (26 students) strongly agreed and 7% (2 students) agreed that the physical objects in the Unscrew game have strong potential to be a tool to help them think.

### 3. Product Feasibility (Validity) and Practicality Test

Product testing is conducted through layered assessments by experts and real users to measure the operational feasibility of the media:

- 1) Material Expert Validation: Assessment by 2 experts (N=2) resulted in a score of 72 out of 75 (96%), thus entering the Very Appropriate/Very Valid category. The media was assessed to meet quality standards in terms of cognitive material suitability, clarity of instructions, depth of content, and safety for children's tactile-kinesthetic activities.
- 2) User Practicality (Students): Based on the responses of 28 students (N=28) after a limited simulation, the media obtained an accumulated score of 1,323 out of 1,400 (94.5%) with the Very Appropriate/Very Practical category. The practicality indicators were dominated by the perception of ease of use and the visual appeal of the product.
- 3) User (Teacher) Practicality: Assessment by one class teacher (N=1) gave a total score of 44 out of 50 (88%) with a Very Appropriate/Very Practical category. The teacher assessed that this media has clear operational instructions, attractive visualizations, and strong potential to stimulate active student involvement in class guidance.



## Discussion ( مناقشة )

### 1. Relevance of Field Needs to Student Development Characteristics

Field findings demonstrate the urgency of providing concrete media to gradually stimulate abstract thinking skills in the early transition phase of elementary school. This is in line with Jean Piaget's Cognitive Development Theory, which emphasizes that elementary school students in the concrete operational stage (ages 7–11) begin to be able to use logical reasoning, but their mental operations still require a bridge in the form of

objects or direct physical experiences. Mapping this developmental theory is very important in underpinning the conception of thinking in children of elementary school age so that their intellectual cognitive growth process runs optimally (Hadi et al., 2025).

According to Piaget, children's knowledge does not grow instantly but rather is formed gradually in line with experience and physical maturity through mechanisms of organization and equilibration (Marinda, 2020). Children are naturally highly interested in the world and actively seek information that can help them understand it through direct interaction, where the thought process develops gradually from concrete dimensions to abstract and logical concepts (Ibda, 2015). Although the stages and sequence of cognitive development are universal, the age at which a child begins to enter a particular stage is not always the same for each individual (Ibda, 2015). The reality of this personal variation is reflected in the field, where educators are often faced with the real challenge of recognizing and adapting learning approaches to the cognitive uniqueness of each student's very diverse range. If the transition process from the pre-operational stage to concrete operational is hampered by monotonous learning patterns, children are vulnerable to facing various cognitive problems in elementary school (Marinda, 2020).

Therefore, implementing learning models and stimulation media that align with Piaget's theory is crucial for improving the effectiveness of classroom learning (Babullah, 2022). Active motor involvement in the Unscrew game, including holding, opening, assembling, moving, and arranging components, provides meaningful, concrete physical stimulation to minimize these cognitive transition barriers.

, lecture-dominated learning methods (Safitri & Wicaksono, 2026) are intervened through Guidance and Counseling (BK) services. The presence of this media facilitates BK teachers or school counselors in providing structured classical guidance services to optimize students' cognitive and academic development tasks. This targeted stimulation strengthens (Hasfaraini & Kusumawati, 2026; Indriani & Suriani, 2024) regarding the importance of creating alternative services based on engaging and interactive group games. The relevance of this structured manipulative tactile game is also supported by the finding that puzzle-like play activities have a real, multidimensional impact on children; not only honing cognitive and problem-solving skills, but also stimulating emotional intelligence, increasing fluency in speaking, and reducing feelings of shyness and fear in group social dynamics. (Cantika & Ilhami, 2025).

## 2. Exploration of the Dimensions of Thinking towards the Potential of Abstract Stimulation

The analysis of the dimensions of thinking is based on the response tendencies of the questionnaire on the needs of class II students (N=28) which are mapped as follows:

- 1) **Visual Representation** : Data shows a high student preference for structured visual aids (62.5% strongly agree). The manipulative patterns in the Unscrew component serve to simplify complex verbal instructions into easily interpretable physical forms. This is relevant to the successful visualization of concrete objects in math puzzles by Indriani & Suriani (2024) and science puzzles by Defi et al., which utilize visual-spatial challenges to bridge the understanding of basic arithmetic and exact

concepts.

- 2) **Logical & Spatial Reasoning** : The high percentage of positive responses in the logical (78%) and spatial (66%) reasoning dimensions indicates that the rules for arranging wooden sticks require children to mentally project changes in the position of objects. This strategy of arranging steps and predicting positions confirms the finding (Rahayu et al., 2025) that strategy-based games are able to train analytical skills from an early age. Unlike the Question Card card game for middle school students (Lailia, 2019), this physical game media is adapted to the level of motor dexterity of lower grade students. This physical coordination aspect is strengthened by empirical evidence that the application of structured media such as math puzzles has a significant effect on training and improving the fine motor skills of second grade elementary school students ( (Rahmadani et al., 2024).
- 3) **Cognitive Strategy**: The process of trial and error, evaluating errors, and modifying the steps in removing and reassembling Unscrew components trains students' cognitive flexibility. This tactile-spatial activity is supported by findings (R. K. Putri et al., 2025) regarding the crucial role of understanding indirect patterns in building the foundation of children's abstract thinking. A structured quiz board game based on unplugged coding (Firdaus & Paksi, 2026) also proves that regular thinking activities in elementary schools can be optimally stimulated through physical media designed to produce valid solution flows.

### 3. Analysis of Product Feasibility, Practicality, and Acceptability

The 96% material validation score achieved by the expert team indicates that the Unscrew media content is considered safe, accurate, and on-target in terms of child development guidance and counseling. This comprehensive product feasibility evaluation adopts Sugiyono's standardized R&D product measurement model, which is validated in layers using expert assessment sheets for both material and media (Nadia et al., 2025).

On the other hand, the high practicality index from students (94.5%) and teachers (88%) confirmed the excellent usability aspect of the media in the classroom. Referring to the quantitative data conversion criteria established in the research method, a score above 81% places this media in the Very Valid and Very Practical criteria. The challenging play aspect and the integration of manipulative wooden sticks successfully became a driver of active student engagement. This practicality finding is in line with the effectiveness of the Make a Match puzzle media (Luthfiyah et al., 2025), the development of interactive puzzles to improve motivation and learning outcomes for elementary school students. (R. S. Putri & Firman, 2024) , and group problem-solving strategies (Pratiwi et al., 2026). This series of studies demonstrates that direct tactile engagement using structured game-based media significantly increases student focus, understanding of the material, and enthusiasm.

Conceptually, the direction of developing educational game-shaped media to stimulate specific thinking skills is validated by the analysis of global publication trends

in Research and Development (R&D) research which shows that the creation of innovative interactive game-shaped devices is a strategic area that contains very high scientific novelty for the renewal of the basic education media ecosystem (Alghiffari et al., 2024).

#### 4. Product Operational Advantages and Limitations

- 1) Product Advantages: Unscrew media facilitates the transition of thinking from concrete operational to abstract concept recognition. This product is specifically designed to meet the target indicators (understanding concepts, connecting information, recognizing patterns/relationships, building units, and drawing conclusions). The simple rules of the game but requiring strategic action make this media highly adaptable for interactive implementation in a classical guidance format by class teachers and guidance counselors.
- 2) Limitations of the Limited Trial: It should be emphasized objectively that this study was limited by the framework of a limited product trial (Develop) without any experimental-control classes or post-action retention tests. Consequently, the data obtained focused on the perceived practicality and level of acceptability of the media by users, rather than absolute evidence of longitudinal improvement in students' abstract thinking capacity. Operationally, this media requires a significant allocation of time for children to understand the structured visual patterns at the beginning of the session, and requires intensive guidance from the teacher when the rules are first introduced. The limited number of media units produced also limits the number of students who can participate simultaneously in a large class, so mass replication of the product in other school environments requires adjustments to the level of difficulty to remain relevant to the characteristics of local facilities.



#### Conclusion ( خاتمة )

This research successfully produced an Unscrew game media product that was proven valid and practical to stimulate the abstract thinking skills of second-grade students of MIN 1 Medan City through a concrete operational approach. The Very Valid criteria were obtained based on the material validation score from experts which reached 96%, which confirmed that the aspects of content depth, cognitive material suitability, and safety of the product's tactile activities had been met. Meanwhile, the level of practicality of the media was categorized as Very Practical based on the percentage of student responses of 94.5% and class teacher responses of 88%. These results indicate that the Unscrew game media has excellent usability aspects, is easy to use in the classroom, and is able to trigger students' enthusiasm for learning.

The implication of this development research is the availability of alternative structured tactile-motor cognitive stimulation instruments to support classical guidance services in facilitating the academic development tasks of elementary school children. However, the implementation of this media has several operational limitations because it requires a significant allocation of time for students to understand the structured visual patterns. In addition, this media requires intensive guidance (scaffolding) from the teacher at the beginning of the introduction of the game rules. The limited number of media units

produced also limits the number of students involved simultaneously, so the difficulty level of the game mechanics still requires adaptive adjustments if it is to be replicated to student characteristics outside the research location .

### Acknowledgment (شكر وتقدير)

The researcher expresses his deepest gratitude and appreciation to the Rector and all academics of the State Islamic University of North Sumatra for the academic facilities provided, as well as to the Principal and all Class II Teachers of MIN 1 Medan City for their permission, support, and extraordinary cooperation in facilitating the entire series of data collection in the field. Deep gratitude is also expressed to the team of expert lecturers as validators who have provided scientific direction and constructive criticism for the improvement of the Unscrew game media product, as well as to all class II students of MIN 1 Medan City for their active participation and enthusiasm during the product trial process. Finally, the researcher expresses his sincere appreciation to his beloved family and colleagues who always provide moral support, prayers, and motivation both directly and indirectly, so that this development research can be completed well and on time.



### Bibliography (مراجع)

- Alghiffari, E. K., Alam, S. R., & Siswanto, D. H. (2024). Tren Publikasi Terkait Model Pengembangan 4D pada Pendidikan. *Jurnal Pendidikan Transformatif (JPT)*, 3(5), 1–10. <https://doi.org/10.9000/jpt.v3i5.2021>
- Babullah, R. (2022). TEORI PERKEMBANGAN KOGNITIF JEAN PIAGET & PENERAPAN NYA DALAM PEMBELAJARAN. *EPISTEMIC: JURNAL ILMIAH PENDIDIKAN*, 01(02), 131–152. <https://doi.org/10.70287/epistemic.v1i2.10>
- Cantika, F., & Ilhami, A. (2025). Pengaruh Media Puzzle Bergambar terhadap Kecerdasan Emosional Anak Usia 5-6 Tahun di Tk B Tunas Muda Lahat. *Jurnal Pendidikan Dan Pembelajaran Indonesia (JPPI)*, 5(1), 530–539. <https://doi.org/10.53299/jppi.v5i1.1478>
- Defi, R. A., Abidin, Z., & Susilaningsih. (2021). Pengembangan Media Puzzle Game Materi Gaya Untuk Kelas IV Sekolah Dasar. *JKTP: Jurnal Kajian Teknologi Pendidikan*, 4(4), 329–338. <https://doi.org/10.17977/um038v4i42021p329>
- Firdaus, A. N., & Paksi, H. P. (2026). Jurnal Penelitian Pendidikan Guru Sekolah Dasar. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar*, 14(1), 30–43.
- Hadi, S., Sa'diyah, L., Yani, J., & Wulandari, A. M. (2025). Rekayasa Jean Piaget: Teori Perkembangan Kognitif dalam Konsepsi Anak di Usia Sekolah Dasar. *Jurnal Pendidikan Riset & Konseptual*, 9(1), 158–168. [https://doi.org/10.28926/riset\\_konseptual.v9i1.1139](https://doi.org/10.28926/riset_konseptual.v9i1.1139)
- Hasfaraini, A. R., & Kusumawati. (2026). Development of a Snakes and Ladders Game Media to Enhance Social Skills and Emotional Regulation in Early Childhood. *Paudia Jurnal Penelitian Dalam Bidang Pendidikan Anak Usia Dini*, 15(2), 413–423. <https://doi.org/10.26877/paudia.v15i2.3229>
- Ibda, F. (2015). Perkembangan Kognitif: Teori Jean Piaget. *Intelektualita: Journal of Education Sciences and Teacher Training*. <https://doi.org/10.22373/ji.v3i1.197>
- Indriani, I., & Suriani, A. (2024). EFEKTIVITAS MEDIA PUZZLE MATEMATIKA TERHADAP PEMAHAMAN KONSEP PENJUMLAHAN SISWA KELAS 2 SD. *Central Publisher*, 2(5), 2064. <https://doi.org/10.60145/jcp.v2i5.446>
- Lailia, N. (2019). PENGEMBANGAN PERMAINAN QUESTION CARD SEBAGAI MEDIA PEMBELAJARAN UNTUK MENINGKATKAN BERPIKIR KRITIS SISWA. *Jurnal Ekonomi Dan Pendidikan*, 16(2), 61–68. <https://doi.org/10.21831/jep.v16i2.28237>
- Luthfiyah, A., Subkhan, M., & Susi. (2025). Pengembangan Media Puzzle Berbasis Make a Match untuk Meningkatkan Motivasi dan Hasil Belajar Siswa pada Materi Simbol dan Lambang Negara. *Jurnal Citizenship Virtues*, 5(2), 199–207. <https://doi.org/10.37640/jcv.v5i2.2486>

- Marinda, L. (2020). TEORI PERKEMBANGAN KOGNITIF JEAN PIAGET DAN PROBLEMATIKANYA PADA ANAK USIA SEKOLAH DASAR. *An Nisa:Jurnal Kajian Perempuan & Keislaman*, 116–152. <https://doi.org/10.35719/annisa.v13i1.26>
- Nadia, N., Zayyadi. Moh, Sari, F. N., & Hasanah, S. I. (2025). PENGEMBANGAN MEDIA PEMBELAJARAN SCRATCH BERBASIS ETNOMATEMATIKA UNTUK MENINGKATKAN KEMAMPUAN COMPUTATIONAL THINKING SISWA. *JiIP - Jurnal Ilmiah Ilmu Pendidikan*, 11(2), 126. <https://doi.org/10.54371/jiip.v8i6.8075>
- Piaget, J. (2001). *The Psychology of Intelligence*. In *Routledge* (Cetak Ulan). Routledge.
- Pratiwi, L. A., Nikmah, K., & Sholikhin, A. (2026). IMPLEMENTASI KURIKULUM MERDEKA BERBASIS PBL DALAM MENINGKATKAN BERPIKIR KRITIS PADA PESERTA DIDIK DI SDN MOJODADI. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, 11(2), 289-. <https://doi.org/10.66045/alqurtas.v9i28.1843>
- Putri, R. K., Anggraeni, R., Salsabila, S., Bela, Y. D., & Fajrudin, L. (2025). Pengaruh Lembar Kerja Peserta Didik (Lkpd) Puzzle Matematika Terhadap Keaktifan Belajar Peserta Didik Kelas II Sekolah Dasar. *Journal of Professional Elementary Education*, 4(2), 173–181. <https://doi.org/10.46306/jpee.v4i2> p-ISSN: 2828-5751 e-ISSN: 2828-5743 Vol.
- Putri, R. S., & Firman, D. (2024). Pengembangan Media Pembelajaran Interaktif Menggunakan Puzzle Untuk Meningkatkan Hasil Belajar Peserta Didik Di Kelas IV Sekolah Dasar. *Jurnal Komunikasi Dan Media Pendidikan*, 2(4), 2024. <https://doi.org/10.61292/cognoscere.247> Pengembangan
- Rahayu, R. K., Saputro, B. A., & Untari, M. F. A. (2025). Pengembangan Media Puzzle Bangun Datar Untuk. *Jurnal Ilmiah Pendidikan Dasar*, 10(September), 319–334. <https://doi.org/10.23969/jp.v10i03.32489>
- Rahmadani, E., Syafitri, E., Anim, & Sirait, S. (2024). Penerapan Pembelajaran Menggunakan Media Puzzle Math Untuk Meningkatkan Keterampilan Motorik Siswa. *Jurnal Pendidikan Matematika*, 5(1), 1–8. <https://doi.org/10.24127/emteka.v5i1.5247>
- Safitri, I., & Wicaksono, D. (2026). Pengembangan Media Puzzle Mencari Kata untuk Kemampuan Berpikir Kritis pada Pelajaran IPA Kelas 5. *Jurnal Pendidikan Dirgantara Volume.*, 3(3), 45–57. <https://doi.org/10.61132/jupendir.v3i3.1244>