

## The Development of Fanzzle (Fauna Puzzle) Learning Media to Enhance Early Childhood Focus

Neuneu Nur Alam, Nita Priyanti, Chandra Apriyansyah

Program Studi Magister Pendidikan Anak Usia Dini, FKIP, Universitas Panca Sakti Bekasi

### ABSTRACT

Focus is a fundamental cognitive ability that underlies successful learning in early childhood. This study aims to: (1) develop the FANZZLE learning media suitable for improving the focus of children aged 5–6 years; (2) examine the feasibility of the FANZZLE learning media based on expert validation; and (3) test the effectiveness of the media in enhancing children's focus. This research employed a Research and Development (R&D) method using the 4D development model (Define, Design, Develop, Disseminate). The research subjects consisted of 29 children aged 5–6 years at TKIT Ar'rosyid, divided into two groups: B1 (14 children) and B2 (15 children). Research instruments included a needs analysis interview guide, expert validation sheets, and observation sheets measuring children's focus through four indicators: engagement duration, engagement intensity, resistance to distraction, and attentional flexibility. Data were analyzed using qualitative descriptive analysis for needs assessment, feasibility percentage analysis for expert validation, and N-Gain analysis to measure effectiveness. The results showed that the FANZZLE media was categorized as "highly feasible" with an average validation score of 93.33%. The media also proved effective in improving children's focus, indicated by an increase in the mean score from 7.76 (pretest) to 12.62 (posttest) with an N-Gain score of 0.595 (moderate–high category). These findings indicate that FANZZLE learning media is both feasible and effective for improving the focus of children aged 5–6 years in early childhood education.

**Keywords:** Learning Media, FANZZLE, Children's Focus, Early Childhood (5–6 Years), 4D Development Model

#### Corresponding author

**Name:** Neuneu Nur Alam

**Email:** [neuneunuralam01@gmail.com](mailto:neuneunuralam01@gmail.com)

### INTRODUCTION

Early childhood education plays a crucial role in shaping children's cognitive, social, and emotional development. During the early years, children experience rapid brain development that significantly influences their readiness for future learning. One of the most essential cognitive abilities during this developmental stage is the capacity to maintain focus or sustained attention. Sustained attention enables children to process information, complete tasks, and engage meaningfully with learning activities. Without sufficient focus,

children may struggle to follow instructions, participate in structured activities, and develop foundational academic skills necessary for later educational success (Ginnell et al., 2021; Geronimi et al., 2020).

In recent years, maintaining children's attention during learning activities has become increasingly challenging. Rapid technological advancement and the growing exposure of young children to digital media have significantly affected attention patterns. Several studies have reported that excessive screen exposure and passive media consumption can reduce children's attention span and self-regulation abilities. This phenomenon is particularly concerning in early childhood settings, where attention development should be stimulated through interactive and meaningful experiences (Christakis, 2019; Sigman, 2017). Children who frequently interact with digital devices often display shorter engagement durations and greater susceptibility to distractions during classroom activities (Baroroh et al., 2022).

The issue of limited attention span is also evident in early childhood education institutions in Indonesia. Many teachers report that children tend to lose focus quickly, especially when learning activities rely on conventional teaching methods that are repetitive or lack interactive elements. Observations conducted in early childhood classrooms indicate that children often become distracted, shift between activities, or show limited persistence when completing tasks. Such behaviors suggest that learning environments need to provide more stimulating and engaging media that can support children's concentration and active participation (Raihan et al., 2020).

Learning media plays an important role in supporting children's cognitive engagement and focus. Effective learning media should be developmentally appropriate, visually appealing, and capable of encouraging active participation. Educational games and puzzle-based activities are widely recognized as tools that can stimulate children's attention and problem-solving skills. Puzzle games encourage children to observe patterns, recognize shapes, and maintain focus while completing tasks. In addition, puzzle activities stimulate cognitive processes such as visual-spatial reasoning, persistence, and goal-directed behavior (Hirsh-Pasek et al., 2015; Zosh et al., 2017).

Previous studies have highlighted the positive impact of puzzle-based learning media on children's cognitive development. Puzzle activities have been shown to improve problem-solving skills, logical thinking, and fine motor coordination. They also encourage sustained engagement because children must concentrate to match shapes, patterns, or images correctly. However, most existing educational puzzles focus primarily on general cognitive development or motor skills, while fewer studies specifically examine their role in improving children's focus or attention span (Fisher et al., 2018).

Furthermore, many puzzle-based learning tools used in early childhood education are still limited in terms of instructional design and developmental progression. Some puzzles do not provide gradual levels of difficulty or structured guidance that can support children's attention development. As a result, children may either lose interest quickly if the activity is too easy or feel frustrated if the task is too difficult. Therefore, there is a need to design learning media that combines attractive visual elements, structured difficulty levels,

and engaging learning experiences that can sustain children's attention over time (Plass et al., 2020).

Based on these considerations, the development of innovative learning media becomes essential in supporting children's focus during learning activities. One potential approach is the use of FANZZLE (Fauna Puzzle) learning media. FANZZLE is designed as an interactive puzzle game featuring colorful tetromino-based pieces and fauna-themed visual elements. The media integrates structured levels of difficulty and engaging visual design to encourage children to stay focused while solving puzzle challenges. Through playful interaction and problem-solving activities, FANZZLE aims to stimulate children's sustained attention and cognitive engagement during the learning process.

Despite the growing interest in game-based learning for early childhood education, research examining the development and effectiveness of puzzle-based media specifically designed to improve children's focus remains limited. Most previous studies focus on cognitive skills in general rather than directly measuring attention indicators such as engagement duration, intensity of involvement, resistance to distraction, and attentional flexibility. This gap indicates the need for systematic research that develops and evaluates learning media capable of improving children's focus through structured educational play.

Therefore, this study aims to develop and evaluate the FANZZLE learning media as an educational tool for improving focus among children aged 5–6 years. Specifically, the objectives of this study are: (1) to develop FANZZLE learning media using the 4D development model (Define, Design, Develop, Disseminate); (2) to determine the feasibility of the developed media based on expert validation; and (3) to examine the effectiveness of FANZZLE in improving children's focus during learning activities.

The contribution of this research lies in several aspects. First, this study provides a systematic development of puzzle-based learning media designed specifically to enhance children's focus in early childhood education. Second, the research introduces an attention-based evaluation framework that measures children's focus through multiple indicators of engagement and distraction resistance. Third, the findings offer practical implications for teachers and educators by providing an innovative and developmentally appropriate learning media that can support children's concentration during classroom activities. Ultimately, this study contributes to the growing body of research on play-based learning and cognitive development in early childhood education.

## **METHOD**

### **Research Design**

This study employed a Research and Development (R&D) approach to develop and evaluate a learning media called FANZZLE (Fauna Puzzle) aimed at improving the focus of children aged 5–6 years. The development process followed the 4D model, which consists of four stages: Define, Design, Develop, and Disseminate. The Define stage involved identifying learning problems and analyzing the needs of teachers and students in early childhood classrooms. The Design stage focused on planning the structure, visual elements, and levels of difficulty of the FANZZLE learning media. The Develop stage involved producing

the prototype, conducting expert validation, and implementing limited trials to evaluate the feasibility and effectiveness of the media. Finally, the Disseminate stage aimed to introduce the developed media for broader educational use.

### **Subjects / Population and Sample**

The subjects of this study were 29 children aged 5–6 years enrolled at TKIT Ar'rosyiid. The participants were divided into two groups: Group B1, consisting of 14 children, and Group B2, consisting of 15 children. These groups were selected to conduct limited trials of the developed learning media and to evaluate its effectiveness in improving children's focus during learning activities. The selection of participants was based on their age group and their enrollment in the kindergarten classes that correspond to the targeted developmental stage.

### **Data Collection Procedure**

Data collection was carried out through several techniques to support the development and evaluation of the FANZZLE learning media.

First, needs analysis interviews were conducted with teachers to identify learning challenges related to children's focus and to gather information about existing learning media used in the classroom. This stage helped determine the design requirements for the FANZZLE media.

Second, expert validation was conducted to assess the feasibility of the developed media. Validation involved experts in educational media and early childhood learning materials who evaluated the product using structured validation sheets. The assessment focused on aspects such as content suitability, visual design, usability, and educational relevance.

Third, observations were conducted during the implementation of the FANZZLE learning media in classroom activities. Observation sheets were used to measure children's focus based on four indicators:

- (1) duration of engagement,
- (2) intensity of involvement,
- (3) resistance to distraction, and
- (4) attentional flexibility.

Pretest and posttest observations were carried out to compare children's focus levels before and after the use of the FANZZLE learning media.

### **Data Analysis**

The collected data were analyzed using several analytical techniques. Qualitative descriptive analysis was used to interpret the results of the needs analysis interviews and to identify the characteristics required for the development of the learning media.

The feasibility of the FANZZLE media was analyzed using percentage-based validation analysis derived from expert evaluation scores. The results were then categorized into feasibility levels such as very feasible, feasible, fairly feasible, or not feasible.

To evaluate the effectiveness of the developed media in improving children's focus, the study employed the Normalized Gain (N-Gain) analysis. The N-Gain score was calculated based on the difference between pretest and posttest scores to determine the magnitude of improvement in children's focus after using the FANZZLE learning media. The resulting N-Gain values were interpreted using standard categories, namely low, moderate, and high improvement levels.

## **FINDING AND DISCUSSION**

### **Research Results**

#### **Needs Analysis Results**

The needs analysis was conducted through interviews with four teachers of Group B at TKIT Ar'rosyiid who had at least two years of teaching experience. The interviews aimed to identify classroom conditions related to children's focus and the learning media currently used.

The results indicated that teachers frequently encountered difficulties in maintaining children's focus during learning activities. Several children tended to shift their attention quickly, become distracted by surrounding stimuli, or discontinue tasks before completion. Teachers also reported that the available learning media were mostly conventional and did not provide sufficient interactive engagement to sustain children's attention. Table 1 presents the summary of findings from the needs analysis interviews.

**Table 1. Summary of Needs Analysis Results**

<b>Aspect</b>	<b>Findings</b>
<b>Children's attention span</b>	Many children showed short engagement duration during learning activities
<b>Learning media used</b>	Mostly conventional teaching aids and worksheets
<b>Learning challenges</b>	Children easily distracted and frequently switch activities
<b>Teacher expectations</b>	Interactive media that encourages sustained engagement and provides immediate feedback

#### **Development of FANZZLE Learning Media**

Based on the needs analysis conducted in the Define stage, the initial prototype (Model Draft 1) of the FANZZLE learning media was designed during the Design stage of the 4D development model.

FANZZLE was developed as a puzzle-based educational game adapted from the concept of tetromino block arrangements. The learning media integrates fauna-themed visual elements and structured levels of difficulty suitable for children aged 5–6 years. Table 2 presents the design characteristics of the FANZZLE learning media.

**Table 2. Design Characteristics of FANZZLE Learning Media**

<b>Component</b>	<b>Specification</b>
<b>Board size</b>	30 × 40 cm
<b>Number of pieces</b>	40 puzzle pieces
<b>Shape types</b>	Seven tetromino shapes
<b>Color design</b>	Seven bright colors
<b>Difficulty levels</b>	Four progressive levels
<b>Learning theme</b>	Fauna-based visual representation
<b>Supporting materials</b>	User guide and activity instructions

### **Expert Validation Results**

Expert validation was conducted to assess the feasibility of the developed learning media. The validation involved two material experts and one media expert.

### **Material Expert Validation**

Material validation was conducted by two experts. The evaluation covered five aspects: learning objectives alignment, content suitability, learning support, clarity of instructions, and educational relevance.

**Table 3. Material Expert Validation Results**

<b>Validator</b>	<b>Maximum Score</b>	<b>Obtained Score</b>	<b>Feasibility (%)</b>
<b>Material Expert 1</b>	80	75	93.75%
<b>Material Expert 2</b>	80	75	93.75%
<b>Average</b>	80	75	93.75%

### **Media Expert Validation**

Media validation was conducted by a media expert who evaluated the product based on visual design, technical quality, safety, practicality, and durability.

**Table 4. Media Expert Validation Results**

<b>Validator</b>	<b>Maximum Score</b>	<b>Obtained Score</b>	<b>Feasibility (%)</b>
<b>Media Expert</b>	80	74	92.50%

### **Overall Expert Validation**

The results from all validators were compiled to determine the overall feasibility level of the FANZZLE learning media.

**Table 5. Recapitulation of Expert Validation Results**

Validation Type	Feasibility Percentage
Material Expert Validation	93.75%
Media Expert Validation	92.50%
Average Feasibility Score	93.33%

### Effectiveness Test Results

The effectiveness of the FANZZLE learning media was tested through a limited trial involving 29 children aged 5–6 years at TKIT Ar'rosyid. The participants were divided into two groups:

- Group B1: 14 children
- Group B2: 15 children

Children's focus was measured using observation sheets before (pretest) and after (posttest) the implementation of FANZZLE learning media.

### Pretest and Posttest Results

Table 6 presents the average scores of children's focus before and after the use of the FANZZLE learning media.

**Table 6. Pretest and Posttest Results**

Group	Number of Children	Average Pretest Score	Average Posttest Score	Score Increase
B1	14	7.79	12.64	4.85
B2	15	7.73	12.60	4.87
Combined Average	29	7.76	12.62	4.86

The combined results from both groups indicate an increase of 4.86 points between the pretest and posttest scores.

### N-Gain Analysis

The improvement in children's focus was further measured using the Normalized Gain (N-Gain) calculation.

**Table 7. N-Gain Analysis Results**

Indicator	Value
Average Pretest Score	7.76
Average Posttest Score	12.62
Score Increase	4.86
Percentage Increase	64.66%
N-Gain Score	0.595

The similarity of results between Group B1 and Group B2 shows consistent patterns in the pretest scores, posttest scores, and score increases across both groups.

## **DISCUSSION**

### **Interpretation of Findings**

The results of this study indicate that the FANZZLE learning media is both feasible and effective for improving the focus of children aged 5–6 years. The expert validation results showed a high feasibility level, with an average score of 93.33%, indicating that the media meets the criteria for educational suitability, visual design quality, and usability in early childhood learning environments. These results demonstrate that the design elements of FANZZLE, including colorful puzzle pieces, fauna-themed visuals, and progressive levels of difficulty, are appropriate for stimulating children's attention and engagement during learning activities.

The effectiveness test further revealed an increase in children's focus scores from the pretest average of 7.76 to the posttest average of 12.62. The calculated N-Gain value of 0.595 indicates a moderate to high level of improvement. These findings suggest that puzzle-based learning activities can encourage children to sustain their attention for longer periods while completing tasks. The structured challenge provided by puzzle-solving activities appears to promote active cognitive engagement and persistence among children during learning tasks.

Additionally, the consistent improvement observed across both trial groups indicates that the FANZZLE learning media can produce stable outcomes in different classroom settings. The similarity of results between Group B1 and Group B2 suggests that the improvement in children's focus is not limited to a specific group but may be applicable to broader early childhood learning contexts.

### **Relationship to Previous Literature**

The findings of this study align with previous research emphasizing the importance of interactive learning media in supporting children's attention and cognitive engagement. Puzzle-based learning activities have been widely recognized as effective tools for stimulating children's problem-solving abilities, visual-spatial reasoning, and persistence in completing tasks (Hirsh-Pasek et al., 2015). Such activities encourage children to concentrate on solving problems while maintaining sustained attention during the learning process.

Similarly, Fisher et al. (2018) reported that educational puzzles can support cognitive development by encouraging children to observe patterns, recognize shapes, and maintain task-oriented engagement. These activities require children to focus on completing a structured goal, which indirectly supports the development of sustained attention.

The present study also supports the perspective that play-based learning approaches can effectively enhance children's learning engagement. Zosh et al. (2017) argue that guided play and interactive learning tools can improve children's attention and

participation by providing meaningful learning experiences that combine play and cognitive challenges. The FANZZLE learning media incorporates these principles by integrating puzzle challenges with colorful visual elements and structured difficulty levels, which may help sustain children's interest and attention.

Furthermore, the findings reinforce the view that developmentally appropriate learning media can play an essential role in addressing attention-related challenges among young children. As noted by Plass et al. (2020), well-designed educational media can enhance motivation, engagement, and cognitive focus when they combine visual appeal, appropriate levels of challenge, and interactive elements.

### **Limitations of the Study**

Despite the positive findings, several limitations should be acknowledged. First, the study involved a relatively small sample consisting of 29 children from a single early childhood education institution. This limited sample size may restrict the generalizability of the findings to broader populations or different educational contexts.

Second, the effectiveness test was conducted within a limited time frame during classroom implementation. As a result, the study focused primarily on short-term improvements in children's focus rather than long-term developmental outcomes. Longer observation periods may provide a more comprehensive understanding of the sustained impact of puzzle-based learning media on children's attention development.

Third, the measurement of children's focus relied on observational assessment using predefined indicators. Although observation is a common method in early childhood research, subjective interpretation by observers may influence the evaluation results. Future studies may incorporate additional measurement methods, such as behavioral tracking or experimental attention tasks, to strengthen the reliability of the findings.

### **Implications**

The results of this study provide several implications for both educational practice and future research. For early childhood educators, the findings suggest that interactive and puzzle-based learning media such as FANZZLE can serve as effective tools for supporting children's focus during classroom activities. Teachers may integrate similar game-based learning approaches to create engaging and stimulating learning environments that encourage sustained attention.

For educational media developers, the study highlights the importance of designing learning tools that incorporate visual attractiveness, progressive levels of difficulty, and interactive problem-solving elements. Such features may help maintain children's interest and promote deeper cognitive engagement during learning activities.

In terms of research implications, future studies may explore the effectiveness of FANZZLE learning media with larger and more diverse samples across multiple educational institutions. Researchers may also examine the long-term effects of puzzle-based learning media on children's cognitive development, attention regulation, and academic readiness.

Additionally, further studies may compare FANZZLE with other types of educational media to determine its relative effectiveness in improving children's focus.

## CONCLUSION

This study aimed to develop and evaluate the effectiveness of the FANZZLE (Fauna Puzzle) learning media in improving the focus of children aged 5–6 years. The research employed a Research and Development (R&D) approach using the 4D development model, which includes the stages of Define, Design, Develop, and Disseminate. Based on the needs analysis conducted with early childhood teachers, it was identified that children often experienced difficulties in maintaining focus during classroom activities, and the available learning media were generally limited in interactivity and engagement.

The results of the development process produced a puzzle-based learning media with specific characteristics, including a 30 × 40 cm puzzle board, 40 puzzle pieces consisting of seven tetromino shapes, seven bright colors, four progressive difficulty levels, and a complete user guide. The developed FANZZLE media integrates fauna-themed visual elements designed to encourage children's engagement and sustained attention during learning activities.

The feasibility evaluation conducted through expert validation showed that the FANZZLE learning media achieved a very high feasibility level with an average score of 93.33%, consisting of 93.75% from material experts and 92.50% from media experts. These results indicate that the developed media meets the criteria of educational relevance, visual design quality, and practical usability for early childhood learning.

The effectiveness test conducted with 29 children aged 5–6 years demonstrated a significant improvement in children's focus. The average focus score increased from 7.76 in the pretest to 12.62 in the posttest, with an N-Gain score of 0.595, categorized as moderate to high improvement. These findings indicate that the FANZZLE learning media is effective in enhancing children's focus during learning activities.

Overall, the results of this study suggest that the FANZZLE learning media is both feasible and effective as an educational tool to support the development of children's focus in early childhood education settings.

## REFERENCES

- Angraeni, D., & Mahmud, B. (2021). Peningkatan perkembangan kognitif dalam mengenal angka melalui media puzzle di taman kanak-kanak. *Tematik: Jurnal Pemikiran dan Penelitian Pendidikan Anak Usia Dini*. <https://doi.org/10.26858/tematik.v5i1.19712>
- Apriliyanto, A., Astuti, W. T., & Nurhayati, L. (2021). Literature review: Penerapan terapi bermain puzzle terhadap kecemasan pada anak prasekolah akibat hospitalisasi. *Jurnal Keperawatan Karya Bhakti*. <https://doi.org/10.56186/jkbb.96>
- Bahri, S. S. S. (2021). *Pengaruh permainan puzzle terhadap kemampuan visual spasial anak kelompok B RA Al-Furqan di Kabupaten Gowa*. Universitas Muhammadiyah Makassar.

- Barkley, R. A., & Wasserstein, J. (2000). ADHD and the nature of self-control. *Journal of Cognitive Psychotherapy*, 14(1), 111–120. <https://doi.org/10.1891/0889-8391.14.1.111>
- Baroroh, E., Faizah, A., & Zahratul Awwaliyah, D. (2022). Pengaruh permainan tradisional terhadap interaksi sosial anak. *Jurnal Ilmu Sosial Humaniora Indonesia*. <https://doi.org/10.52436/1.jishi.39>
- Berk, L. E. (2002). *Infants and children: Prenatal through middle childhood*. Allyn & Bacon.
- Christakis, D. A. (2019). The challenges of defining and studying “digital addiction” in children. *JAMA – Journal of the American Medical Association*. <https://doi.org/10.1001/jama.2019.4690>
- Crawford, M. (2020). Ecological systems theory: Exploring the development of the theoretical framework as conceived by Bronfenbrenner. *Journal of Public Health Issues and Practices*. <https://doi.org/10.33790/jphip1100170>
- Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*. <https://doi.org/10.1126/science.1204529>
- Gaertner, B. M., Spinrad, T. L., & Eisenberg, N. (2008). Focused attention in toddlers: Measurement, stability, and relations to negative emotion and parenting. *Infant and Child Development*. <https://doi.org/10.1002/icd.580>
- Geronimi, E. M. C., Arellano, B., & Woodruff-Borden, J. (2020). Relating mindfulness and executive function in children. *Clinical Child Psychology and Psychiatry*. <https://doi.org/10.1177/1359104519833737>
- Ginnell, L., Boardman, J. P., Reynolds, R. M., & Fletcher-Watson, S. (2021). Attention profiles following preterm birth: A review of methods and findings from infancy to adulthood. *Infant and Child Development*. <https://doi.org/10.1002/icd.2255>
- Goldstein, S., & Naglieri, J. A. (2014). *Handbook of executive functioning*. Springer. <https://doi.org/10.1007/978-1-4614-8106-5>
- Hakim, A. (2017). Upaya meningkatkan kecerdasan visual spasial melalui permainan puzzle pada anak kelompok A di TK Aisyiyah Pabelan Kartasura Sukoharjo tahun ajaran 2016/2017.
- Hallam, S. (2010). The power of music: Its impact on the intellectual, social and personal development of children and young people. *International Journal of Music Education*. <https://doi.org/10.1177/0255761410370658>
- McClelland, M. M., Acock, A. C., & Morrison, F. J. (2006). The impact of kindergarten learning-related skills on academic trajectories at the end of elementary school. *Early Childhood Research Quarterly*. <https://doi.org/10.1016/j.ecresq.2006.09.003>
- Posner, M. I., & Gilbert, C. D. (1999). Attention and primary visual cortex. *Proceedings of the National Academy of Sciences of the United States of America*. <https://doi.org/10.1073/pnas.96.6.2585>
- Prasetyoningrom, W., Sutijan, & Shaifuddin, M. (2015). *Meningkatkan kecerdasan visual spasial pada tema pekerjaan melalui media puzzle gambar*. Universitas Sebelas Maret.

- Putri, R. F. A., & Adhani, D. N. (2023). Media BUBOP (Busy Book Puzzle) untuk menstimulus kemampuan visual spasial anak. *Jurnal PG-PAUD Trunojoyo: Jurnal Pendidikan dan Pembelajaran Anak Usia Dini*. <https://doi.org/10.21107/pgpaustrunojoyo.v10i2.21999>
- Rahayu Khoerunnisa, S., Muqodas, I., & Justicia, R. (2023). Pengaruh bermain puzzle terhadap perkembangan motorik halus anak usia 5–6 tahun. *Murhum: Jurnal Pendidikan Anak Usia Dini*. <https://doi.org/10.37985/murhum.v4i2.279>
- Raihan, F., Rachman, F., Gita Saputra, I., & Iqbal Afghan, M. (2020). Pengaruh tayangan kartun di TV terhadap kemampuan bersosialisasi anak. *Communications*. <https://doi.org/10.21009/communications.2.1.4>
- Riglin, L., Blakey, R., Langley, K., Thapar, A. K., Agha, S. S., Davey Smith, G., Stergiakouli, E., & Thapar, A. (2022). Assessment of age-at-onset criterion for adult attention-deficit hyperactivity disorder. *British Journal of Psychiatry*. <https://doi.org/10.1192/bjp.2021.122>
- Ruff, H. A., & Capozzoli, M. C. (2003). Development of attention and distractibility in the first four years of life. *Developmental Psychology*. <https://doi.org/10.1037/0012-1649.39.5.877>
- Ruff, H. A., & Rothbart, M. K. (2010). *Attention in early development: Themes and variations*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195136326.001.0001>
- Sagar, A. D., & Najam, A. (1998). The human development index: A critical review. *Ecological Economics*. [https://doi.org/10.1016/S0921-8009\(97\)00168-7](https://doi.org/10.1016/S0921-8009(97)00168-7)
- Santrock, J. W. (2007). *Child development*. McGraw-Hill.
- Sigman, A. (2017). Screen dependency disorders: A new challenge for child neurology. *Journal of the International Child Neurology Association*. <https://doi.org/10.17724/jicna.2017.119>
- Suryani, L., Kandarisah, I., et al. (2025). A mixed-methods development study of teak wood thematic puzzle media to enhance storytelling skills of 4–5 year old children in early childhood learning settings. *Jurnal Konseling dan Pendidikan*, 13(3). <https://doi.org/10.29210/1163600>
- Suryani, L., Elida, H., Harlina, Apriani, D., Yeny, Y., & Asti, D. (2023). *Media pembelajaran digital untuk anak usia dini*. Deepublish.
- Yudha, R. P., & Hetharia, T. S. (2025). Analysis of the validity of the instrument for early childhood numeracy literacy assessment. *Journal of Scientific Research, Education, and Technology (JSRET)*, 4(137), 368–377.