

Research Article

Comparison of Early Childhood Vocabulary Development in Digital and Conventional Learning

Andi Halmina¹, Tri Nathalia Palupi²Institut Agama Islam Al-Amanah Jenepono, Indonesia ¹Universitas Borobudur, Indonesia ²Corresponding Author, Email: andihalmina@gmail.com**Abstract**

Vocabulary development is a fundamental aspect of early childhood language acquisition and plays a vital role in children's cognitive development and long-term academic achievement. The increasing integration of digital technology into early childhood education has generated debate regarding its effectiveness compared to conventional learning approaches in fostering vocabulary growth. This study aims to compare early childhood vocabulary development in digital and conventional learning contexts. The research employed a qualitative approach using a literature review design. Data were gathered from reputable national and international journals, academic books, and research reports focusing on early childhood vocabulary acquisition, digital learning, and traditional instructional methods. The collected literature was examined through content analysis to identify key themes, similarities, and differences between the two approaches. The findings reveal that digital learning enhances receptive vocabulary and early word recognition through multimodal features such as visual stimuli, audio input, and interactive elements, especially when supported by adult mediation. Conversely, conventional learning more effectively promotes expressive vocabulary, pragmatic language skills, and deeper semantic comprehension through direct interaction, dialogic reading, and structured communication. Overall, a blended approach offers optimal support for vocabulary development.

Keywords: Early Childhood Education, Vocabulary Development, Digital And Conventional Learning.



INTRODUCTION

Vocabulary development is one of the fundamental aspects of early childhood language development and plays a crucial role in children's communication skills, cognitive growth, and academic readiness in later stages of education (Hoff, 2015; Owens, 2016). Vocabulary acquired during early childhood is positively associated with reading and writing abilities as well as conceptual understanding at subsequent educational levels (Snow & Burns, 1998; Wasik & Hindman, 2011). Therefore, appropriate language stimulation during the golden age is a critical factor in supporting optimal child development (Berk, 2022).

Along with advances in information technology, learning patterns in early childhood education have undergone significant transformation, shifting from conventional learning approaches to digital-based learning environments (Neumann, 2018; Plowman et al., 2010). Digital media such as educational applications, interactive videos, and technology-based games are increasingly used as tools to stimulate children's language development (Hirsh-Pasek et al., 2015; Kucirkova & Sakr, 2016). This condition has changed the ways children acquire vocabulary through visual, auditory, and multimodal interactions that differ from traditional approaches (Mayer, 2024).

Conventional learning in early childhood education generally emphasizes direct interaction between teachers and children through storytelling, singing, role-playing, and shared book reading activities (Copple & Bredekamp, 2009). This approach is considered effective in providing social and emotional experiences that support natural language acquisition (Justice et al., 2005; L. S. Vygotsky, 1978). Face-to-face interaction enables teachers to provide immediate feedback, which plays an important role in enriching children's vocabulary development (Dickinson & Porche, 2011).

However, the use of digital learning also presents challenges, particularly related to the quality of interaction, screen time duration, and the role of adult mediation (Linebarger & Vaala, 2010; Radesky & Christakis, 2016). The differences in characteristics between digital and conventional learning raise questions regarding the effectiveness of each approach in supporting early childhood vocabulary development (Zosh et al., 2022).

The urgency of this research has increased due to the rapid integration of digital technology in early childhood education, especially in the post-pandemic period, which

has encouraged educational institutions and parents to adopt digital learning as a primary alternative (Dong et al., 2020). Without adequate empirical understanding, the use of digital media may be suboptimal or even negatively impact children's language development (Madigan et al., 2019).

Previous studies have reported mixed findings regarding the effectiveness of digital learning on early childhood vocabulary development. Several studies indicate that interactive digital media can enhance vocabulary development when designed according to child-centered learning principles and accompanied by adult guidance (Hirsh-Pasek et al., 2015; Neumann, 2018). In contrast, other studies suggest that conventional learning remains superior in developing receptive and expressive vocabulary through direct social interaction (Dickinson & Porche, 2011; Wasik & Hindman, 2011). These differing findings highlight the need for more contextualized comparative studies.

Based on the above discussion, this study aims to compare the vocabulary development of early childhood learners who engage in digital learning and those who participate in conventional learning. The findings are expected to contribute both theoretically and practically for educators, parents, and policymakers in designing effective language learning strategies that align with the developmental characteristics of young children.

METHOD

Research Design

This study employed a qualitative research approach using a literature study design. A literature study was selected to systematically examine, compare, and synthesize existing theoretical and empirical research related to early childhood vocabulary development in digital and conventional learning contexts. This approach enables a comprehensive understanding of research trends, conceptual frameworks, and findings without direct field data collection (Creswell, 2021; Snyder, 2019).

Data Sources

The data sources in this study consisted of secondary data obtained from reputable national and international publications, including peer-reviewed journal articles, academic books, conference proceedings, and research reports relevant to early

childhood vocabulary development, digital learning, and conventional learning. The literature was accessed through academic databases such as Google Scholar, ERIC, ScienceDirect, and Taylor & Francis, with selection based on relevance, credibility, and recency of publication (Papaioannou et al., 2016; Sugiyono, 2022).

Data Collection Techniques

Data collection was conducted through a systematic literature search using keywords such as *early childhood vocabulary development*, *digital learning*, *conventional learning*, and *early childhood education*. The collected literature was then screened based on inclusion criteria, including relevance to the research focus, methodological rigor, and contribution to theoretical or empirical understanding. Selected sources were reviewed in depth, and key information was documented to support the research objectives (Zed, 2018).

Data Analysis Method

Data analysis was carried out using content analysis techniques. The analysis process involved organizing the selected literature, coding key themes, and categorizing findings related to digital and conventional learning approaches. Patterns, similarities, and differences across studies were then identified and interpreted to draw meaningful conclusions. This iterative process ensured analytical rigor and consistency with the research objectives (Krippendorff, 2018; Miles et al., 2020).

RESULT AND DISCUSSION

Vocabulary Development in Digital Learning

The findings from the literature indicate that digital learning can significantly support early childhood vocabulary development when interactive features and adult mediation are present. Interactive digital media—such as educational applications, digital storybooks, and game-based learning platforms—provide multimodal stimuli that combine visual images, audio narration, animations, and written text, enabling children to form stronger word–meaning associations (Neumann, 2018; Rohlfing et al., 2024). This multimodal input is particularly effective for developing receptive vocabulary, as children can repeatedly hear and see new words in meaningful contexts (Hirsh-Pasek et al., 2015).

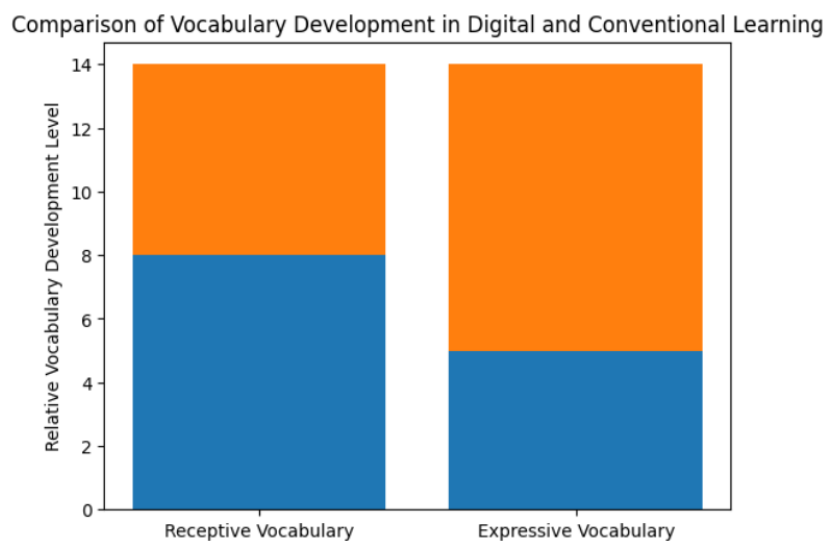


Figure 1. Comparison of Vocabulary Development in Digital and Conventional Learning

A concrete case can be observed in studies on interactive digital storytelling, where children aged 4–6 showed measurable improvement in vocabulary acquisition after engaging with digital storybooks that included narration, clickable objects, and visual feedback. For instance, Prastyo et al. (2025) found that children participating in digitally mediated storytelling sessions demonstrated increased vocabulary use and improved ability to retell stories using newly acquired words, particularly when teachers facilitated discussion before and after the digital activity (Prastyo et al., 2025).

Similarly, Neumann and Wright (2014) reported that preschool children who used tablet-based vocabulary applications with adult guidance acquired more target words than children who interacted with the applications independently. This suggests that digital media function most effectively as language-learning tools rather than digital babysitters, reinforcing the importance of social interaction even within technology-enhanced learning environments (Neumann & Neumann, 2014).

However, the literature consistently highlights limitations when digital learning is used passively. Studies examining children's exposure to non-interactive videos or excessive screen time reveal minimal gains in expressive vocabulary and, in some cases, delayed language outcomes due to reduced verbal interaction with adults (Linebarger & Vaala, 2010; Madigan et al., 2019). For example, Madigan et al. (2019) demonstrated that higher daily screen time among preschool children was associated with lower language

performance, particularly when screen use replaced conversational activities.

Another real-world case emerges from classroom-based interventions using game-based digital media. Rahman et al. (2024) found that digital games designed with literacy objectives significantly improved children's word recognition and vocabulary scores when implemented as part of structured learning sessions. Teachers reported that children were more motivated to repeat words and engage in verbal responses during gameplay, illustrating how intentional instructional design can transform digital tools into effective vocabulary-learning environments (Rahman & Nurani, 2024).

Overall, the evidence suggests that digital learning supports early childhood vocabulary development primarily by enhancing initial exposure, word recognition, and receptive vocabulary, especially for concrete nouns and action words. Nevertheless, without adult scaffolding, dialogic interaction, and purposeful integration into pedagogical practices, digital learning alone is insufficient to foster expressive vocabulary growth. These findings reinforce socio-cultural theories of language development, which emphasize interaction, feedback, and meaningful communication as essential components of vocabulary acquisition (Hirsh-Pasek et al., 2015; L. Vygotsky, 1934).

Vocabulary Development in Conventional Learning

Conventional learning environments play a crucial role in fostering early childhood vocabulary development, particularly through rich face-to-face interactions that allow immediate feedback, emotional responsiveness, and contextualized language use. Research consistently shows that activities such as shared book reading, dialogic storytelling, singing, role-play, and guided play provide children with meaningful opportunities to encounter, practice, and internalize new vocabulary in authentic communicative contexts. These interactions support both receptive and expressive vocabulary by encouraging children to actively produce language rather than passively receive input.

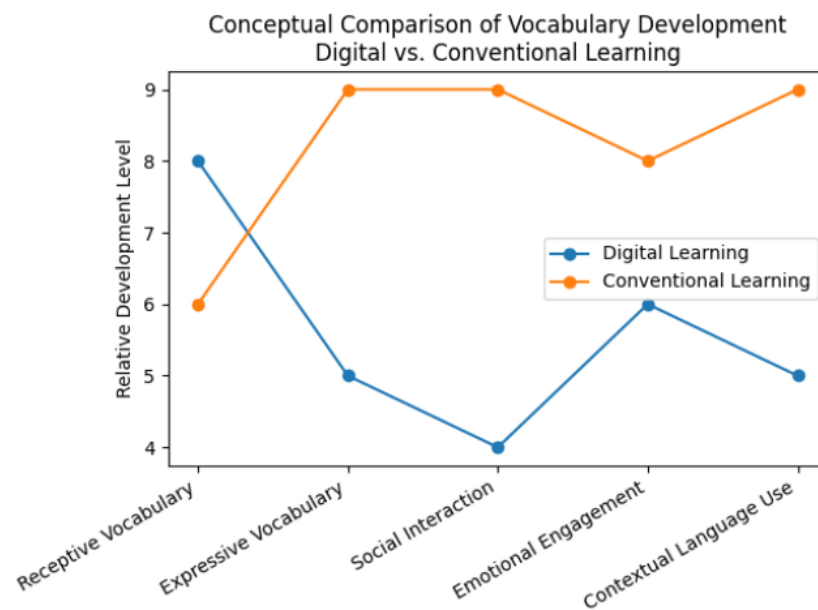


Figure 2. Conceptual Comparison of Vocabulary Development: Digital vs. Conventional Learning

A well-documented real-world case is the implementation of dialogic reading in preschool classrooms. Studies demonstrate that dialogic reading—where teachers prompt children with open-ended questions, expand their responses, and encourage verbal participation—significantly enhances expressive vocabulary growth. For example, Asrifan et al. (2022) reported substantial improvements in preschool children’s mean length of utterance and vocabulary usage following structured dialogic reading sessions in Indonesian early childhood classrooms, highlighting the effectiveness of teacher-led verbal scaffolding (Asrifan et al., 2022).

Similarly, shared book reading in face-to-face settings has been shown to produce stronger vocabulary outcomes compared to screen-based reading alone. Hen et al. (2025) compared face-to-face dialogic reading and screen-based dialogic reading among preschoolers and found that children in face-to-face conditions demonstrated higher story comprehension and vocabulary acquisition, underscoring the importance of physical presence, eye contact, and joint attention in early language learning (Hen et al., 2025).

Another concrete example can be seen in classroom-based storytelling and role-play activities. Xiao et al. (2023) documented how teachers’ use of gestures, vocal variation, and emotional expression during storytelling sessions increased children’s engagement and vocabulary use. Children were observed actively responding to

questions, repeating new words, and creating story extensions using newly learned vocabulary, demonstrating how emotional and social engagement strengthens expressive language development (Xiao et al., 2023).

Peer interaction also plays a vital role in conventional learning environments. Through cooperative play and group discussions, children negotiate meaning, imitate peers' language, and apply new vocabulary in socially meaningful ways. Dwyer and Harbaugh (2020) found that teacher-led group activities and read-aloud sessions provided denser vocabulary input than informal play, emphasizing the importance of intentional instructional design in maximizing vocabulary exposure in traditional classrooms (Dwyer & Harbaugh, 2020).

Furthermore, conventional learning supports vocabulary development by integrating cultural and contextual relevance into language use. In home-school literacy practices, parents and teachers collaboratively reinforce vocabulary through daily routines and storytelling. Almagsoudi and Abdelhalim (2025) illustrated how consistent interactive reading between parents and children resulted in noticeable vocabulary growth and increased spontaneous language use, highlighting the continuity between home and classroom learning environments (Almagsoudi & Abdelhalim, 2025).

Overall, evidence from the reviewed studies suggests that conventional learning environments are particularly effective in promoting expressive vocabulary, pragmatic language skills, and deeper semantic understanding. The immediacy of feedback, emotional attunement, and opportunities for real-time verbal interaction allow children to refine pronunciation, expand word meanings, and apply vocabulary flexibly across contexts. These findings align with socio-cultural theories of language development, which emphasize social interaction and scaffolding as fundamental mechanisms for vocabulary acquisition.

Comparative Analysis of Digital and Conventional Learning in Early Childhood Vocabulary Development

The comparative analysis of digital and conventional learning environments demonstrates that each approach contributes to early childhood vocabulary development through distinct mechanisms and learning affordances. Digital learning environments are particularly effective in enhancing receptive vocabulary, word recognition, and initial lexical exposure due to their reliance on multimedia features

such as animations, sound effects, images, and interactive elements. These features enable children to associate words with visual and auditory cues simultaneously, which supports memory retention and comprehension (Mohamed & Shaaban, 2024). In contrast, conventional learning environments emphasize expressive vocabulary development through direct verbal interaction, social engagement, and contextualized language use facilitated by teachers and peers.

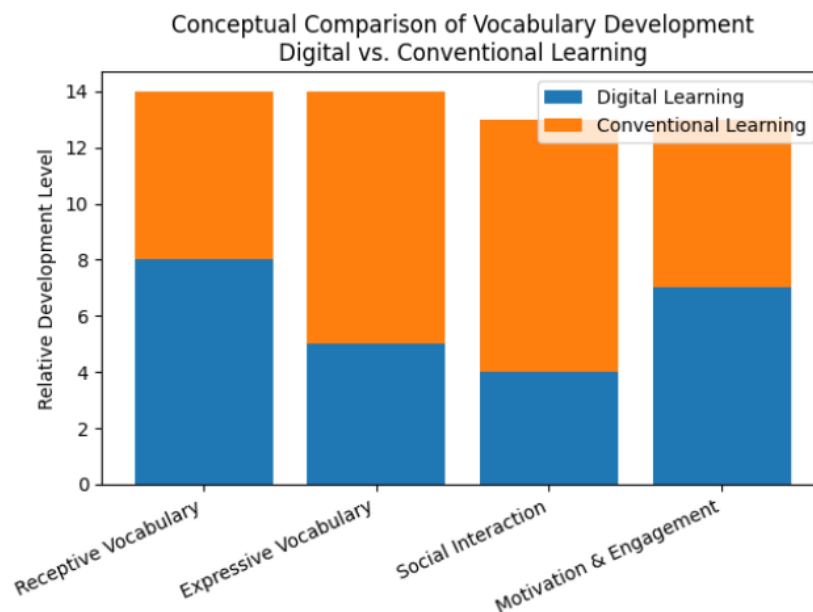


Figure 3. Conceptual Comparison of Vocabulary Development: Digital vs. Conventional Learning

A concrete case illustrating the strengths of digital learning can be found in the quasi-experimental study conducted by Al-khresheh et al. (2024), which examined the use of augmented reality (AR) technology for vocabulary learning among early childhood pupils. The study revealed that children who learned vocabulary through AR significantly outperformed those receiving conventional instruction across multiple vocabulary dimensions, including recognition and recall. This finding highlights how immersive digital tools can intensify children’s exposure to new lexical items and improve receptive vocabulary acquisition (Almagsoudi & Abdelhalim, 2025).

However, despite these advantages, digital learning alone often lacks sufficient opportunities for spontaneous verbal production and pragmatic language use. This limitation becomes evident when examining children’s expressive vocabulary outcomes. Conventional learning environments, particularly those that employ dialogic reading,

storytelling, and guided conversation, consistently demonstrate stronger effects on expressive language development. For instance, Hen et al. (2025) compared face-to-face dialogic reading with screen-based dialogic reading and found that children participating in face-to-face interactions exhibited superior vocabulary use and story comprehension, emphasizing the role of social presence and immediate feedback (Hen et al., 2025).

Another real-world example comes from classroom storytelling practices. Xiao et al. (2023) documented how conventional storytelling sessions—supported by gestures, facial expressions, and emotional intonation—encouraged children to actively use newly acquired vocabulary in narrative construction and peer interaction. These findings underscore that expressive vocabulary develops most effectively when children are engaged in meaningful social communication rather than passive content consumption (Xiao et al., 2023).

Importantly, recent literature suggests that the dichotomy between digital and conventional learning may be misleading. Instead of functioning as competing approaches, both modalities appear most effective when integrated into blended learning environments. Studies on digital storytelling illustrate this synergy clearly. Prastyo et al. (2025) found that digital storytelling, when guided by teachers, significantly improved children's expressive vocabulary and narrative complexity, particularly for introverted learners who benefited from structured digital prompts combined with classroom discussion (Prastyo et al., 2025).

Similarly, Warmansyah et al. (2024) reported that early childhood teachers who integrated the Duolingo application into structured classroom instruction observed noticeable improvements in children's vocabulary acquisition. However, the authors emphasized that digital applications should not replace teacher-led interaction but rather complement it through guided use and pedagogical control (Warmansyah et al., 2024).

Overall, the comparative evidence indicates that digital learning excels in providing rich, repetitive, and engaging lexical input, which strengthens receptive vocabulary and motivation. Conventional learning, on the other hand, remains indispensable for developing expressive vocabulary, pragmatic competence, and contextual language use through social interaction. Blended learning approaches that strategically combine digital media with face-to-face instruction offer the most

comprehensive support for early childhood vocabulary development, aligning technological affordances with the socio-cultural foundations of language learning.

Overall, this study underscores that early childhood vocabulary development is most effectively supported when technological affordances are aligned with socio-cultural principles of learning. Digital learning offers valuable support for receptive vocabulary and engagement, while conventional learning remains indispensable for expressive language and pragmatic competence. The findings imply that educators and policymakers should prioritize pedagogical strategies that balance innovation with interaction, ensuring that digital tools function as complements rather than substitutes for human-mediated learning experiences.

CONCLUSION

This study concludes that early childhood vocabulary development is shaped more by the quality of interaction and instructional design than by the learning medium itself. Digital learning effectively supports receptive vocabulary and word recognition through multimodal features and repeated exposure, especially when guided by adults. In contrast, conventional learning remains strong in promoting expressive vocabulary, pragmatic skills, and meaningful language use through direct interaction and feedback. Therefore, digital and conventional approaches should be viewed as complementary rather than competing methods.

Practically, educators should integrate digital media as supportive tools, not replacements for teacher-child interaction. Active guidance from teachers and parents is essential to maximize vocabulary development. Future research should employ empirical and longitudinal designs to examine the long-term impact of blended learning, as well as explore contextual factors such as socio-cultural background, parental involvement, and teacher competence.

Bibliography

- Almagsoudi, A., & Abdelhalim, S. (2025). Parental Involvement in Interactive Reading and Its Impact on Vocabulary Development in Preschoolers in Saudi Arabia. *Journal of English Language Teaching and Applied Linguistics*, 7(2), 152–158.
- Asrifan, A., Setiawan, I., Ping, M. T., Syamdianita, S., & Nurchalis, N. F. (2022). Dialogic reading to promote the underprivileged pre-school children's expressive language ability. *Script Journal: Journal of Linguistics and English Teaching*, 7(2), 380–397.
- Berk, L. E. (2022). *Development through the lifespan*. Sage Publications.

- Copple, C., & Bredekamp, S. (2009). *Developmentally appropriate practice in early childhood programs serving children from birth through age 8*. ERIC.
- Creswell, J. W. (2021). *A concise introduction to mixed methods research*. SAGE publications.
- Dickinson, D. K., & Porche, M. V. (2011). Relation between language experiences in preschool classrooms and children's kindergarten and fourth-grade language and reading abilities. *Child Development, 82*(3), 870–886.
- Dong, C., Cao, S., & Li, H. (2020). Young children's online learning during COVID-19 pandemic: Chinese parents' beliefs and attitudes. *Children and Youth Services Review, 118*, 105440.
- Dwyer, J., & Harbaugh, A. G. (2020). Where and when is support for vocabulary development occurring in preschool classrooms? *Journal of Early Childhood Literacy, 20*(2), 252–295.
- Hen, M., Deri, N., & Dolev, N. (2025). Face-to-face vs. screen-based dialogic reading: a comparative study on language skills in preschool children. *Early Child Development and Care, 195*(3), 163–178.
- Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B., & Kaufman, J. (2015). Putting education in “educational” apps: Lessons from the science of learning. *Psychological Science in the Public Interest, 16*(1), 3–34.
- Hoff, E. (2015). Language development. In *Developmental science* (pp. 443–488). Psychology Press.
- Justice, L. M., Meier, J., & Walpole, S. (2005). *Learning new words from storybooks*.
- Krippendorff, K. (2018). *Content analysis: An introduction to its methodology*. Sage publications.
- Kucirkova, N., & Sakr, M. (2016). Digital technologies, children's learning, and the affective dimensions of family relationships in the home. In *Families, intergenerationality, and peer group relations* (pp. 1–21). Springer.
- Linebarger, D. L., & Vaala, S. E. (2010). Screen media and language development in infants and toddlers: An ecological perspective. *Developmental Review, 30*(2), 176–202.
- Madigan, S., Browne, D., Racine, N., Mori, C., & Tough, S. (2019). Association between screen time and children's performance on a developmental screening test. *JAMA Pediatrics, 173*(3), 244–250.
- Mayer, R. E. (2024). The past, present, and future of the cognitive theory of multimedia learning. *Educational Psychology Review, 36*(1), 8.
- Miles, H., Huberman, A. M., & Saldana. (2020). *Qualitative data analysis: A methods sourcebook*. New York: Sage Publications, Inc.
- Mohamed, A. M., & Shaaban, T. S. (2024). A quasi-experimental study on the effectiveness of augmented reality technology on english vocabulary learning among early childhood pupils with learning disabilities. *Innoeduca: International Journal of Technology and Educational Innovation, 10*(2), 5–26.
- Neumann, M. M. (2018). Using tablets and apps to enhance emergent literacy skills in young children. *Early Childhood Research Quarterly, 42*, 239–246.
- Neumann, M. M., & Neumann, D. L. (2014). Touch screen tablets and emergent literacy. *Early Childhood Education Journal, 42*(4), 231–239.
- Owens, R. E. (2016). *Language Development: An Introduction 9e*. Boston: Pearson Education.
- Papaioannou, D., Sutton, A., & Booth, A. (2016). Systematic approaches to a successful literature review. *Systematic Approaches to a Successful Literature Review, 1–336*.

- Plowman, L., McPake, J., & Stephen, C. (2010). The technologisation of childhood? Young children and technology in the home. *Children & Society*, 24(1), 63–74.
- Prastyo, D., Purwoko, B., Rosyanafi, R. J., Mardiani, D. P., & Reswari, A. (2025). Digital Storytelling in Developing Expressive Language Skills in Early Childhood: A Phenomenological Study. *Al Hikmah Indonesian Journal of Early Childhood Islamic Education*, 9(1), 62–72.
- Radesky, J. S., & Christakis, D. A. (2016). Increased screen time: implications for early childhood development and behavior. *Pediatric Clinics*, 63(5), 827–839.
- Rahman, T., & Nurani, Y. (2024). Enhancing early childhood literacy through game-based interactive digital media development. *International Journal of Religion*, 5(11), 2598–2608.
- Rohlfing, K. J., Wildt, E., & Tolksdorf, N. F. (2024). Language learning with media and technology in (early) childhood. *Dzieciństwo. Literatura i Kultura*, 6(1), 35–69.
- Snow, C. E., & Burns, M. S. (1998). *Grif[®] n P. Preventing Reading Difficulties in Children*. Washington: National Academy Press.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339.
- Sugiyono, P. D. (2022). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*.
- Vygotsky, L. (1934). Thought and Language. In *Language and Thinking*. Harmondsworth: Penguin Education.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (Vol. 86). Harvard university press.
- Warmansyah, J., Diandra, P., Sari, E. N., Mudinillah, A., Hendriani, S., & Mustafa, M. C. (2024). Enhancing Early Childhood English Vocabulary: Teachers' Perspectives on Optimizing the Duolingo Application. *Journal of English Education and Teaching*, 8(1), 33–45.
- Wasik, B. A., & Hindman, A. H. (2011). Improving vocabulary and pre-literacy skills of at-risk preschoolers through teacher professional development. *Journal of Educational Psychology*, 103(2), 455.
- Xiao, M., Amzah, F. B., & Rong, W. (2023). Experience of beauty: valuing emotional engagement and collaboration in teacher-child storytelling activities. *International Journal of Learning, Teaching and Educational Research*, 22(2).
- Zed, M. (2018). *Metode penelitian kepustakaan*. Yayasan Pustaka Obor Indonesia.
- Zosh, J. M., Hassinger-Das, B., & Laurie, M. (2022). Learning through play and the development of holistic skills across childhood. *Billund, Denmark: LEGO Foundation*.