

ARTICLE

Integrating Digital Media in Early Childhood Literacy: An Educational Communication Approach from Bandung, Indonesia

Nofha Rina ^{*}, Catur Nugroho , Astri Wulandari , Mohamad Syahrir Sugandi , Clara Novita Anggraini 

School of Communication and Social Sciences, Telkom University, Bandung 40257, Indonesia

ABSTRACT

Early childhood literacy development in the digital era presents opportunities and challenges, particularly in aligning media content with children's cognitive, linguistic, and social development. This study explores integrating digital media and communication-based pedagogical methods to enhance literacy learning among early childhood learners in Bandung, Indonesia. Employing a qualitative intrinsic case study approach, the research involved interviews and observations with ten kindergarten teachers across five institutions. The study identifies a variety of digital and traditional media—such as educational videos, interactive storybooks, word cards, and digital applications—used to support foundational literacy skills. It also examines the application of instructional methods, including the School Literacy Movement, reading corners, discovery learning, and cooperative learning strategies. The findings underscore the significance of educational communication strategies in designing contextually appropriate, developmentally sensitive, and sustainable literacy practices. This research contributes to the discourse on early childhood education by highlighting how communication-centered approaches and digital integration can foster multi-dimensional literacy development, including reading, writing, social, scientific, and digital literacies. These insights offer practical implications for educators and policymakers seeking to innovate literacy instruction in early education settings through media-informed pedagogy. Furthermore, the study highlights that digital media function not only as instructional aids but as communicative ecosystems that shape how children engage

*CORRESPONDING AUTHOR:

Nofha Rina, School of Communication and Social Sciences, Telkom University, Bandung 40257, Indonesia; Email: nofharina@telkomuniversity.ac.id

ARTICLE INFO

Received: 3 May 2025 | Revised: 26 May 2025 | Accepted: 6 June 2025 | Published Online: 15 July 2025

DOI: <https://doi.org/10.30564/fls.v7i7.9851>

CITATION

Rina, N., Nugroho, C., Wulandari, A., et al., 2025. Integrating Digital Media in Early Childhood Literacy: An Educational Communication Approach from Bandung, Indonesia. *Forum for Linguistic Studies*. 7(7): 670–685. DOI: <https://doi.org/10.30564/fls.v7i7.9851>

COPYRIGHT

Copyright © 2025 by the author(s). Published by Bilingual Publishing Group. This is an open access article under the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License (<https://creativecommons.org/licenses/by-nc/4.0/>).

with language, symbols, and meaning. Through carefully curated media, teachers act as mediators who foster multi-modal literacy and critical thinking.

Keywords: Early Childhood Literacy; Digital Media; Educational Communication; Literacy Development; Bandung

1. Introduction

Literacy is an essential skill in the 21st century. Hardiyanti & Alwi argue that literacy development must be balanced with the advancement of information technology^[1], as understanding modern information and communication technology requires strong literacy skills. Literacy development involves enhancing children's abilities, competencies, and skills. According to Aswat & Nurmaya G^[2], children's literacy skills refer to their ability to observe, understand, perform, and use information accurately and intelligently through various activities such as viewing, listening, reading, writing, and speaking. Thus, literacy skills are embedded in every aspect of a child's development. Early childhood literacy primarily focuses on reading and writing, ensuring children are well-prepared for the next level of education. Maryono et al. state that, in simple terms, literacy is an individual's ability to read and write to process basic information and knowledge^[3].

Early childhood literacy varies according to different aspects of development. Generally, early childhood literacy includes reading, writing, numeracy, environmental, financial, health, and scientific literacy. Gogahu & Prasetyo state that children's reading literacy refers to their ability to engage in reading, thinking, and writing based on what they read, helping them improve their reading skills and comprehension accurately and effectively^[4]. Maesaroh et al. assert that environmental literacy involves educators introducing the environment to young learners^[5]. It is assumed that children's behavior and character related to environmental awareness will also improve by fostering ecological literacy. Yuwono explains that financial literacy or financial intelligence refers to early childhood knowledge about money management concepts, financial assets they own, and financial regulation^[6], which needs to be instilled early as financial management relates to a child's character regarding saving or being wasteful. Health literacy involves raising awareness and knowledge in children about the importance of maintaining personal and environmental health, enabling them to develop healthy

lifestyles^[7].

Literacy development should be nurtured early, as literacy skills influence many aspects of child development. Early childhood reading literacy helps foster positive character traits that benefit children as they enter elementary education. Justice et al. argue that from a developmental perspective, reading and literacy growth begin when a child enters formal elementary education^[8]. This aligns with Suarni et al.^[9], who state that positive behavior in children is shaped through literacy activities using folklore. Maryono et al. emphasize that the literacy skills children should master upon entering elementary school include basic, language, numeracy, scientific, digital, cultural, social, environmental, and financial literacy^[3]. Furthermore, Arsa et al. highlight the importance of early childhood literacy development^[10], as it is crucial for children to acquire the skills and awareness necessary to become proficient readers, writers, and listeners who can understand information within relevant contexts. Well-developed literacy skills enable children to think creatively, innovatively, analytically, and critically in processing information.

The role of teachers in developing early childhood literacy is to act as facilitators and guides to ensure that learning activities aimed at enhancing children's literacy skills are carried out effectively. Safitri & Dafit explain that teachers have multiple roles in realizing children's literacy development^[11]. They are not only educators and instructors but also mentors who help children find appropriate reading materials, guides who direct children in reading activities, motivators who encourage children to read more diligently, role models in reading habits, and supporters for children who have low interest in reading. Afrida & Suparno add that, in efforts to develop early childhood literacy, teachers can play a role by dedicating time to reading with children, reading engaging storybooks aloud, sharing stories about positive characters, and introducing word cards to enhance children's vocabulary skills^[12]. Thus, in literacy development, teachers focus on fostering children's listening, reading, writing, and numeracy abilities to help them process information effectively.

The need for media and methods in literacy development is essential for increasing children's interest in literacy, as literacy skills among children remain relatively low. This is supported by Iin Puspasari & Dafit^[13], who state that literacy development among Indonesian children is still lacking. This is evident from Indonesia's reading proficiency ranking, where children placed 57th out of 65 countries. Therefore, schools and educational institutions serve as the primary platforms for children to develop their literacy skills. This effort is reinforced by the role of school principals as leaders of educational institutions. Research by Ummami et al. indicates that school principals have implemented several policies to enhance children's literacy^[14]. They support literacy programs in schools by actively promoting reading campaigns among children and implementing teacher-guided reading assistance programs.

There are several media and methods that teachers use to develop early childhood literacy. According to Ulfa & Oktaviana^[15], children's literacy skills can be enhanced through the Discovery Learning model, in which children independently explore and discover what they are learning. This method ensures that the knowledge and skills acquired remain long-lasting and firmly embedded in children.

Furthermore, early childhood literacy development can also be facilitated through the social media application TikTok^[16]. Short educational videos tailored for young children help train their literacy skills. TikTok not only contains negative content but also positive materials, such as videos of Quranic recitations, excerpts from hadiths, educational content, humorous videos, and visually appealing images. However, parental or teacher supervision is necessary when using this application with children to prevent exposure to negative and sensitive content. Additionally, digital literacy media can also support early childhood literacy growth. Ellya Novera, Daharnis, & Yeni Erita explain that children's digital literacy develops through digital platforms^[17]. Digital literacy refers to a child's ability to comprehend information from digital sources, utilize information technology media effectively, and apply them in daily life. Therefore, digital media should not be avoided but rather utilized to ensure that children acquire literacy skills that align with the advancements of the modern era.

Several previous studies have explored the development of early childhood literacy. First, Setiawan conducted a

study titled "*Scientific Literacy Activity Sheets for Distance Learning*"^[18]. The findings indicate that although students can engage in scientific literacy activities remotely, their scientific literacy skills have not been optimally trained. Second, Setiawan carried out research titled "*Thematic Learning Oriented Towards Scientific Literacy*," which resulted in the development of a learning program focused on scientific literacy for children^[19]. Third, a study by Ardipal et al.^[20], titled "*Development of Teaching Materials Using Music Literacy*," found that music literacy-based teaching materials are suitable for children and can be effectively applied in classroom learning. Lastly, research by Kurnia et al.^[21], titled "*Literacy-Based Civic Education Lesson Planning Model*," integrates literacy into Civic Education, aiming to foster students' independence, innovation, character development, learning effectiveness, and creativity.

From the overview of previous studies mentioned above, there are both similarities and differences between this research and prior studies. The relevance of this study lies in its focus on early childhood literacy development, similar to previous research. However, the key difference is in the content and focus, as this study specifically examines the media and methods for developing early childhood literacy, which have not been explored in previous studies. The uniqueness of this study lies in its specific focus on analyzing the media and methods used in the development of digital-based literacy learning for early childhood, particularly in the context of Bandung City. This dimension has not been the central focus of previous studies.

Additionally, this study examines the integration of local cultural practices into literacy development, including the use of folklore and traditional storytelling as tools to enhance children's comprehension and moral understanding. The study also incorporates diverse communication strategies, including teacher-led interactions, peer collaboration, and multimedia-based storytelling, to promote a more engaging literacy experience for children. Furthermore, this research highlights the variety of media platforms—ranging from digital applications like TikTok to traditional picture books and interactive word cards—used to cultivate early literacy in different settings. Therefore, further research is needed to analyze the media and methods used in literacy development, which constitutes the novelty of this study. Consequently, the aim of this research is to explain media

analysis and development methods of digital-based literacy learning for early childhood in Bandung City.

2. Materials and Methods

2.1. Research Design

This study employed a qualitative intrinsic case study design to explore the communicative practices and pedagogical strategies involved in digital-based literacy development for early childhood education. An intrinsic case study was chosen because the research focused on understanding a specific educational phenomenon—how digital media and educational communication approaches are applied in real classroom contexts in Bandung—rather than on theory testing or comparison. This approach is particularly suitable for capturing the contextual, interactional, and communicative dynamics of literacy practices within early childhood education settings^[22].

2.2. Research Site and Participants

This research was conducted at Bandung City, West Java, Indonesia. It is a qualitative study using a case study method. In this research, the case study approach was chosen to describe the media and methods used for literacy development in early childhood education at several kindergartens, including Bina Putra, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum. The informants in this study are ten classroom teachers representing each kindergarten in Bandung City. These institutions were selected based on purposive sampling, as they actively implement digital literacy activities and have diverse instructional strategies reflecting different levels of media integration. The focus was on TK-A level classrooms, which typically include children aged 4 to 6 years. The teachers were selected as informants due to their communication expertise, which enables them to provide clear explanations and insights regarding the media and methods used in the classroom for early childhood literacy development. The research instruments include observation, interviews, and documentation. Data collection techniques in this study involve conducting interviews with research respondents and direct observation at the research site. The data analysis techniques used are data condensation, data

display, and conclusion drawing and verification^[22].

2.3. Data Collection Procedures

To capture the multifaceted nature of media use and instructional communication in early childhood literacy, the study employed triangulated data collection methods, including:

- a. Semi-structured interviews: Conducted with each teacher to explore their perspectives on literacy development, the role of digital media, and the pedagogical strategies they use. Interviews lasted approximately 45–60 minutes and were audio-recorded with consent^[23].
- b. Participant observation: Researchers observed classroom interactions during literacy sessions, focusing on media use, teacher-child communication, and child engagement. Observation sessions were guided by a structured field note protocol and occurred across multiple time points to ensure depth.
- c. Document analysis: Relevant institutional documents such as lesson plans, literacy program guidelines, digital content samples, and media tools were reviewed to complement interview and observational data.

All data were collected between August and October 2024, following ethical guidelines and with written consent from all participants.

2.4. Data Analysis Techniques

Data were analyzed using the model of qualitative data analysis, which includes three concurrent stages: (1) data condensation, which transcribed interviews and field notes were coded and categorized to identify recurring themes related to media types, instructional methods, communication strategies, and perceived outcomes^[24]; (2) data display, key findings were organized into thematic matrices, enabling comparison across cases (schools) and helping visualize connections between communication approaches and literacy development practices^[25]; (3) conclusion drawing and verification, themes were refined through iterative analysis, constant comparison, and peer debriefing to ensure trustworthiness and credibility. The use of multiple data sources supported methodological triangulation and enhanced the validity of findings.

3. Results

Based on the researcher's observation at the study site, the ten teachers teaching at the five kindergartens are at the TK-A level, educating children aged 4 to 6 years. Early childhood literacy learning covers literacy across all aspects of development. Classroom teachers implement literacy instruction using a variety of media and diverse methods or approaches. Furthermore, based on interviews conducted with research informants, two key factors support early childhood literacy learning and development: literacy development media and literacy development methods (See **Appendix A Table A1**).

3.1. Communicative Media Tools in Early Childhood Literacy Development

The first literacy development medium is digital literacy media. Digital literacy refers to an individual's ability to comprehend digital content. Nowadays, children do not need to be introduced to digital media, as they are already familiar with it and may even have a better understanding than adults^[26,27]. However, the key focus here is literacy skills—not just listening, but also comprehending, writing, and reading information through digital platforms. An example of applying digital literacy media is the use of interactive e-books and educational apps that allow children to listen to stories while following along with the text. This helps improve both listening and reading comprehension.

“Children become more focused and better at processing information when digital media is used as a literacy tool rather than just entertainment”^[28]. This medium significantly enhances children's comprehension abilities, vocabulary acquisition, and digital awareness.

At Bina Putra, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum, digital literacy media is not frequently used for early childhood education to prevent children from becoming overly dependent on digital applications. However, literacy learning and development are still carried out using this medium to ensure children recognize its benefits beyond mere entertainment. Widayati et al.^[29] explain that digital literacy media benefits children by expanding their knowledge and understanding of information, improving verbal abilities, enhancing critical information comprehension, and fostering concentration and focus on what they read, see,

and hear^[30,31]. According to Rusdawati & Eliza^[32], the current digital literacy media needed for early childhood literacy development includes gender-inclusive games, singing activities, drawing, storytelling, and play-based learning. Digital literacy media particularly enhances various literacy aspects, especially science literacy. Firda & Suharni^[33] state that science is a crucial aspect of development for children, as they naturally enjoy exploring, experimenting with new things, and possess a strong sense of curiosity. Therefore, appropriate media is necessary to encourage such development.

Second, ICT Media (Information and Communication Technology). In the five kindergartens, ICT media is used to develop children's literacy skills through laptops, computers, and smartphones. These media are already familiar to children, as they are well-acquainted with them and even more proficient than adults in using them. However, in schools, these technologies are utilized specifically for educational and developmental purposes. Junindra et al. support the idea that ICT-based literacy learning should be implemented to enhance children's technological skills in education^[34]. Since children are already accustomed to these tools, their learning experience becomes enjoyable and tangible, fostering creativity and innovation in their educational journey. At kindergartens like Bina Putra and Al Hunafa, children use child-friendly software on laptops and tablets to engage in literacy games that teach spelling, phonics, and reading skills. “When ICT tools are used in literacy learning, children are more enthusiastic and demonstrate increased creativity and independent thinking”^[35]. This shows that ICT not only supports literacy skills but also encourages innovation and confidence in using technology.

Third, literacy development media is Illustrated Storybooks. Illustrated storybooks are an effective way to enhance children's literacy skills, as they not only provide engaging visuals but also feature large, clear fonts that make reading easier for young learners. Latifah & Rahmawati state that illustrated storybooks are a highly popular medium in early childhood learning environments^[36]. These books are particularly beneficial for children, as their colorful illustrations capture children's interest, while the stories themselves encourage them to read. Consequently, children can more easily understand information and articulate what they have seen and read^[37]. With this medium, school literacy programs can flourish, as children learn through engaging visual materials.

Illustrated storybooks play a significant role in developing early childhood reading literacy. Sinaga et al. explain that early childhood reading activities are referred to as emergent reading^[38]. This stage involves children's understanding of written language, recognition of literacy environments, and exposure to various reading sources.

Fourth, Educational Play Equipment (APE). Educational play equipment is already familiar to early childhood learners, as it is present in every early childhood education institution and serves as a learning medium. Ritonga & Sutapa^[39] state that APE significantly impacts early childhood science literacy. Educational play equipment functions as a simulation-based learning tool, providing children with interactive play experiences. Through these tools, children can learn while playing, fostering holistic development across various aspects^[40]. Some examples of educational play equipment available at Bina Putra, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum include pipe telephones, musical pipes, rolling boards, pulleys, number balls, colored balls, spinning machines, and many others. An example is the use of pipe telephones and number balls during play-based science literacy activities. Children use the equipment to experiment with sounds or numbers, enhancing both physical and cognitive skills. "Children who engage in play using educational tools are more responsive, curious, and show improved focus during structured learning"^[41]. Such tools foster experiential learning and critical thinking, which are vital to literacy development.

Fifth, the Science Book Media. This medium enhances reading literacy and fosters children's environmental and cultural awareness. It provides young learners with general knowledge, scientific concepts, shapes, colors, patterns, sizes, numbers, and mathematical figures. Science books can also be adapted to local culture and wisdom, aligning with the location of early childhood education institutions. Consequently, this medium strengthens children's scientific literacy, reading abilities, and cultural understanding^[42]. Hartanti & Kurniawan further explain that science books are beneficial for early childhood literacy acquisition^[43]. Children need to be introduced to early literacy skills to recognize letters that form words, letter sounds, and word pronunciation. Literacy skills serve as the foundation for vocabulary acquisition and are a key aspect of children's language development. According to Eshet.^[44], early literacy skill development is

essential in early childhood education to support future academic achievement. In general, foundational early literacy skills consist of oral and written language comprehension as well as phonological awareness. The development of these early literacy skills greatly contributes to children's overall literacy proficiency later in life. Teachers integrate science books that explore nature, animals, and environmental themes into reading sessions, often followed by hands-on observations or field trips. "Science books help children build early literacy while simultaneously shaping their understanding of the world around them"^[45]. This dual benefit promotes both academic literacy and cultural awareness.

Sixth, Educational Video Media. The educational videos commonly used at Bina Putra Kindergarten, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum include Quranic and Hadith learning videos, videos about the lives of prophets and their companions to introduce children to their character values, science learning videos, and others. Sari & Esa'Ida explain that educational videos are an interactive learning medium for children^[46], as they allow them to see visuals while listening to explanations. Through this medium, children's scientific literacy and cognitive abilities will develop. Moreover, this type of audiovisual media keeps children engaged for extended learning periods because it is interesting and not monotonous. Scientific literacy helps foster children's creative thinking, character development, social behavior, and overall creativity. Children with strong scientific literacy skills can effectively solve problems and creatively provide solutions to the challenges they encounter^[47]. Children frequently watch Quranic stories or science exploration videos, which are later discussed in class to reinforce vocabulary and comprehension. "Educational videos capture children's attention and help them retain information better, especially when accompanied by teacher-guided reflection"^[48]. These videos enhance listening comprehension, scientific reasoning, and moral values.

Seventh, Word Card Media (Flashcards). This medium is also familiar to children at Bina Putra, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum, as it is commonly used as a daily learning tool. Word card media is useful for developing children's reading and writing literacy. Ahsan et al. explain that this medium helps children stay more engaged in the learning process and enhances their focus on lessons^[49]. Flashcards come in various forms, depending on the child's

developmental stage. Therefore, this medium is used based on children's fundamental literacy skills. Flashcards serve as a tool for learning new vocabulary alongside corresponding images, encouraging children to connect visuals with words and form meaningful messages from each picture. Teachers use flashcards with letters, words, and matching images during circle time or group activities to introduce vocabulary and improve recognition skills. "Children who use word cards daily show improved spelling, vocabulary development, and are quicker in identifying letter-sound patterns"^[50]. This method fosters foundational reading and writing abilities in a fun and interactive way.

Consistent with the aforementioned findings, this is further substantiated by the study conducted by Lo & Shi (2024)^[35], which asserts that in offering novel contributions regarding the review of pedagogical implications within a contemporary context, as well as providing up-to-date insights applicable to future curriculum design, it is imperative to emphasize the integration of literature into second language instruction as a highly effective strategy for language acquisition. This approach can yield new perspectives on students' language learning experiences. Furthermore, the connection between second language acquisition and content-based learning approaches constitutes a distinctive aspect of the research^[51].

Cooperative learning on this research is applied by engaging children in group-based literacy activities such as sequencing picture cards to build narratives. This method enhances their social and language literacy by encouraging discussion, explanation, and collaborative thinking. Similarly, Lo & Shi (2024) reported that content-based instruction (CBI) is used to integrate literature into ESL teaching, promoting interaction, discussion, and critical thinking^[35]. This mirrors cooperative learning's goals: fostering engagement, mutual understanding, and deeper cognitive processing through peer collaboration.

3.2. Instructional Communication Strategies for Early Literacy Learning

The first literacy development method is the CALISTUNG Program (Reading, Writing, Counting). As its name suggests, this program is designed to enhance early childhood numeracy and reading literacy skills. CALISTUNG serves

as a fundamental program for literacy development in early childhood education institutions. At Bina Putra Kindergarten, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum, this program continues to be developed and improved, as it significantly influences children's learning readiness for the future. Budiarti state that implementing the CALISTUNG program enhances students' numeracy literacy, reading literacy, and writing literacy^[52]. These basic literacy skills are essential and must be developed in early childhood education. Additionally, the CALISTUNG program is also used to foster children's financial literacy. Damaniket.al & Sa'ida^[53] explain that financial literacy development in children serves as an investment in their financial management skills. Financial literacy is a structured effort by early childhood education institutions to cultivate children's awareness and skills in fundamental financial aspects, which will be beneficial in the future.

Second, the School Literacy Movement (SLM). The School Literacy Movement is a government initiative aimed at increasing children's reading interest. Since the program was officially launched by the government, all educational levels are required to implement it, particularly starting with early childhood education institutions, including Bina Putra Kindergarten, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum. Dewi et.al, state that SLM is a government program designed to improve educational quality through a love of reading^[54]. Through this initiative, each school is provided with various reading materials, ranging from textbooks to storybooks and other light reading materials for children. The program mandates that students read for at least 15 minutes each day in school as part of the learning process. For early childhood learners, this reading activity can be guided by teachers to ensure children understand what they are reading.

Third, the Reading Corner Literacy Movement. Based on interviews conducted with classroom teachers, one of the strategies for developing early childhood literacy at Bina Putra Kindergarten, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum is the establishment of reading corners within classrooms. These corners encourage children's literacy skills by providing an inviting space for them to observe and read. The reading corner contains a collection of letters, numbers, short stories, announcements, images, and various educational materials presented in a colorful and engaging

manner to attract children's interest in reading. According to Diani & Amiruddin^[55], the reading corner is an effective method for fostering early childhood reading interest by utilizing classroom or room corners as reading spaces or mini libraries. The benefits of having a reading corner include encouraging children to read more frequently, making it easier for teachers to store books and learning resources in an accessible location, and establishing a miniature classroom library. Additionally, reading corners serve as both a learning environment and a play area for children. Play environments greatly support literacy development, as they offer comprehensive facilities—not only books but also educational play equipment used for learning^[56].

Reading corners are presented as crucial spaces for promoting early reading habits. These spaces are tailored to be child-friendly and engaging, encouraging independent exploration of books. Lo & Shi (2024) also their research used advocating for autonomous, student-centered reading experiences in ESL courses, especially through the integration of fiction, which parallels the role of reading corners in early education settings^[35].

The fourth method for early childhood literacy development is Media-Assisted Cooperative Learning. Cooperative learning activities previously implemented at Bina Putra Kindergarten, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum involved engaging all children in arranging a sequence of images based on logical order. The media used in this approach consists of pictures relevant to the lesson themes being studied. Fitriani Linda et.al, explain that understanding the events depicted in images and the messages conveyed through image sequences requires literacy skills from children^[57]. In this process, teachers can assist by providing keywords to describe the pictures. Subsequently, children can develop their literacy skills and enhance their thinking abilities in relation to the narratives presented through images. This method effectively strengthens children's social literacy and fosters language literacy in storytelling.

The fifth method is Discovery Learning Model. This model is applied to children at Bina Putra Kindergarten, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum in science learning activities based on experiments. The method guides children in independently discovering answers or concepts related to the lesson themes. Ulfa & Oktaviana explain that literacy learning through the Discovery

Learning Model is systematically and gradually introduced to children, allowing them to express ideas and independently discover fundamental concepts related to the lesson^[58]. Children may also be provided with appropriate learning media to support this instructional approach.

The sixth method for early childhood literacy development is the Humanistic Approach. According to Herawan et.al,^[59] the humanistic approach is a learning method that enables individuals to develop awareness, freedom, and responsibility in their learning activities—both as independent beings and as social entities. Through this approach, students recognize the importance of learning and literacy development. Therefore, at Bina Putra, Bunda Asuh Nanda, Alamanda, Al Hunafa, and Mekar Arum, this method is applied based on children's social-emotional development. Instead of imposing learning upon them, it fosters an awareness of why learning is meaningful and relevant to their growth.

The seventh method is the Parenting Program. This program is designed for early childhood learners and their parents to help them build positive, harmonious, and communicative relationships. Through this initiative, children's health literacy and social literacy are enhanced. Idris et.al, explain that the parenting program also aims to develop early childhood health literacy^[60]. This program provides parents with guidance and support in ensuring their children's well-being, caregiving, protection, and overall nurturing. As a result, children's health literacy improves because they receive consistent guidance from their parents at home.

4. Discussion

4.1. Digital Media as a Communicative Ecosystem in Early Literacy Development

This study found that various media, including digital literacy media, educational play tools, illustrated storybooks, and educational video media, positively impact early childhood literacy. These media improve children's comprehension skills, strengthen their reading and writing skills, and enhance their critical thinking abilities. This finding is supported by research from Istiana & Widodo^[61], which states that using digital-based media enhances literacy skills and children's ability to critically and systematically process information. Additionally, the implementation of Science

Book media has been proven to expand children's scientific knowledge and concept understanding, contributing to the development of their science literacy^[62]. This demonstrates that using science-based media can increase children's interest in exploration and enrich their scientific thinking from an early age.

This study also demonstrates that digital media function as more than mere instructional tools—they operate as communicative ecosystems that shape how young children interact with language, symbols, and meaning. Educational videos, illustrated storybooks, ICT-based games, and word card media offer rich multimodal environments where children simultaneously engage auditory, visual, and kinesthetic faculties to develop foundational literacy skills. In Bandung's kindergarten classrooms, the selective use of digital media, particularly those with cultural and educational value, reflects a strategic communication practice in which educators curate content aligned with children's cognitive and linguistic stages. For example, Quranic videos or science animations transfer knowledge and mediate values, language use, and narrative structure, positioning children as receivers and meaning-makers. This aligns with social semiotic theory, where language and literacy emerge from socially embedded communication. Furthermore, the use of digital media in literacy development also parallels strategies in English as a Second Language (ESL) contexts, where computer-mediated activities are integrated with interactive learning to support literacy advancement^[63]. This approach is part of content-based instruction (CBI), which emphasizes the integration of literary content mastery with English language skills, including reading and writing. These practices indicate a model that can be contextually adapted and transferred to other countries seeking to integrate culturally relevant and pedagogically grounded digital literacy strategies in early childhood education^[64].

However, this study contradicts several established theories in international literature that suggest digital media can hinder early childhood literacy development due to reduced face-to-face interaction, attention span fragmentation, and the overreliance on passive consumption. For instance, studies by Nurdin (2024) and Pires et.al (2023) warn that excessive exposure to screen-based media in early childhood may displace essential print-based literacy practices, delay language development, and diminish children's ability to en-

gage in deep reading or dialogic interactions^[65,66]. Contrary to these concerns, this research found that when digital tools are used selectively and integrated with guided interaction and cultural content, they can foster—not hinder—children's active participation, cognitive engagement, and comprehension skills. These findings suggest that the negative impacts often associated with digital media may stem more from poor implementation and lack of pedagogical strategy than from the medium itself^[63].

The methods used in this study, such as the SLM, discovery Learning Model, media-assisted cooperative learning, and parenting programs, all play a significant role in shaping children's literacy skills. Perwita et.al, explain that implementing the CALISTUNG program is essential in developing fundamental literacy skills for early childhood, particularly in preparing them for academic readiness^[67]. Furthermore, the humanistic approach is also applied as a learning strategy that emphasizes children's awareness and responsibility in understanding the importance of literacy. Pikri et.al, asserts that this approach provides children with the freedom to learn^[68], allowing them to develop their literacy skills independently and systematically. Digital literacy, in this context, becomes the gateway to multiliteracy, enabling children to navigate symbolic systems in science, finance, and culture. Early exposure to these literacies also builds their readiness for future learning environments increasingly saturated with digital communication demands. Consequently, the implementation of these structured pedagogical methods—especially the SLM, cooperative learning, and parenting-based interventions—has strong potential to be replicated in diverse international contexts, particularly in countries facing similar challenges in early literacy and digital integration. Thus, integrating digital tools in literacy development is not ancillary—it is central to equipping children with the ability to interpret and construct meaning across contexts critically^[69].

4.2. Educational Communication as a Framework for Literacy Pedagogy

Teachers in this study do more than deliver lessons—they act as mediators of meaning, guiding children through inquiry, storytelling, collaborative media tasks, and reflective discussion. For instance, cooperative learning using picture sequencing or flashcards fosters both language development

and communicative competence, as children must listen, explain, and negotiate with peers. These are not isolated literacy exercises but communicative events, reinforcing language use in authentic, socially situated contexts^[70]. Moreover, including parents through structured parenting programs emphasizes that literacy development is not confined to the classroom—it thrives in a network of communicative relationships involving teachers, caregivers, and peers. This resonates with Bronfenbrenner’s ecological model of development, where learning is mediated by overlapping communication systems, from the microsystem (home and school) to the macrosystem (digital culture and policy).

By framing early literacy through the lens of educational communication, this study contributes to a broader rethinking of pedagogy in the digital age: message design, medium selection, interpersonal feedback, and cultural relevance become critical components of instructional literacy planning^[71]. It also underscores the necessity of training early childhood educators in media use and strategic communication literacy, enabling them to shape meaningful, multimodal learning interactions that align with children’s lived realities. This research also highlights the significance of digital literacy in developing children’s social skills. By using media such as educational videos and digital applications, children can learn not only through written texts but also through engaging audiovisual interactions^[72]. Digital literacy also contributes to the enhancement of children’s financial literacy. As Rahman, et.al, explain^[73], early financial literacy education helps children gradually understand basic economic concepts and money management. Additionally, word card media (flashcards) play a role in improving children’s communication skills by introducing new vocabulary and encouraging them to actively practice speaking^[74].

By utilizing diverse literacy development media and methods, this study demonstrates that early childhood digital literacy development can be carried out systematically and contextually. These findings support previous research emphasizing that digital literacy must be integrated with effective learning methods to maximize its impact on children’s development^[75]. The inclusion of various literacy approaches also indicates that children’s literacy education should not be limited to reading and writing skills but must also encompass science literacy, numeracy literacy, social literacy, cultural literacy, and digital literacy. This study

contributes to the development of sustainable digital-based literacy strategies, in line with the challenges of the modern era^[76].

The learning content implemented in kindergartens across Bandung offers transferable strategies that can be adapted in other cities or countries with diverse educational settings. Key aspects that can be applied elsewhere include: (1) the integration of collaborative learning methods such as storytelling and picture sequencing, which foster children’s language and communication skills in a socially meaningful context; (2) The use of multimedia and digital tools—including educational videos, interactive applications, and flashcards—to develop early literacy and digital competencies in ways that engage children’s interests and cognitive styles; (3) Parent involvement programs that emphasize co-learning and shared responsibility in literacy development, a practice that can be tailored to local cultures and community structures worldwide; (4) A holistic approach to literacy that expands beyond reading and writing, including science, financial, cultural, and social literacies—preparing children for global citizenship; and (5) contextualized instructional design based on educational communication principles, which can guide educators globally in choosing appropriate media, crafting meaningful messages, and offering culturally responsive pedagogy.

In essence, the Bandung model of early childhood literacy education offers a flexible, inclusive, and communication-driven framework that can inform and enrich educational practices across borders.

However, this study also reveals findings that contradict some established theories regarding digital media use in early childhood literacy. While many scholars emphasize the benefits of digital media for literacy development^[77], this research found that excessive or unstructured exposure to digital media without guided interaction may hinder the development of deeper comprehension and critical thinking skills in young children. Unlike the optimistic view that digital tools universally enhance literacy, these results suggest that digital media alone, especially when used passively, can lead to superficial engagement and reduce opportunities for meaningful dialogue and social interaction, which are crucial for early literacy growth. This aligns with findings by Tatminingsih (2015)^[78], who caution that digital media might contribute to fragmented attention spans and limit sustained

reading behaviors if not carefully integrated into pedagogical strategies. Thus, the study highlights the necessity of combining digital literacy tools with active mediation by educators and caregivers to avoid potential negative impacts.

5. Conclusions

This study examined the integration of digital media and educational communication strategies in early childhood literacy development within kindergartens in Bandung, Indonesia. The findings reveal that digital media—such as educational videos, illustrated storybooks, science books, and ICT-based tools—function not merely as instructional aids but as components of multimodal communicative environments that significantly enhance children’s comprehension, engagement, and cognitive development. When employed alongside interactive and participatory pedagogical approaches—such as the School Literacy Movement, discovery learning, cooperative learning, and parenting programs—these media play a crucial role in fostering multiliteracy among young learners, encompassing reading, writing, scientific reasoning, social interaction, and digital competencies. Theoretically, this study contributes to the expanding discourse on educational communication by framing literacy development as a dialogic, socially constructed, and media-mediated process. It challenges traditional transmission-based literacy models by advocating for a more communicative, child-centered pedagogy that leverages digital tools and multimodal content tailored to early childhood developmental stages. Although the study offers valuable insights into the synergies between media use and pedagogical strategy, its findings are limited by the narrow geographic and institutional scope, involving only five kindergartens within Bandung. Data collection primarily relied on teacher perspectives and observational data, without direct measurement of student learning outcomes.

In terms of generalizability, the findings should be interpreted with caution. The limited and localized sample constrains the applicability of the results to broader educational settings, particularly those with differing socio-cultural, technological, or institutional characteristics. To enhance external validity, future research should include more diverse samples drawn from various regions and educational systems,

thereby enabling more robust cross-contextual comparisons. The study’s primary contribution lies in its interdisciplinary framework, which integrates digital media, pedagogy, and communication theory within early childhood literacy practices. This research demonstrates how structured, developmentally appropriate digital media interventions can serve as powerful instruments for holistic literacy development, thereby offering a conceptual model for sustainable digital education in early learning environments.

Future studies are recommended to incorporate direct and systematic assessment of children’s learning outcomes, including their literacy competencies, cognitive development, and socio-emotional growth. Employing quantitative measures, such as standardized literacy assessments and developmental scales, in conjunction with longitudinal and mixed-method approaches, could yield more comprehensive insights into the effectiveness of digital media interventions. Moreover, the use of experimental or quasi-experimental designs would strengthen causal inferences and provide a firmer empirical foundation for policy recommendations and curriculum design. Such enhancements are essential for addressing current methodological limitations and advancing the field of digital literacy education in early childhood contexts.

Author Contributions

Conceptualization, N.R and C.N.; methodology, N.R.; software, N.R.; validation, N.R.; formal analysis, N.R and C.N.; investigation, N.R.; resources, N.R.; data curation, N.R.; writing—original draft preparation, N.R.; writing—review and editing, N.R and C.N.; visualization, N.R.; supervision, N.R and C.N.; project administration, A.W.; funding acquisition, N.R, A.W, M.S.S and C.N.A. All authors have read and agreed to the published version of the manuscript.

Funding

This work received no external funding.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The data can be accessed by contacting the first author.

Acknowledgments

The author would like to express sincere gratitude to the informants from Bina Putra, Bunda Asuh Nanda, Al-

manda, Al Hunafa, and Mekar Arum kindergartens for their willingness to participate in interviews during the course of this research. The author also extends appreciation to the leadership of the School of Communication and Social Sciences, as well as the Directorate of Research and Community Service at Telkom University, for their financial support and assistance throughout the publication process of this article, which contributed to the smooth completion of all stages.

Conflicts of Interest

The authors declare no conflict of interest.

Appendix A

Table A1. List of Categorized Interview Questions for Informants.

Category	Questions
General Questions on Literacy Development Media	<ol style="list-style-type: none"> 1. What are the key benefits of digital literacy media in early childhood education? 2. How does digital literacy media support children's comprehension, writing, and reading skills? 3. Why is digital literacy media used selectively in some kindergartens? 4. In what ways do gender-inclusive games and storytelling contribute to digital literacy development? 5. How does science literacy benefit from digital media exposure?
ICT Media in Literacy Development	<ol style="list-style-type: none"> 6. How do ICT tools such as laptops and smartphones help improve children's literacy skills? 7. What role does ICT-based learning play in fostering creativity and innovation in early childhood education? 8. Why is it important to use ICT media strictly for educational purposes in kindergarten settings?
Illustrated Storybooks in Literacy Development	<ol style="list-style-type: none"> 9. What makes illustrated storybooks an effective literacy development tool for young learners? 10. How do colorful illustrations and large fonts improve children's reading comprehension? 11. What is emergent reading, and how does it relate to early childhood literacy? 12. How do illustrated storybooks contribute to the success of school literacy programs?
Educational Play Equipment (APE) and Literacy Growth	<ol style="list-style-type: none"> 13. How do simulation-based educational play tools enhance children's literacy skills? 14. What are some examples of educational play equipment used in literacy development? 15. In what ways does APE impact early childhood science literacy? 16. Why is interactive play essential for holistic child development?
Science Book Media in Early Childhood Literacy	<ol style="list-style-type: none"> 17. How do science books help develop children's environmental and cultural awareness? 18. What foundational literacy skills are reinforced through science books? 19. How can science books be adapted to align with local cultural contexts? 20. Why is early literacy skill development crucial for long-term academic success?
Educational Video Media and Cognitive Development	<ol style="list-style-type: none"> 21. What types of educational videos are commonly used in literacy learning for early childhood? 22. How do audiovisual learning tools enhance scientific literacy and cognitive abilities? 23. Why are educational videos engaging and effective in promoting long-term learning? 24. How do scientific literacy skills contribute to problem-solving and creative thinking in young children?
Word Card Media (Flashcards) in Literacy Enhancement	<ol style="list-style-type: none"> 25. What advantages do flashcards offer in children's reading and writing literacy development? 26. How do flashcards help children learn new vocabulary effectively? 27. Why do flashcards need to be adapted to different developmental stages? 28. How does using flashcards enhance children's ability to connect visuals with words?
CALISTUNG Program	<ol style="list-style-type: none"> 1. What are the main objectives of the CALISTUNG program in early childhood education? 2. How does the CALISTUNG program enhance children's numeracy, reading, and writing literacy skills? 3. Why is the CALISTUNG program continuously developed in some kindergartens? 4. How does CALISTUNG contribute to financial literacy development in early childhood?
School Literacy Movement (SLM)	<ol style="list-style-type: none"> 5. What is the purpose of the School Literacy Movement (SLM)? 6. How does the government support the implementation of SLM in early childhood education? 7. What types of reading materials are provided to schools under the SLM initiative? 8. Why is it important for early childhood learners to have teacher-guided reading activities?

Table A1. Cont.

Category	Questions
Reading Corner Literacy Movement	9. How do reading corners help enhance children's literacy skills? 10. What types of materials are typically included in a classroom reading corner? 11. How does the reading corner encourage children to read more frequently? 12. In what ways does a reading corner serve as both a learning space and a play environment?
Media-Assisted Cooperative Learning	13. What is media-assisted cooperative learning, and how does it support literacy development? 14. How does arranging image sequences help children develop literacy skills? 15. What role do teachers play in guiding children through cooperative learning? 16. How does this method strengthen children's social and language literacy?
Discovery Learning Model	17. How is the Discovery Learning Model applied to early childhood science education? 18. What are the benefits of allowing children to discover concepts independently? 19. How can appropriate learning media support the Discovery Learning approach? 20. Why is the gradual introduction of discovery-based literacy learning important?
Humanistic Approach	21. What is the main principle of the Humanistic Approach in literacy development? 22. How does the Humanistic Approach foster children's awareness and responsibility in learning? 23. Why is social-emotional development considered in this approach? 24. How does the Humanistic Approach differ from other literacy development methods?
Parenting Program	25. What is the role of the Parenting Program in early childhood literacy development? 26. How does the program help parents build positive relationships with their children? 27. In what ways does the Parenting Program enhance children's health literacy? 28. Why is parental guidance essential in reinforcing literacy skills at home?

References

- [1] Hardiyanti, W.E., Alwi, N.M., 2022. Analysis of Early Childhood Education Teachers' Digital Literacy Skills During the Covid-19 Pandemic [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 6(4), 3759–3770. DOI: <https://doi.org/10.31004/obsesi.v6i4.1657>
- [2] Aswat, H., Nurmaya G, A.L., 2019. Analysis of the Classroom Reading Corner Literacy Movement on the Existence of Children's Reading Motivation in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 4(1), 70–78. DOI: <https://doi.org/10.31004/basicedu.v4i1.302>
- [3] Maryono, M., Pamela, I.S., Budiono, H., 2021. Implementation of Literacy in Reading, Writing, and Science in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 6(1), 491–498. DOI: <https://doi.org/10.31004/basicedu.v6i1.1707>
- [4] Gogahu, D.G.S., Prasetyo, T., 2020. Development of E-Bookstory-Based Learning Media to Improve Reading Literacy of Elementary School Students [in Indonesian]. *Jurnal Basicedu*. 4(4), 1004–1015. DOI: <https://doi.org/10.31004/basicedu.v4i4.493>
- [5] Maesaroh, S., Bahagia, B., Kamalludin, K., 2021. Strategies for Fostering Environmental Literacy in Students [in Indonesian]. *Jurnal Basicedu*. 5(4), 1998–2007.
- [6] Yuwono, W., 2020. Conceptualizing the Strategic Role in Children's Financial Literacy Education Through a Systematic Review Approach [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 5(2), 1419–1429. DOI: <https://doi.org/10.31004/obsesi.v5i2.663>
- [7] Inten, D.N., Permatasari, A.N., 2019. Health Literacy in Early Childhood Through Eating Clean Activities [in Indonesian]. *Obsesi: Jurnal Pendidikan Anak Usia Dini*. 3(2), 366.
- [8] Justice, L.M., Yeomans-Maldonado, G., Gonzalez, J., et al., 2018. A Multi Method Investigation Of Literacy And Language Practices In Mexican Early Childhood Programs. *Cogent Education*. 5(1), 1455632. DOI: <https://doi.org/10.1080/2331186x.2018.1455632>
- [9] Suarni, N., Taufina, T., Zikri, A., 2019. Reading Literacy to Enhance Positive Character in Elementary School Students [in Indonesian]. *Jurnal Basicedu*. 3(4), 1014–1021. DOI: <https://doi.org/10.31004/basicedu.v3i4.215>
- [10] Arsa, D., Atmazaki, A., Juita, N., 2019. Early Literacy in Young Children of the Suku Anak Dalam in Dhar-masraya [in Indonesian]. *Obsesi: Jurnal Pendidikan Anak Usia Dini*. 3(1), 127.
- [11] Safitri, V., Dafit, F., 2021. The Role of Teachers in Teaching Reading and Writing Through the Literacy Movement in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 5(3), 1356–1364.
- [12] Afnida, M., Suparno, S., 2020. Literacy in Early Childhood Education: Teachers' Perceptions and Practices in Preschool [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 4(2), 971.
- [13] Puspasari, I., Dafit, F., 2021. Implementation of the School Literacy Movement in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 3(2), 1390–1400.
- [14] Ummami, W., Wandra, D., Gistituati, N., et al., 2020. Principal's Policy to Enhance the School Literacy Movement in Elementary Schools [in Indonesian].

- Jurnal Basicedu. 5(3), 1673–1682.
- [15] Ulfa, M., Oktaviana, E., 2021. Literacy in Early Childhood Education: Teachers' Perceptions and Practices in Preschool [in Indonesian]. *Jurnal Basicedu*. 5(6), 5204–5212. DOI: <https://doi.org/10.31004/basicedu.v5i6.1549>
- [16] Kusumandaru, A.D., Rahmawati, F.P., 2022. Implementation of the School Literacy Movement in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 6(3), 4876–4886.
- [17] Novera, E., Daharnis, Yeni Erita, A.F., 2021. Principal's Policy to Enhance the School Literacy Movement in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 5(6), 6349–6356.
- [18] Setiawan, A.R., 2020. Improving Literacy Skills Through the Discovery Learning Model Assisted by the Literacy Tree [in Indonesian]. *Edukatif: Jurnal Ilmu Pendidikan*. 2(1), 28–37.
- [19] Setiawan, A.R., 2019. Implementation of the TikTok Social Media Application as a Tool to Strengthen Literary Literacy in Thematic Learning in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 4(1), 51–69. DOI: <https://doi.org/10.31004/basicedu.v4i1.298>
- [20] Ardipal, A., Machfauzia, A.N., Zikri, A., 2020. Development of Teaching Materials Using Music Literacy in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 4(4), 899–906.
- [21] Kurnia, H., Bowo, A.N.A., Nuryati, N., 2021. Civic Education Lesson Planning Model Based on Literacy [in Indonesian]. *Jurnal Basicedu*. 5(2), 733–740. DOI: <https://doi.org/10.31004/basicedu.v5i2.794>
- [22] Miles, M.B., Huberman, A.M., Saldana, J., 2014. *Qualitative Data Analysis: A Methods Sourcebook*, 3rd ed. Sage Publications: Thousand Oaks, CA, USA.
- [23] Dewi, D.A., Hamid, S.I., Annisa, F., et al., 2021. Growing Student Character Through Digital Literacy [in Indonesian]. *Jurnal Basicedu*. 5(6), 5249–5257. DOI: <https://doi.org/10.31004/basicedu.v5i6.1609>
- [24] Hidayatullah, S., Syihabuddin, S., Damayanti, V., 2021. Needs Analysis of Digital-Based Literacy Media in Early Childhood [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 6(3), 1190–1196. DOI: <https://doi.org/10.31004/obsesi.v6i3.1183>
- [25] Sholeha, V., Wahyuningsih, S., Hafidah, R., et al., 2021. Application of Science Literacy-Based Class by Early Childhood Teachers in Surakarta City [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 6(3), 2013–2019. DOI: <https://doi.org/10.31004/obsesi.v6i3.1237>
- [26] Junindra, A., Fitri, H., Putri, A.R., et al., 2021. Designing Social Studies and Civic Education Learning Based on ICT Literacy (Information and Communication Technology) at the Elementary School Level [in Indonesian]. *Jurnal Basicedu*. 5(6), 6264–6270. DOI: <https://doi.org/10.31004/basicedu.v5i6.1827>
- [27] Sapri, S., Muhaini, A., Zunidar, Z., 2022. Analysis of the School Literacy Movement (GLS) Using Illustrated Storybook Media in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 6(3), 4107–4116.
- [28] Sinaga, E.S., Dhieni, N., Sumadi, T., 2021. The Influence of Literacy Environment in Class on Children's Early Reading Ability [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 6(1), 279–287. DOI: <https://doi.org/10.31004/obsesi.v6i1.1264>
- [29] Widayati, J.R., Safrina, R., Supriyati, Y., 2020. Analysis of the Development of Scientific Literacy in Early Childhood Through Educational Play Equipment [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 5(1), 654.
- [30] Zr, Z., Eliza, D., 2020. Development of Children's Science Book for Literacy and Character Introduction Based on Minangkabau Natural Culture [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 5(2), 1567–1577. DOI: <https://doi.org/10.31004/obsesi.v5i2.896>
- [31] Hartanti, D., Kurniawan, M., 2022. Augmented Reality Literacy Book as Supporting Media for Early Childhood Literacy Learning [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 6(4), 3100–3110. DOI: <https://doi.org/10.31004/obsesi.v6i4.2042>
- [32] Rusdawati, R., Eliza, D., 2022. Development of Science Literacy Learning Videos for 5–6-Year-Old Children to Learn from Home [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 6(4), 3648–3658.
- [33] Firda, A., Suharni, 2022. Level of Science Literacy Ability of Early Childhood Education Teachers [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 6(5), 3868–3876.
- [34] Fitria, N., Amelia, Z., Nurfadilah, N., 2022. Influence of Flashcard "Path to Literacy" on Reading and Writing Literacy Skills [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 6(5), 4039–4048.
- [35] Lo, N., Shi, H., 2024. The perceptions of undergraduate students toward reading contemporary fiction in English: a case study of content-based ESL instruction at a self-financed tertiary institution in Hong Kong. *Frontiers in Education*. 9, 1395168. DOI: <https://doi.org/10.3389/feduc.2024.1395168>
- [36] Latifah, L., Rahmawati, F.P., 2022. Application of the CALISTUNG Program to Improve Numeracy Literacy in Lower Grade Elementary Students [in Indonesian]. *Jurnal Basicedu*. 6(3), 5021–5029.
- [37] Solichah, N., Shofiah, 2024. Artificial intelligence (AI) literacy in early childhood education: A scoping review. *Psikologika: Jurnal Pemikiran dan Penelitian Psikologi*. 29(2), 173–190. DOI: <https://doi.org/10.20885/psikologika.vol29.iss2.art1>
- [38] Dafit, F., Ramadan, Z.H., 2020. Implementation of the School Literacy Movement (GLS) in Elemen-

- tary Schools [in Indonesian]. *Jurnal Basicedu*. 4(4), 1429–1437. DOI: <https://doi.org/10.31004/basicedu.v4i4.585>
- [39] Ritonga, R.A., Sutapa, P., 2020. Literacy and Gender: Inequality at the Level of Early Childhood Education [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 5(1), 965–974.
- [40] Hasyda, S., Djenawa, A., 2020. Application of Cooperative Learning Picture and Picture Using Mind Map Media to Improve Students' Social Literacy in Elementary Schools [in Indonesian]. *Jurnal Basicedu*. 4(3), 696–706. DOI: <https://doi.org/10.31004/basicedu.v4i3.414>
- [41] Holisah, H., 2022. Implementation of Humanistic Approach in Increasing Self-Confidence in Literacy Skills of Students [in Indonesian]. *Jurnal Basicedu*. 6(1), 1440–1448.
- [42] Fitroh, S.F., Oktavianingsih, E., 2020. The Role of Parenting in Improving Mothers' Health Literacy on Stunting in Bangkalan Madura [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 4(2), 610–619.
- [43] Dewi, C., 2022. Digital literacy analysis of elementary school students through implementation of e-learning based learning management system. *Journal of Education Technology*. 6(2), 199–206. DOI: <https://doi.org/10.23887/jet.v6i2.44160>
- [44] Eshet, Y., 2020. Digital literacy: A conceptual framework for survival skills in the digital era. *Journal of Educational Multimedia and Hypermedia*. 13(1), 93–106.
- [45] Neumann, M.M., 2018. Using tablets and apps to enhance emergent literacy skills in young children. *Early Childhood Research Quarterly*. 42, 239–246.
- [46] Sari, A.Y., Sa'Ida, N., 2021. Educational Investment in Financial Literacy for Early Childhood in Indonesia [in Indonesian]. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. 6(3), 2085–2094. DOI: <https://doi.org/10.31004/obsesi.v6i3.1369>
- [47] Marsh, J., Plowman, L., Yamada-Rice, D., et al., 2015. Exploring play and creativity in pre-schoolers' use of apps: Final project report. 29 January 2020. University of Sheffield: Sheffield, UK.
- [48] Ahsan, M.H., Ismail, S.A., Ahmad, M., et al., 2022. Digital Literacy Research in Scopus: A Bibliometric Analysis Between 1997 and 2021. *Journal Business, Management and Economics Engineering*. 20(2), 1–30.
- [49] Ahsan, M.H., Ismail, S.A., Ahmad, M., et al., 2024. Digital Media Literacy in Scholarly Discourse: A Bibliometric Analysis of Scopus-Indexed Publications. *Khizanah al-Hikmah: Jurnal Ilmu Perpustakaan, Informasi, dan Kearsipan*. 12(2), 89–105.
- [50] Amalia, A.N., Supriyadi, S., 2023. The Influence of Social Media and Digital Literacy on Students' Learning Achievement in Economics Subjects. *International Journal of Business, Law, and Education*. 4(2), 1560–1566. DOI: <https://doi.org/10.56442/ijble.v4i2.620>
- [51] Bahlamar, A.R.U., 2024. Digital media literacy in scholarly discourse: A bibliometric analysis of Scopus-indexed publications. *Khizanah Al-Hikmah: Jurnal Ilmu Perpustakaan, Informasi, dan Kearsipan*. 12(2), 253–266. DOI: <https://doi.org/10.24252/kah.v12i2a3>
- [52] Budiarti, E., 2022. Problematics of digital literacy implementation in early children at Nurul Aulia Kindergarten, Depok. *International Journal of Emerging Issues in Early Childhood Education*. 4(2), 70–79. DOI: <https://doi.org/10.31098/ijeiece.v4i2.893>
- [53] Damanik, S.H., Srinahyanti, S., Lubis, M.S., et al., 2024. Digital literacy profile of early childhood education students. *Proceedings of the 5th International Conference of Educational Science (ICONSEIR 2023)*; 30 November 2023; Medan, Indonesia. pp. 45–52. DOI: <http://dx.doi.org/10.4108/cai.30-11-2023.2346948>
- [54] Dewi, R.K., Lasmana, O., Festiyed, F., et al., 2024. Implications and impact of digital literacy on higher education: Systematic literature review. *Eduvest-Journal of Universal Studies*. 4(6), 5300–5312. DOI: <https://doi.org/10.59188/eduvest.v4i6.1410>
- [55] Diani, O., Amiruddin, A., 2023. Students' digital literacy skill at Universitas PGRI Palembang. *Journal of Social Work and Science Education*. 4(3), 859–866. DOI: <https://doi.org/10.52690/jswse.v4i3.481>
- [56] Fadhli, M., Kuswandi, D., Utami, P.S., et al., 2023. Game-based learning and children's digital literacy to support pervasive learning: A systematic review. *Jurnal Teknologi Pendidikan*. 25(3), 386–393. DOI: <https://doi.org/10.21009/jtp.v25i3.38388>
- [57] Fitrianolinda, F., Faizah, H., Sumarno, S., 2024. The influence of information literacy, media literacy and digital literacy on the pedagogical competence of public elementary school teachers in Sukajadi Sub-District, Pekanbaru. *Innovative: Journal of Social Science Research*. 4(2), 6368–6375.
- [58] Garcia-Ruiz, R., Ramirez-Garcia, A., 2023. A digital literacy model to narrow the digital literacy skills gap. *Heliyon*. 9(7), e14878. DOI: <https://doi.org/10.1016/j.heliyon.2023.e14878>
- [59] Herawan, E., Febianti, Y.N., Safitri, A.L., 2023. Digital literacy and student creativity through e-resources on the quality of learning in college. *Journal of Education Technology*. 7(1), 25–33. DOI: <https://doi.org/10.23887/jet.v7i1.43622>
- [60] Idris, M., Weda, S., Fansury, A.H., 2023. Students' digital literacy skill to solve learning problems. *Bosowa Journal of Education*. 3(2), 72–76. DOI: <https://doi.org/10.35965/bje.v3i2.2628>
- [61] Istiana, Y., Widodo, M., 2023. A systematic review of technology integration in early childhood education. *Early Childhood Education Development and Studies (ECEDS)*. 4(1), 31–37. DOI: <https://doi.org/10.35508/>

- ceeds.v4i1.11910
- [62] Knaus, T., 2022. Making in media education: A defense of maker education in the field of educational science. *Journal of Media Literacy Education*. 14(3), 53–65.
- [63] Kusumo, F.A., Subali, B., Sunarto, S., 2022. The analysis of student's digital literacy with Microsoft E-learning media. *Journal of Primary Education*. 11(2), 165–177. DOI: <https://doi.org/10.15294/jpe.v11i2.61402>
- [64] Maya, L., Suseno, M., 2022. Investigating the incorporation of digital literacy and 21st-century skills into postgraduate students' learning activities. *ELE Reviews: English Language Education Reviews*. 2(1), 13–27. DOI: <https://doi.org/10.22515/elereviews.v2i1.5121>
- [65] Noordin, N.H., 2024. Examining media and information literacy levels among underprivileged communities. *Journal of Media Literacy Education*. 16(2), 85–97.
- [66] Pires Pereira, Í.S., Parente, M.C.C., da Silva, M.C.V., 2023. Digital literacy in early childhood education: What can we learn from innovative practitioners? *International Journal of Early Years Education*. 31(1), 287–301. DOI: <https://doi.org/10.1080/09669760.2021.1892598>
- [67] Perwita, D., Widuri, R., Afif, N., 2023. The influence of the eLDirU LMS, digital literacy, and CBL methods on learning achievement. *Economic Education Analysis Journal*. 12(3), 241–254. DOI: <https://doi.org/10.15294/eeaj.v12i3.75498>
- [68] Pikri, F., Rahayu, K., La Ode Muhammad Idrus Hamid, B., et al., 2024. Foreign language learning: A study of digital literacy in Generation Z. *International Journal of Language and Ubiquitous Learning*. 1(4), 344–357. DOI: <https://doi.org/10.70177/ijlul.v1i4.691>
- [69] Purnama, S., Ulfah, M., Ramadani, L., et al., 2022. Digital storytelling trends in early childhood education in Indonesia: A systematic literature review. *JPUD-Jurnal Pendidikan Usia Dini*. 16(1), 17–31. DOI: <https://doi.org/10.21009/JPUD.161.02>
- [70] Purwati, S., Sukiman, 2024. The influence of teachers' digital literacy and media literacy on the quality of learning at Raudhatul Athfal. *Journal of Scientific Research, Education, and Technology (JSRET)*. 3(2), 600–612. DOI: <https://doi.org/10.58526/jsret.v3i2.389>
- [71] Purworini, D., Pamungkas, E.W., Naidoo, G.M., et al., 2024. Enhancing digital literacy in early childhood school teachers: Technology and analysis approaches based on social cognitive theory. *Transformasi: Jurnal Pengabdian Masyarakat*. 20(2), 401–412. DOI: <https://doi.org/10.20414/transformasi.v20i2.10605>
- [72] Putri, N.E., Iriyanto, T., Anisa, N., 2024. Stimulating early childhood digital literacy through the innovative Kiddyfun platform. *Jurnal Pendidikan Anak Usia Dini Undiksha*. 12(2), 89–98. DOI: <https://doi.org/10.23887/paud.v12i2.77180>
- [73] Rahman, F., Suyidno, S., Miriam, S., et al., 2023. Developing learners' digital literacy through guided discovery learning on the matter of work and energy. *JPPS (Jurnal Penelitian Pendidikan Sains)*. 13(1), 42–53. DOI: <https://doi.org/10.26740/jpps.v13n1.p42-53>
- [74] Riyanti, A., Sagena, U., Lestari, N.C., et al., 2023. Internet-based learning in improving student digital literacy. *Cendikia: Media Jurnal Ilmiah Pendidikan*. 13(4), 585–594. DOI: <https://doi.org/10.35335/cendikia.v13i4.3598>
- [75] Sari, D.M.M., 2022. Digital literacy and academic performance of students' self-directed learning readiness. *ELite Journal: International Journal of Education, Language, and Literature*. 2(3), 127–136. DOI: <https://doi.org/10.26740/elitejournal.v2n3.p127-136>
- [76] Selfa Sastre, M., Llovera Moranco, L., 2015. Scientific studies on literacy and digital literacy indexed in Scopus: A literature review (2000–2013). *Actualidades Pedagógicas*. 67, 197–215. DOI: <https://doi.org/10.19052/ap.3579>
- [77] Smith, E.E., Storrs, H., 2023. Digital literacies, social media, and undergraduate learning. *International Journal of Educational Technology in Higher Education*. 20(1), 29. DOI: <https://doi.org/10.1186/s41239-023-00398-2>
- [78] Tatminingsih, S., 2022. Implementation of digital literacy in Indonesia early childhood education. *International Journal of Emerging Issues in Early Childhood Education*. 4(1), 12–22. DOI: <https://doi.org/10.31098/ijeiece.v4i1.894>