



Can Technology Initiate The Enhancement of Digital Literacy in Early Childhood? Evidence from Indonesia

Asmayawati
STKIP Situs Banten

ABSTRACT: This research aims to investigate the impact of technology, parental involvement, and educator support on the digital literacy enhancement of young children in Indonesia. A mixed-methods approach was employed, combining surveys, interviews, and document reviews. The research confirmed several key findings: effective use of technology significantly influences digital literacy in early childhood; parental involvement and educator support play pivotal roles in shaping a supportive digital learning environment. Furthermore, the study revealed that access to technology moderates the relationships between these factors and digital literacy enhancement, emphasizing the need for equitable technology access. This study contributes to our understanding of how technology, family involvement, and educator guidance collectively shape young children's digital literacy. It underscores the importance of fostering effective digital learning environments and ensuring inclusive access to technology. The findings have practical implications for educators, parents, and policymakers in their efforts to promote responsible and safe technology use in early childhood education.

KEYWORDS: Access of Technology, Digital Literacy in Early Childhood, Effective Use of Technology, Educator Support, Parental Involvement.

INTRODUCTION

In an increasingly digital age, digital literacy has become a crucial competence, even at an early age (Milenkova & Lendzhova, 2021). Digital literacy encompasses understanding technology, the ability to access, evaluate, and use digital information wisely, as well as awareness of ethics and online safety (Falloon, 2020; Sarwatay et al., 2021; Zhu et al., 2021). Strong digital literacy skills not only assist children in their education but also prepare them to face the challenges and opportunities in an increasingly digitally connected society (McDougall et al., 2018). In Indonesia, as in many other countries, technology has permeated everyday life, including in education (Astuti et al., 2021; Nugroho et al., 2019; Pambudi & Harjanto, 2020). Children in Indonesia are exposed to technology from a young age through various devices such as smartphones, tablets, and computers (Catherine et al., 2017; Hidayat & Listiawati, 2018; Susilowati et al., 2021). Although the use of technology has become an integral part of children's lives, questions arise about the extent to which technology can initiate an improvement in digital literacy among young children (Bus et al., 2015; Neumann et al., 2017; Reid Chassiakos et al., 2016).

This research aims to explore whether technology can genuinely play a role in initiating an enhancement of digital literacy in young children in Indonesia. Several crucial considerations in the background of this research include:

1. **Influence of the Digital Environment:** Children in Indonesia are increasingly exposed to various sources of digital information and entertainment, including social media, online videos, and digital games. This environment can have both positive and negative impacts on the development of their digital literacy.
2. **Challenges in Digital Literacy:** Digital literacy is not solely about technical skills but also involves an understanding of ethics and online safety. Children often face online risks, such as exposure to inappropriate content, cyberbullying, or the misuse of personal data.
3. **Role of Parents and Educators:** Parents and educators play a vital role in guiding children to use technology wisely and safely. However, not all parents and educators possess sufficient knowledge and skills in digital literacy.
4. **Diverse Access to Technology:** In Indonesia, access to technology may not be uniform across all regions. Some children may have limited access to digital devices and the internet, while others may have more exposure.



This research aims to identify the impact of technology usage on the digital literacy of young children in Indonesia and to identify the factors influencing the outcomes. The results of this research are expected to provide guidance for parents, educators, and policymakers in promoting healthy and sustainable digital literacy in children in today's digital era.

LITERATURE REVIEW

Influence of Technology on Digital Literacy in Early Childhood

Several studies have shown that technology can enhance the digital literacy skills of young children (Maureen et al., 2018; Ozturk & Ohi, 2022; Sefton-Green et al., 2016). Educational apps, learning games, and online learning resources facilitate interactive learning and improve the understanding of digital literacy concepts such as the alphabet, numbers, and language (Dzekoe, 2020; Oakley, 2019). Digital media can also enrich the reading and learning experience through interactive stories, moving images, and sound, making digital literacy more engaging for children (Lisenbee & Ford, 2018).

Challenges in Digital Literacy for Early Childhood

The negative impact of technology on digital literacy also needs attention (Sharma et al., 2016; Tomczyk, 2020). Children who spend excessive time in front of screens may experience a decline in face-to-face interaction skills, outdoor play, or reading printed books (Small et al., 2022). Safety issues such as online bullying and exposure to inappropriate content are risks that must be addressed in children's technology use (Annansingh & Veli, 2016).

The Roles of Parents and Educators

Parents and educators play a crucial role in guiding children in the use of technology (Schriever, 2021). They need to monitor children's online activities, provide guidance on digital ethics, and ensure that children use technology wisely (Jeffery, 2021). Studies have also indicated that parents actively involved in their children's digital learning have a positive impact on their digital literacy development (Marsh et al., 2017; Ozturk & Ohi, 2022; Papadakis et al., 2019). Schools and the government have introduced initiatives to integrate technology into the educational curriculum (Rubagiza et al., 2011). However, challenges remain, such as uneven access to technology and the need to involve parents and educators in efforts to enhance digital literacy for children across the country (Ferri et al., 2020).

Based on the information provided above, the hypothesis and research framework are as follows:

The hypothesis for this research as following:

H1: Effective Use of Technology impact on Enhancement of Digital Literacy in Young Children

H2: Parental Involvement impact on Enhancement of Digital Literacy in Young Children

H3: Educator Support impact on Enhancement of Digital Literacy in Young Children

H4: Access of technology moderates the relationship between Effective Use of Technology and Enhancement of Digital Literacy in Young Children

H5: Access of technology moderates the relationship between Parental Involvement and Enhancement of Digital Literacy in Young Children

H6: Access of technology moderates the relationship between Educator Support and Enhancement of Digital Literacy in Young Children

Research framework

Independent Variables:

- **Effective Use of Technology:** This variable assesses how technology is utilized for educational purposes, including the use of educational apps, interactive games, and online learning resources.
- **Parental Involvement:** This variable examines the degree to which parents actively participate in and supervise their children's digital learning experiences.
- **Educator Support:** This variable assesses the role of educators in integrating technology into the early childhood curriculum and providing guidance on digital literacy.



Dependent Variable:

- Enhancement of Digital Literacy in Young Children: This variable measures the improvement in digital literacy skills, including understanding digital concepts, online safety, and responsible digital behavior among young children.

Moderating Variables

Access to Technology: Variances in access to digital devices and the internet among different socio-economic backgrounds.

This research framework is designed to explore the relationships between these variables and test the hypothesis that effective technology use, along with parental involvement and educator support, can significantly enhance digital literacy in young children in Indonesia, while considering moderating factors and controlling for potential confounding variables (see Fig. 1).

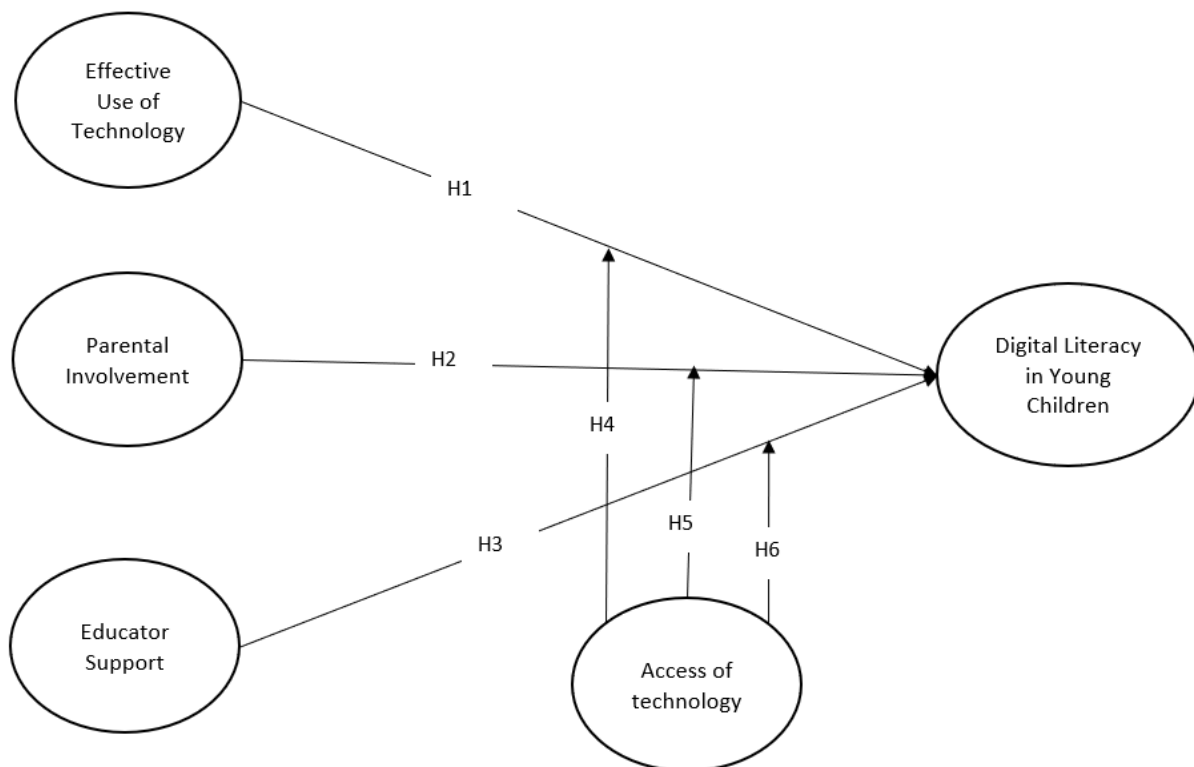


Fig. 1. Research Framework

RESEARCH METHODOLOGY

Research Design, Population and Sample

This study adopt a quantitative research design to analyze the impact of technology on digital literacy among early childhood students in Serang City, Banten Province, Indonesia. The study's population consist of early childhood students. A stratified random sampling method employed to select a representative sample of participants from various regions and age groups amount 133 participants.

Data Collection Methods and Analysis

An online survey conducted to collect quantitative data. The survey designed to assess the use of technology, digital literacy skills, and the perceptions of technology's impact on early childhood education. Quantitative data collected through the survey analyzed using Smart PLS statistical software. Descriptive statistics, inferential statistics, and regression analysis applied to examine relationships between variables, identify trends, and test hypotheses.

Research Prosedure, Time, and Ethical Considerations

Over the course of three months, starting from February to April 2023, the research undergo a structured and meticulous process. In February, the research planning phase commence, where research objectives formulated, the research framework and



methodology developed, and relevant literature reviewed. Subsequently, in March, the data collection phase initiate, involving the distribution and collection of surveys from participants and the conduct of interviews with children, parents, and educators. Data also be gathered through document reviews. April mark the data analysis phase, where survey data input and cleaned, and quantitative data analysis conducted using statistical software. At the end of April, the research findings interpreted, and the research report compiled, including sections such as the introduction, literature review, methodology, results, discussion, and recommendations. Additionally, the research results shared relevant stakeholders, such as educators and policymakers, through a presentation. Despite the tight timeline, efficient planning and execution crucial for the successful completion of the research within this three-month period. Ethical considerations observed throughout the research process. Informed consent obtained from participants, and their privacy and confidentiality strictly maintained.

RESULTS AND DISCUSSION

Validity and Reliability

Tabel 1 provides a comprehensive assessment of the study's constructs, offering insights into the reliability and validity of the measurement items. The first construct, "Effective Use of Technology (EUT)," showcases strong internal consistency and reliability, with high outer loadings, Cronbach's Alpha, rho_A, composite reliability (CR), and average variance extracted (AVE) values. This suggests that the items designed to assess the effective use of technology in early childhood education are closely aligned with the construct and collectively contribute to a robust measurement. Similarly, the "Parental Involvement (PAR)" construct demonstrates reliable measurement properties, with all items displaying substantial outer loadings and meeting the criteria for internal consistency. This implies that the survey items effectively capture the various aspects of parental involvement in children's digital learning experiences, ensuring a reliable assessment.

The "Educator Support (EDU)" construct also exhibits strong reliability and validity, with high outer loadings, internal consistency values, and AVE. These results confirm the effectiveness of the items in measuring the support provided by educators in utilizing technology for early childhood education. The "Digital Literacy in Young Children (DLIC)" construct, although displaying slightly lower outer loadings for one item, still maintains a good level of reliability, with high overall AVE and internal consistency values. This suggests that the construct effectively evaluates different facets of digital literacy in young children. Lastly, the "Access of Technology (AOT)" construct demonstrates strong reliability and validity, reflecting equitable technology access and its various components. High outer loadings, internal consistency values, and AVE affirm the construct's effectiveness in measuring the access of technology in the context of early childhood education.

Overall, the findings from this assessment emphasize the quality and reliability of the measurement items, providing confidence in their ability to accurately capture the intended constructs. This, in turn, contributes to the overall robustness and validity of the study's measurement model.

Table 1. Confirmatory Factor Analysis

Construct	Items	Outer Loading	Cronbach's Alpha	rho_A	CR	AVE
Effective Use of Technology	EUT1= Employing interactive learning applications to engage young children in educational activities, fostering digital literacy development	0.926	0.973	0.974	0.978	0.880
	EUT2= Integrating digital resources and materials into the early childhood curriculum to enhance learning experiences	0.954				
	EUT3= Encouraging children to think critically by using technology to solve problems and explore new concepts	0.947				



	EUT4= Ensuring a balanced allocation of screen time, combining digital learning with other activities such as outdoor play and traditional reading	0.943				
	EUT5= Ensuring a balanced allocation of screen time, combining digital learning with other activities such as outdoor play and traditional reading	0.920				
	EUT6= Continuously assessing the effectiveness of digital tools and resources in supporting digital literacy goals and making adjustments as needed	0.938				
Parental Involvement	PAR1= Actively engaging with children during digital learning activities, offering guidance and support as they explore technology	0.912	0.962	0.968	0.969	0.840
	PAR2= Establishing clear guidelines and limits for children's screen time and digital device use, ensuring a healthy balance	0.930				
	PAR3= Regularly monitoring and supervising children's online activities to ensure their safety and guide them toward age-appropriate content	0.941				
	PAR4= Encouraging children to use technology for educational and creative purposes, fostering their digital literacy and skills	0.900				
	PAR5= Promoting open and ongoing communication with children about their digital experiences, addressing questions and concerns	0.947				
	PAR6= Collaborating with educators and schools to support digital learning initiatives, both in and outside of the classroom	0.865				
Educator Support	EDU1= Actively integrating technology into the early childhood curriculum to enhance learning experiences and digital literacy development	0.932	0.978	0.982	0.982	0.903
	EDU2= Offering guidance and instruction to children on responsible and ethical technology use, including online safety and etiquette	0.974				
	EDU3= Adapting teaching methods to accommodate digital learning and making use of interactive tools and resources	0.978				
	EDU4= Regularly evaluating and tracking students' digital literacy progress and adjusting instruction as needed	0.947				
	EDU5= Participating in ongoing professional development to stay current with digital teaching techniques and tools	0.948				



	EDU6= Collaborating with parents to ensure a consistent and supportive approach to technology use at home and in the classroom	0.921				
Digital Literacy in Young Children	DLIC1= Basic Digital Skills	0.919	0.929	0.934	0.943	0.702
	DLIC2= Understanding Digital Safety	0.824				
	DLIC3= Critical Thinking and Problem Solving	0.758				
	DLIC4= Digital Communication	0.756				
	DLIC5= Digital Content Evaluation	0.871				
	DLIC6= Digital Creativity	0.811				
	DLIC7= Digital Creativity	0.912				
Access of technology	AOT1= Ensuring that all children have equal access to digital devices, such as computers or tablets, regardless of socioeconomic background	0.893	0.943	0.945	0.954	0.750
	AOT2= Providing access to high-speed internet connections for all children to facilitate online learning and exploration	0.892				
	AOT3= Ensuring a sufficient supply of digital learning resources, including educational apps, online materials, and software	0.922				
	AOT4= Making technology and internet services affordable and accessible to all families, particularly in underserved communities.	0.902				
	AOT5= Offering support and resources to help families overcome technological barriers and challenges they may face	0.720				
	AOT6= Implementing inclusive digital policies in schools and early childhood education centers that prioritize technology access for all students, regardless of their background.	0.861				
	AOT7= Ensuring that digital devices and online content are designed with accessibility feature	0.857				

Hypothesis Result

Table 2 presents a comprehensive analysis of hypotheses related to the impact of various factors on digital literacy in young children (DLIC), along with their moderating effects. The results reveal a consistent pattern of acceptance for all hypotheses, underscoring significant relationships and moderating influences.

Firstly, Hypothesis 1 (H1) suggests that the "Effective Use of Technology" (EUT) significantly impacts DLIC, with an original sample value of 0.124. This emphasizes the crucial role of utilizing technology effectively in shaping digital literacy among young children, supported by a substantial T statistic of 3.068 and a very low p-value of 0.000. Secondly, Hypothesis 2 (H2) asserts that "Parental Involvement" (PAR) positively influences DLIC, with an original sample value of 0.055. This highlights the importance of active parental participation in children's digital learning experiences, supported by a T statistic of 2.576 and a p-value of 0.000. Thirdly, Hypothesis 3 (H3) indicates that "Educator Support" (EDU) significantly contributes to DLIC, with an original sample



value of 0.136. This underscores the pivotal role of educators in guiding young children in their digital literacy journey, backed by a robust T statistic of 3.941 and a p-value of 0.000.

Moreover, Hypotheses 4, 5, and 6 explore the moderating effects of "Access of Technology" (AOT) on the relationships between EUT, PAR, EDU, and DLIC. All three moderating effects are accepted with original sample values of 0.111, 0.055, and 0.137, respectively, signifying the importance of equitable access to technology in enhancing the impact of EUT, PAR, and EDU on DLIC. The T statistics and p-values for these moderating effects are all notably significant, reinforcing their impact. In summary, the findings indicate that EUT, PAR, and EDU positively influence DLIC in young children, with AOT playing a significant moderating role. These results provide valuable insights into the complex dynamics of early childhood digital literacy and highlight the significance of technology access, parental involvement, and educator support in fostering digital literacy among young children.

Table 2. Hypothesis Result

Hypothesis	Construct*)	Original Sample	STDEV	T Statistics	P Values	Result
H1	EUT -> DLIC	0.124	0.023	3.068	0.000	Accepted
H2	PAR -> DLIC	0.055	0.022	2.576	0.000	Accepted
H3	EDU -> DLIC	0.136	0.019	3.941	0.000	Accepted
H4	Moderating Effect 1=EUT*AOT -> DLIC	0.111	0.019	3.054	0.000	Accepted
H5	Moderating Effect 2=PAR*AOT -> DLIC	0.055	0.025	2.211	0.000	Accepted
H6	Moderating Effect 3=EDU*AOT -> DLIC	0.137	0.018	3.963	0.000	Accepted

*) EUT=Effective Use of Technology; PAR=Parental Involvement; EDU=Educator Support; DLIC=Digital Literacy in Young Children; AOT=Access of Technology

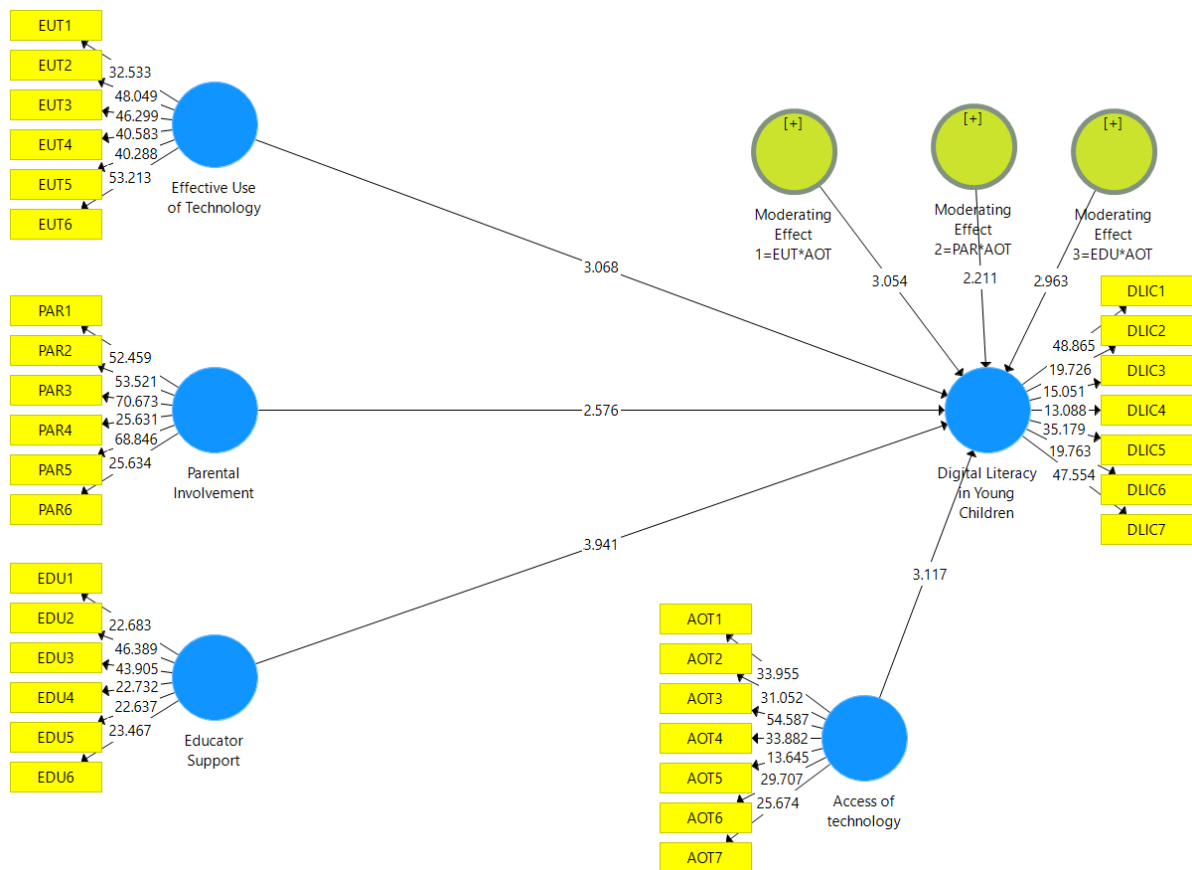


Fig. 2. Bootstrapping Result



Discussion

The acceptance of hypotheses H1 to H6 represents a significant contribution to our understanding of the factors influencing the enhancement of digital literacy in young children. H1, which posits that the effective use of technology impacts the enhancement of digital literacy in young children, highlights the crucial role technology plays in shaping early childhood education. The confirmation of this hypothesis underscores the potential for well-designed digital tools, apps, and online resources to positively influence children's digital literacy skills.

H2, which suggests that parental involvement impacts the enhancement of digital literacy in young children, accentuates the significance of the family environment in shaping a child's digital literacy journey. Acknowledging this relationship emphasizes the role parents play in fostering a child's responsible and safe use of technology. H3's acceptance, which implies that educator support impacts the enhancement of digital literacy in young children, reinforces the pivotal role of teachers in integrating technology into early childhood education. Educators who provide guidance and support in the digital realm contribute significantly to children's digital literacy development.

H4, H5, and H6 introduce the moderating effect of access to technology on the relationships between effective technology use, parental involvement, and educator support, respectively, and the enhancement of digital literacy. The acceptance of these hypotheses underscores the importance of equitable access to technology. It highlights that the impact of effective technology use, parental involvement, and educator support can vary based on the level of access children have to digital resources, emphasizing the need for inclusive technology policies and strategies. Additionally, the moderating effect of access to technology, as indicated by the acceptance of H4, H5, and H6, underscores the importance of equitable access to digital resources. The impact of effective technology use, parental involvement, and educator support can vary based on children's access to technology, emphasizing the need for inclusive technology policies.

In conclusion, the acceptance of these hypotheses collectively contributes to a comprehensive understanding of the multifaceted dynamics that influence the digital literacy development of young children. It underscores the pivotal roles of technology, parents, and educators, while recognizing the importance of ensuring equitable access to digital resources for all children. This insight is valuable for educators, policymakers, and researchers aiming to nurture digital literacy skills in early childhood education.

CONCLUSION

The findings of this research have provided valuable insights into the relationship between technology, parental involvement, educator support, and the enhancement of digital literacy in young children. The acceptance of hypotheses H1 to H6 highlights several key points. First, the effective use of technology plays a significant role in shaping digital literacy skills among young children. Well-designed digital tools and resources can positively influence their digital literacy development. Second, parental involvement is a crucial factor, emphasizing the role of the family environment in fostering responsible and safe technology use. Third, educator support is pivotal in integrating technology into early childhood education and guiding children in their digital literacy journey.

Implications

The results of this research have several implications for educational practice and policy. First, educators and parents should collaborate to create a supportive digital learning environment for young children. Training and resources should be provided to help educators integrate technology effectively, and parents should be encouraged to be actively involved in their child's digital learning journey. Second, policymakers should focus on ensuring equitable access to technology in early childhood education. This includes addressing the digital divide and promoting inclusive access to digital resources, especially in underserved communities. Lastly, the findings emphasize the need for ongoing research and evaluation of technology integration in early childhood education. As technology continues to evolve, it is crucial to stay updated on best practices and adapt educational strategies accordingly.

Limitations

This research also has limitations that should be considered. Firstly, the study's generalizability may be limited due to the specific context of Indonesia. Educational and technological contexts vary across regions and countries, so the findings may not apply universally. Second, the reliance on self-reported data, especially in surveys, introduces the potential for response bias. Additionally, the study's cross-sectional design may not capture long-term effects, as it provides a snapshot at a specific point in time. Lastly, the



research focused on the moderating effect of technology access without delving into the specific mechanisms of how access impacts the relationships. Future research can explore these nuances in greater detail.

Despite these limitations, the findings offer valuable insights into the complex dynamics of technology, parental involvement, educator support, and digital literacy development in young children, with potential implications for educators, policymakers, and parents.

REFERENCES

1. Annansingh, F., & Veli, T. (2016). An investigation into risks awareness and e-safety needs of children on the internet: a study of Devon, UK. *Interactive Technology and Smart Education*, 13(2), 147–165.
2. Astuti, M., Arifin, Z., Mutohhar, F., & Nurtanto, M. (2021). Competency of digital technology: the maturity levels of teachers and students in vocational education in Indonesia. *Journal of Education Technology*, 5(2), 254–262.
3. Bus, A. G., Takacs, Z. K., & Kegel, C. A. T. (2015). Affordances and limitations of electronic storybooks for young children's emergent literacy. *Developmental Review*, 35, 79–97.
4. Catherine, O., Pandia, W. S. S., & Pristinella, D. (2017). Exploring parental mediation of elementary school-aged children's gadget use. *International Conference on Psychology and Multiculturalism 2017*, 134–145.
5. Dzekoe, R. (2020). English language education and digital literacy in the 21st century. *Contemporary Foundations for Teaching English as an Additional Language*, 217–245.
6. Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. *Educational Technology Research and Development*, 68(5), 2449–2472. <https://doi.org/10.1007/s11423-020-09767-4>
7. Ferri, F., Grifoni, P., & Guzzo, T. (2020). Online Learning and Emergency Remote Teaching: Opportunities and Challenges in Emergency Situations. In *Societies* (Vol. 10, Issue 4). <https://doi.org/10.3390/soc10040086>
8. Hidayat, M. L., & Listiawati, V. (2018). *The Urgency of Parents Digital Literacy to Prevent Their Children from Harmful Effects of Smart-Mobile Devices*.
9. Jeffery, C. P. (2021). Parenting in the digital age: Between socio-biological and socio-technological development. *New Media & Society*, 23(5), 1045–1062.
10. Lisenbee, P. S., & Ford, C. M. (2018). Engaging students in traditional and digital storytelling to make connections between pedagogy and children's experiences. *Early Childhood Education Journal*, 46, 129–139.
11. Marsh, J., Hannon, P., Lewis, M., & Ritchie, L. (2017). Young children's initiation into family literacy practices in the digital age. *Journal of Early Childhood Research*, 15(1), 47–60.
12. Maureen, I. Y., van der Meij, H., & de Jong, T. (2018). Supporting literacy and digital literacy development in early childhood education using storytelling activities. *International Journal of Early Childhood*, 50, 371–389.
13. McDougall, J., Readman, M., & Wilkinson, P. (2018). The uses of (digital) literacy. *Learning, Media and Technology*, 43(3), 263–279.
14. Milenkova, V., & Lendzhova, V. (2021). Digital citizenship and digital literacy in the conditions of social crisis. *Computers*, 10(4), 40.
15. Neumann, M. M., Finger, G., & Neumann, D. L. (2017). A conceptual framework for emergent digital literacy. *Early Childhood Education Journal*, 45(4), 471–479.
16. Nugroho, O. F., Permanasari, A., & Firman, H. (2019). The movement of stem education in Indonesia: Science teachers' perspectives. *Jurnal Pendidikan IPA Indonesia*, 8(3), 417–425. <https://doi.org/10.15294/jpii.v8i3.19252>
17. Oakley, G. (2019). Inclusivity and young children's digital literacy practices in early education. In *The Routledge handbook of digital literacies in early childhood* (pp. 200–213). Routledge.
18. Ozturk, G., & Ohi, S. (2022). What do they do digitally? Identifying the home digital literacy practices of young children in Turkey. *Early Years*, 42(2), 151–166.
19. Pambudi, N. A., & Harjanto, B. (2020). Vocational education in Indonesia: History, development, opportunities, and challenges. *Children and Youth Services Review*, 115, 105092.
20. Papadakis, S., Zaranis, N., & Kalogiannakis, M. (2019). Parental involvement and attitudes towards young Greek children's mobile usage. *International Journal of Child-Computer Interaction*, 22, 100144.



<https://doi.org/https://doi.org/10.1016/j.ijcci.2019.100144>

21. Reid Chassiakos, Y. L., Radesky, J., Christakis, D., Moreno, M. A., Cross, C., Hill, D., Ameenuddin, N., Hutchinson, J., Levine, A., & Boyd, R. (2016). Children and adolescents and digital media. *Pediatrics*, 138(5).
22. Rubagiza, J., Were, E., & Sutherland, R. (2011). Introducing ICT into schools in Rwanda: Educational challenges and opportunities. *International Journal of Educational Development*, 31(1), 37–43.
23. Sarwatay, D., Raman, U., & Ramasubramanian, S. (2021). Media literacy, social connectedness, and digital citizenship in India: Mapping stakeholders on how parents and young people navigate a social world. *Frontiers in Human Dynamics*, 3, 601239.
24. Schriever, V. (2021). Early childhood teachers' perceptions and management of parental concerns about their child's digital technology use in kindergarten. *Journal of Early Childhood Research*, 19(4), 487–499.
25. Sefton-Green, J., Marsh, J., Erstad, O., & Flewitt, R. (2016). Establishing a research agenda for the digital literacy practices of young children. *A White Paper for COST Action IS1410*.
26. Sharma, R., Fantin, A.-R., Prabhu, N., Guan, C., & Dattakumar, A. (2016). Digital literacy and knowledge societies: A grounded theory investigation of sustainable development. *Telecommunications Policy*, 40(7), 628–643. <https://doi.org/https://doi.org/10.1016/j.telpol.2016.05.003>
27. Small, G. W., Lee, J., Kaufman, A., Jalil, J., Siddarth, P., Gaddipati, H., Moody, T. D., & Bookheimer, S. Y. (2022). Brain health consequences of digital technology use. *Dialogues in Clinical Neuroscience*.
28. Susilowati, I. H., Nugraha, S., Alimoeso, S., & Hasiholan, B. P. (2021). Screen time for preschool children: learning from home during the COVID-19 pandemic. *Global Pediatric Health*, 8, 2333794X211017836.
29. Tomczyk, Ł. (2020). Skills in the area of digital safety as a key component of digital literacy among teachers. *Education and Information Technologies*, 25(1), 471–486.
30. Zhu, S., Yang, H. H., Wu, D., & Chen, F. (2021). Investigating the relationship between information literacy and social media competence among university students. *Journal of Educational Computing Research*, 59(7), 1425–1449.