

## Utilizing Digital Technology for Character Development in Early Childhood Education: A Scoping Review

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### Abstrak

Guru dan orang tua sering kali kekurangan contoh implementasi teknologi digital dalam mengembangkan karakter anak usia dini. Penelitian ini bertujuan untuk menganalisis praktik baik penerapan teknologi digital dalam pengembangan karakter anak usia dini. Metode yang digunakan adalah model Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Review (PRISMA-ScR) untuk mengidentifikasi laporan penelitian terkait penerapan teknologi digital dalam pengembangan karakter anak usia dini selama lima tahun terakhir. Hasil penelitian menunjukkan bahwa teknologi digital yang diterapkan terbagi menjadi dua jenis, yaitu audio visual dan visual. Melalui perspektif Early Childhood Education for Sustainability (ECEfs), pemanfaatan teknologi digital terbukti efektif dalam menstimulasi karakter anak, dengan komposisi karakter self respect (31%), respect to others (38%), dan respect to the environment (31%). Berdasarkan 18 karakter bangsa menurut Permendikbud No. 20 Tahun 2018, hanya 33% dari proporsi karakter yang dikembangkan melalui teknologi digital. Penelitian ini menyimpulkan bahwa teknologi digital, baik dalam bentuk audio visual maupun visual, dapat digunakan oleh guru dan orang tua untuk mendukung pengembangan karakter anak usia dini. Teori socio-cultural dan ecological systems digunakan untuk menjelaskan peran dan potensi teknologi digital dalam upaya pengembangan karakter pada anak usia dini.

**Kata Kunci:** Teknologi, Digital, Moral, Karakter, Anak.Usia Dini

### Abstract

Teachers and parents often lack examples of implementing digital technology in the development of character for early childhood. This study aims to analyze best practices in the application of digital technology for character development in young children. The method used is the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Review (PRISMA-ScR) to identify research reports on the use of digital technology for character development in early childhood over the past five years. The findings show that the applied digital technologies are divided into two types: audiovisual and visual. Through the perspective of Early Childhood Education for Sustainability (ECEfs), the use of digital technology has been proven effective in stimulating children's character, with the character composition of self-respect (31%), respect for others (38%), and respect for the environment (31%). Based on the 18 national character values according to Permendikbud No. 20 of 2018, only 33% of the character proportions are developed through digital technology. This study concludes that digital technology, both in audiovisual and visual forms, can be utilized by teachers and parents to support the development of character in early childhood. Socio-cultural and ecological systems theories are used to explain the role and potential of digital technology in character development for young children.

**Keywords:** Technology, Digital, Moral, Character, Early Childhood

## 1. INTRODUCTION

Digital technology has been available and can be used by early childhood both at home, school, and in the community in today's era. In various contexts, early childhood can access various digital devices easily (Lawrence & Lawrence, 2017; Saracho, 2015). Digital devices can be explained as devices with digital technology in the form of smartphones, tablets, iPads, laptops, or desktop computers that are used for various purposes (Ichhpujani et al., 2019). Data in 2014 showed that active smartphone users in Indonesia reached around 47 million people. As many as 79.5% of them came from the age category of children and adolescents. Smartphones and tablets are the digital devices most widely used by early childhood (Lawrence & Lawrence, 2017; Verma et al., 2018; Zaini & Soenarto, 2019).

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In fact, early childhood is starting to be given full freedom in using digital devices. Globally, more than 25% of children have gadgets before the age of 8. Around 33% of children start using smartphones when they are 3 years old. Then, 10% of children enjoy gadgets at the age of 2 years. In these digital devices, early childhood can access various applications, information, or games (Bouck et al., 2016; Ichhpujani et al., 2019). In the learning process at school, digital devices are the easiest and cheapest tools in providing various material needs and learning processes for early childhood. In addition, through the use of digital technology, it has been proven to support character development (Candrayani & Sujana, 2023; Hakim et al., 2022; Wolff et al., 2020). For example, the development of a character of love of cleanliness and commendable behavior in early childhood. In other words, digital devices have the potential to benefit the development of academic and non-academic aspects of early childhood.

On the contrary, it is also important to understand that digital devices also have various negative impacts on early childhood development. Excessive use in children has an impact on children's cognitive and brain functions. Children also have the potential to become addicted to various digital devices. This behavior has an impact on disrupting the social and emotional development of early childhood (Bosica et al., 2021; Sadeghi et al., 2019). The various positive and negative impacts of the use of digital devices are influenced by several factors. Among them, parents have the perception that early childhood cannot learn through digital devices due to a lack of symbolic skills, attention, and memory (Ali & Gözümlü, 2021; Sadeghi et al., 2019). Parents also stated a lack of guidance for utilizing digital applications to support learning.

From the teacher's perspective, many have difficulty in choosing appropriate applications and content that support the learning process. Teachers also find it difficult to integrate digital technology with the classroom learning process (Hirsh-Pasek et al., 2015; Reisoğlu & Çebi, 2020). Digital technology is only used for entertainment without paying attention to the content contained in the content. Children have the potential to absorb information and imitate vocabulary, negative behavior, and various forms of violence (Higgins & Katsipataki, 2015; Saracho, 2015). Some teachers have been able to utilize digital technology in learning, especially for the development of early childhood character. For example, teachers are able to develop picture story books, pop-up media, and wordless picture books based on digital technology to stimulate the development of early childhood character (Haryaningrum et al., 2023; Mawaddah et al., 2023; Rakhman et al., 2023).

Many long-term studies have proven that the implementation of quality PAUD provides benefits for an individual, including for early childhood character development efforts (Busch et al., 2023; Courtney et al., 2023; Knudsen et al., 2006; McCoy et al., 2017; Raikes et al., 2023). Character development is greatly influenced by various stimulations in early childhood. Among others, through storytelling activities (Safitri & 'Aziz, 2019), play activities (Hakim et al., 2022; Jumiatmoko et al., 2023), adult role models (Wuryaningsih & Prasetyo, 2022), and the use of various digital technologies (Supartini & Ambara, 2022).

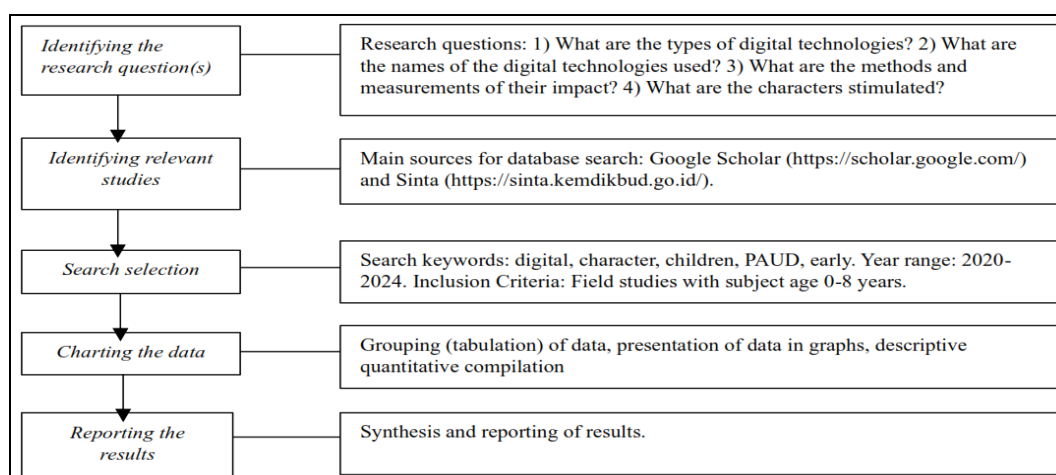
Early character education is the initial foundation in forming a child's character. Character is stated as an act that is formed throughout life to produce good habits (Hendro & Risti P, 2017; Misahapsari & Stevanus, 2023). Character education is an effort to build students into whole human beings who have emotional and spiritual intelligence so that they are able to act and make decisions wisely based on core ethical values, including respect, caring, honesty, tolerance and sharing (Nadlifah, 2017; Wuryaningsih & Prasetyo, 2022). Character is terminologically interpreted by Lickona as a reliable inner disposition to respond to situations in an amorally good way. Character consists of interrelated parts, namely moral knowing, moral feeling, and moral behavior. The use of digital technology in early childhood is important to identify further. The use of digital technology must be accompanied by clear

objectives (Loudoun et al., 2022; Nouri et al., 2020). Digital technology has played a significant role in social life and human life as a whole. The increasing number of studies in the field of digital technology utilization has not fully increased understanding of the role of digital technology in the early childhood learning process, especially in character development (Astafiria & Bayu, 2021; Fleeer, 2017).

Several literature reviews have been conducted related to early childhood character development in Indonesia. For example, regarding the role of various play activities, or related to the role of parenting style (Agusriani, 2020; Aji & Wangid, 2022; Jaberia et al., 2022; Jumiarmoko et al., 2023). According to the researcher's knowledge, there has been no literature study that identifies the use of digital technology in early childhood character development. This study offers novelty to systematically examine the results of empirical research regarding the types, names, implementation steps, development aspects, and impacts of digital technology in character development in the context of early childhood. This study aims to analyze best practices in the application of digital technology for character development in young children. This literature study provides benefits, as a reference for teachers and parents regarding good practices in implementing digital technology in early childhood character development.

## 2. METHODS

This study refers to the Preferred Reporting Items for Systematic review and Meta-Analyses extension for Scoping Review (PRISMA-ScR) model adapted from (Amodia-bidakowska et al., 2020; Arksey & O'Malley, 2005; Devi & Rustina, 2019) to provide a structured and systematic approach to the literature review conducted. This model consists of 5 (five) main stages. The research stages are described in detail in Figure 1.



**Figure 1. Research Stages**

A total of 31 articles were full text screened by all authors (J; M; A). Any studies not meeting the criteria were excluded and the remaining full-text studies were retained for data extraction. Figure 1 outlines the screening process of identifying and selecting of the study is indicated based on the PRISMA-ScR. Following the initial screening and full-text review, a total of 23 articles were excluded based on the inclusion and exclusion criteria. Articles that did not specifically examine the use of digital media, character development, and were carried out in the context of PAUD were excluded. Articles that meet the criteria were then analyzed. The analysis was carried out with specific objectives set in accordance with the research objectives (Lai et al., 2018; Perignat & Katz-buonincontro, 2019). Analysis was

carried out to find and compare the substance in each article. Components analyzed include: type, device, name, method, sample, impact test, result, and types of character.

### 3. RESULTS AND DISCUSSION

#### Results

There are 8 (eight) research articles that meet the specified inclusion criteria. Each article contains variables regarding digital technology, digital devices, and character. The article must also be the result of field study research. The age limit of the subjects involved in the study must be in the early age category, namely 0 to 8 years. All data are presented in Table 1.

**Table 1.** Tabulation of Research Analysis Results

No.	Type (Device)	Name	Method; Sample; Impact test; Result	Character	Source
1.	Audio Visual (Smartphone)	Digital Illustrated Stories Based on Tri Hita Karana	R and D model ADDIE; 3 children for individual test and 5 children for small group test; There is no specific testing for character development.	Believe in God* Respect yourself* Respect others** Respect the environment*** Honesty** Maintain cleanliness*** Perform religious duties*	(Supartini & Ambara, 2022)
2.	Audio Visual (Not specifically mentioned)	Video Blog	Qualitative Descriptive; sample was not specifically mentioned, There was not impact assesment; there is no specific testing for character development.	Honesty**	(Munif et al., 2022)
3.	Audio Visual (Smartphone)	Gim ASIK	Quasi Experiment: Non Equivalent Control Group; 30 children; Difference test; result: Sig. 2 tailed $0.000 < 0.005$ .	Get to know religion* Maintain cleanliness *** Commendable behavior** Knowing worship *	(Hakim et al., 2022)
4.	Visual (Not specifically mentioned)	Digital media wordless picture book	R and D; 15 and 32 children; paired sample t- test; result: Sig. 2 tailed $0.000 < 0.005$ .	Respect the environment ***	(Rakhman et al., 2023)
5.	Audio Visual	Digital	R and D Model	Love local culture	(Najib,

No.	Type (Device)	Name	Method; Sample; Impact test; Result	Character	Source
	(Not specifically mentioned)	Shadow Puppet	ADDIE; 5-10 children; Post Test; result: 83% (Very Good).	***	Fahad Ainun; Nurbiana Dhieni, 2023)
6.	Visual (Laptop)	Digital Pop-Up Media	One grup pretest– posttest; 10 children; Wilcoxon match pair test; result: positive impact.	Tolerance**	(Mawaddah et al., 2023)
8.	Visual (Laptop)	Digital Illustrated Storybook Media Based on Local Wisdom	R and D Model ADDIE; 15 children; Wilcoxon test; result: Sig. 2-tailed 0,001 < 0,05.	Care**	(Haryaningrum et al., 2023)

Note. \* = Self-Respect; \*\* = Respect to others; \*\*\*= Respect to environment.

In an effort to develop character with various methods, not all studies carry out specific testing on the impact of technology on development. Meanwhile, several studies conducted testing with paired t-tests and pre- and post-tests. To measure the impact, researchers involved early childhood as subjects. Using digital technology that was developed directly. In each study, the subjects involved were at least 3 (three) to a maximum of 30 (thirty) children. The next section obtained the characters that were the focus of development. In order to facilitate the proportion of the characters developed, they are arranged in the ECEfS (Early Childhood Education for Sustainability) framework and 18 (eighteen) national characters. The classification of characters developed through the implementation of digital technology within the ECEfS framework (Wolff et al., 2020) is presented in Figure 2.

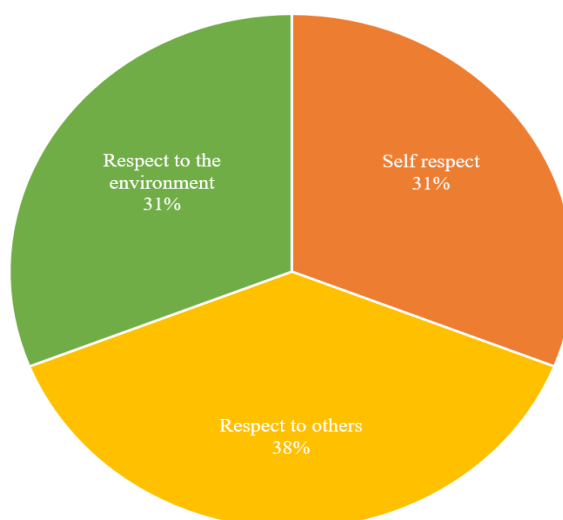


Figure 2. Character Development Proportion

The character classification as presented in Figure 2. The characters included in the self-respect group are 31%, the respect to others group is 38%, and respect to the environment is 31%. Character development within the framework of respect to others is the largest group. Next, the research results were analyzed using the framework for developing 18 (eighteen) national characters. Each type of character studied in each study was then analyzed for its suitability with the types of characters included in the 18 national characters. The results of the analysis were then tabulated in Table 2.

**Table 2.** Proportion of Character Development based on 18 National Characters

No.	Character	No.	Character	No.	Character
1.	Religious	V	10.	National spirit	-
2.	Honest	V	11.	Love for the homeland	V
3.	Tolerance	V	12.	Appreciating achievement	-
4.	Discipline	-	13.	Friendly/Communicative	-
5.	Hard work	-	14.	Love peace	-
6.	Creative	-	15.	Likes to reas	-
7.	Independent	-	16.	Care for the environment	V
8.	Democratic	-	17.	Care for society	V
9.	Curiosity	-	18.	responsibility	-

Based on the data presented in Table 2, it appears that the types of characters developed using digital technology only number 6 out of the 18 existing types of characters.

**Discussion**

This study conducted a study of the results of empirical research related to the use of digital technology for character development in the context of early childhood. The results of the study showed the success of the use of digital technology in the context of early childhood education in Indonesia. This chapter is a marker of positive developments for early childhood education. Viewed from the paradigm of progressivism, the use of digital technology shows a form of orientation of early childhood education that is in line with the dynamics of progress of the times (Gopalan et al., 2020; Haatainen & Aksela, 2021).

The presence of digital technology in the context of ECE can also be understood as part of the new socio-cultural characteristics for modern society. Socio-cultural theory explains that the presence of technology and digital devices as part of socio-cultural tools for children (Alkhudiry, 2022; Neumann, 2021). Directly or indirectly, early childhood will interact and feel the impact on their development. In accordance with Bronfenbrenner's ecological perspective theory, the process of education and character development in particular is a multilevel and mutually influencing system. Digital technology is part of the system that currently influences the development of early childhood character. If a system consists of person, process, and context components (Arnott, 2016; Udayani et al., 2022). Therefore, digital technology and devices can influence the process and context components of an education system and moral development in particular.

Judging from the results of testing the impact of using digital technology on character development, it can be stated that digital technology provides positive results. These results are in accordance with the use of digital technology in early childhood in various countries (Hung et al., 2012; Kucirkova et al., 2018; Mou et al., 2019; Yuksel-Arslan et al., 2016). Digital technology has succeeded in increasing motivation, focus, and happiness in early childhood. These various social emotional well-beings ultimately have an impact on the success of the learning process, including the process of developing the character of early childhood. The challenges in utilizing and integrating digital technology are greatly

influenced by the factors of Teacher's Philosophy and Digital Competencies. The philosophy believed by a teacher can directly influence the steps of digital technology integration in learning (Hatzigianni & Kalaitzidis, 2018; Munday et al., 2022). Various efforts are needed to improve the digital competencies of teachers and parents so that their insights, perspectives, and digital competencies can develop better.

Digital competencies that are directly relevant to the integration of digital technology with character development include: digital resources and digital pedagogy. Competencies related to digital resources mean teacher competencies in managing resources, mastering the creation, and distribution of digital resources. Competencies related to digital pedagogy are the ability to design, plan, and implement the use of digital technology at various stages of the teaching and learning process (Romero-Tena et al., 2020; Wang et al., 2022). In terms of implementation, the development of competencies of teachers and prospective ECE teachers must accommodate at least competencies related to digital resources and digital pedagogy. Through mastery of these two sub-competencies, teachers and prospective teachers are expected to be able to create, develop, and implement the use of digital technology more effectively (Alelaimat et al., 2020; Wuryaningsih & Prasetyo, 2022). In relation to the family, the Family Involvement theory reaffirms the important role of the family in instilling character education from an early age. Moreover, with a greater proportion of time for early childhood with the family than at school. Therefore, parents' digital insights and competencies also need to be developed. In order to be able to guide children to use digital technology positively (Putri, 2018; Ritonga, 2022).

Finally, future research can explore the development of other types of characters within the ECEfs framework and the 18 national characters. In addition, further research can utilize a variety of other digital technologies that have not been utilized such as: Augmented Toys (Verver et al., 2019), Artificial Intelligences (Yang, 2022), Augmented Reality (Han et al., 2015), or Digital Storytelling (Tzima et al., 2020) to develop the character of early childhood.

This study provides valuable insights for educators, policymakers, and educational technology developers regarding the use of digital technology in character development for early childhood education. By identifying various ways technology can support the cultivation of moral, social, and emotional values, this research serves as a foundation for effectively integrating digital tools into early childhood education curricula. Furthermore, it highlights the importance of training educators to use digital tools wisely to promote positive character development. The findings are also relevant for policymakers in designing regulations and ethical guidelines for the use of digital technology in early childhood educational institutions.

However, this study has several limitations that should be acknowledged. First, the scope of the review is restricted to literature available in specific languages or databases, which may introduce selection bias. Second, as a scoping review, this study does not provide an in-depth analysis of the specific effectiveness of particular technologies in character development. Moreover, the variability in cultural and social contexts is not deeply explored, even though these factors can significantly influence how technology is applied and received by children in different regions. Finally, the study does not directly address the technical and ethical challenges that may arise from using digital technology in early childhood education, such as the risk of technology dependence or exposure to inappropriate content.

#### **4. CONCLUSION**

Digital technology has been successfully implemented for positive character development in the context of early childhood. Digital technology that has been tested in

various empirical studies can be used as a role model for teachers or parents in stimulating the development of early childhood character. Exploration of research and development of digital technology and devices for stimulating early childhood character development shows high opportunities in Indonesia. Teachers and parents need to receive training and competency strengthening in a programmed manner in order to have adequate digital competencies. These digital competencies will encourage teachers and parents to be able to choose, provide, and integrate digital technology along with content that is appropriate for early childhood character development. In addition, cooperation is needed from policy makers, academics, practitioners, teachers, and parents in providing and integrating appropriate digital technology for efforts to stimulate early childhood development holistically.

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