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# The Use of Digital Technologies by Early Childhood Educators in Children's Language Development

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**Abstract**

Digital technology has become an important component of contemporary education, including early childhood education, by providing opportunities to create interactive and meaningful learning experiences. However, the effective integration of digital technologies to support children's language development depends on educators' digital competencies, available resources, and appropriate pedagogical practices. This study aimed to understand how early childhood educators used digital technologies to support children's language development. This research employed a qualitative approach using an empirical research design. Data were collected through semi-structured interviews with one school coordinator and three early childhood educators at Creche Knua Labarik, Dili. The collected data were analyzed using qualitative content analysis to identify educators' experiences, practices, perceived benefits, and challenges related to digital technology integration.The findings indicated that digital technologies supported children's language development by improving communication skills, stimulating verbal expression, expanding vocabulary, encouraging creativity, and providing exposure to multiple languages. Digital resources, including videos, songs, educational applications, digital stories, and interactive games, were found to enhance children's engagement and participation in learning activities. However, several challenges remained, including limited technological infrastructure, the need for educator training, and concerns regarding excessive screen exposure among children.This study suggests that digital technologies should be integrated as complementary learning tools supported by adequate infrastructure, continuous professional development, and culturally appropriate digital resources to optimize children's language development.

## INTRODUCTION

The rapid advancement of digital technology has transformed various aspects of human life, including communication, social interaction, and education (Akour & Alenezi, 2022; Alsaleh, 2024; Hanandini, 2024; Kaputa et al., 2022; Salfin et al., 2024; Setiawati, 2024; Yıldız & Nur, 2024). In the educational context, digital transformation has created new opportunities to develop child-centered learning environments by providing interactive, flexible, and meaningful learning experiences. Early childhood education has increasingly adopted digital technologies because young children are growing within digital environments where smartphones, tablets, computers, and multimedia platforms have become part of daily life. The integration of technology in early education is considered important because early childhood represents a critical period for cognitive, social, emotional, and language development.

Therefore, understanding how digital technologies can be effectively utilized by educators has become a significant global educational concern (Al-Adwan et al., 2024; Drijvers & Sinclair, 2024; Okoye et al., 2023; Rahimi & Oh, 2024; Sarva & Puriņa-Biezā, 2023; Sharma & Singh, 2024).

Globally, the adoption of digital technology in education has increased significantly, particularly after the COVID-19 pandemic accelerated the implementation of technology-based learning systems (Abdelfattah et al., 2023; Nieto-Taborda & Luppicini, 2025; Noor, 2023; Ogwu et al., 2023; Reyes-Mercado et al., 2023; Sitorus et al., 2025; Tuhuteru et al., 2023). According to UNESCO (2023), digital technologies have become increasingly important in expanding educational access, supporting teachers, and creating innovative learning approaches. However, international reports have also highlighted that unequal access to digital infrastructure, limited teacher competencies, and differences in digital literacy remain major challenges, especially in developing countries. These conditions indicate that the availability of technology alone is insufficient; effective educational outcomes depend on educators' ability to integrate digital resources into pedagogically appropriate learning activities.

In early childhood education, language development is one of the most essential developmental domains because language skills influence children's abilities to communicate, express ideas, interact socially, and participate in learning activities. Digital technologies provide various opportunities to support language acquisition through multimedia resources such as videos, songs, digital stories, educational applications, animations, and interactive games. These resources can stimulate children's imagination, increase motivation, enrich vocabulary, and encourage communication skills. Previous studies have emphasized that technology can function not only as a teaching instrument but also as a mediating tool that supports children's cognitive and linguistic development.

Previous research has demonstrated the educational benefits of digital technology integration in early childhood settings. Amante and Faria (2014) reported that multimedia-based learning activities encourage children's creativity, sensory stimulation, and imagination development. Similarly, Duarte (2012) explained that digital technologies can support innovative teaching strategies by enabling educators to develop and evaluate diverse learning resources. Research by Taborda (2019) also indicated that children's exposure to digital devices may contribute positively to knowledge development, literacy skills, and curiosity when technology is applied appropriately.

Despite increasing evidence regarding the advantages of digital technologies, the implementation of technology in early childhood education remains complex. Previous studies have indicated that successful integration strongly depends on educators' digital competence, pedagogical understanding, and ability to select appropriate learning materials. Educators are required not only to operate digital devices but also to design meaningful learning experiences that balance technology use with social interaction and play-based activities. Without adequate professional preparation, technology may be used merely as entertainment rather than as an effective educational medium.

The specific issue addressed in this research is the use of digital technologies by early childhood educators in supporting children's language development at Creche Knua Labarik, Dili, Timor-Leste. Although digital technology has become increasingly relevant in education,

empirical studies exploring how early childhood educators in Timor-Leste utilize digital resources for language development remain limited. Existing studies have primarily focused on general technology integration or educational outcomes in broader contexts, while less attention has been given to educators' actual experiences, classroom practices, challenges, and strategies within local early childhood education environments.

The research gap identified in previous literature concerns the limited understanding of technology implementation from the perspective of early childhood educators, particularly in developing educational contexts. Previous studies have highlighted the potential benefits of digital technologies, but fewer studies have explored how educators apply digital tools in daily teaching practices, the obstacles they encounter, and how technology influences children's communication and language development. Therefore, investigating educators' experiences provides valuable insights into the practical realities of digital technology integration in early childhood education.

This research is urgent because early childhood educators play a central role in determining whether digital technologies can generate meaningful educational benefits. Effective technology integration requires not only digital devices but also teacher competence, appropriate learning strategies, institutional support, and culturally relevant digital resources. In Timor-Leste, where early childhood education continues to develop, understanding the opportunities and limitations of digital technology implementation can support policymakers, educators, and institutions in designing more effective technology-based learning programs.

The novelty of this study lies in its exploration of digital technology utilization specifically from the perspective of early childhood educators in Dili, Timor-Leste. Unlike previous studies that mainly examine the general impact of technology on children's learning outcomes, this research focuses on educators' experiences, practices, perceived benefits, and challenges in applying digital technologies for language development. Through a qualitative approach, this study provides contextual evidence regarding how digital technologies function within a specific early childhood education setting.

Therefore, this study aimed to investigate the use of digital technologies by early childhood educators in supporting children's language development. The research sought to identify how educators utilized digital resources, the benefits of technology for children's communication and language skills, and the challenges encountered during implementation. The contribution of this study is expected to provide theoretical and practical insights for early childhood education development by highlighting strategies for meaningful technology integration. The findings may benefit educators through improved digital teaching practices, support educational institutions in developing appropriate technology policies, and provide references for future researchers investigating digital transformation in early childhood education.

## METHOD

Considering the objective of this study in the field of education, a qualitative research approach was adopted, as recommended by Coutinho (2018). According to the author, "in the investigation of social and educational problems, the use of a qualitative approach seeks to penetrate the personal world of the participants" (p. 59). A qualitative approach was considered

appropriate for this study because it enabled an in-depth exploration of educators' experiences regarding digital technology use in early childhood education.

Similarly, Minayo (2010) explained that qualitative research examines social relationships, representations, beliefs, perceptions, and opinions that reflect how individuals interpret their experiences and construct social realities. Therefore, qualitative approaches are suitable for exploring specific social contexts, understanding participants' perspectives, and analyzing interview data.

Data were collected through semi-structured interviews with one school coordinator and three early childhood educators. The study focused on educators' experiences regarding the use of digital technologies to support children's language development. Interview guides were used to conduct interviews with the coordinator (C) and three educators (E1, E2, and E3) at Creche Knua Labarik, Dili. The participants taught children in three age groups: the Butterfly Group (3–4 years), the Bird Group (4–5 years), and the Crocodile Group (5–6 years).

The collected data were analyzed using qualitative content analysis. The analysis focused on identifying themes related to educators' practices, experiences, perceived benefits, and challenges in integrating digital technologies into language development activities. Amado (2017), Bardin (1977), and Morgado (2012) identified content analysis as an important method in qualitative research for analyzing interview-based data. Following Vala (1999, as cited in Morgado, 2012) and Amado (2017), the analysis process involved defining the research objectives and theoretical framework, organizing the interview data, establishing analytical categories, and interpreting the findings to produce meaningful and valid conclusions.

## RESULTS AND DISCUSSION

### The Importance of Digital Technologies in Early Childhood Education

The findings indicate that both the school coordinator and the educators hold positive perceptions regarding the integration of digital technologies into early childhood education. Participants viewed digital technologies as valuable pedagogical resources that enrich children's learning experiences by stimulating cognitive, linguistic, psychomotor, and socio-emotional development. Multimedia resources, including videos, songs, educational games, and digital stories, were considered effective in attracting children's attention, fostering curiosity, and promoting active participation during learning activities. These findings suggest that digital technologies are no longer perceived merely as technological devices but as instructional tools that facilitate child-centred learning.

These findings are consistent with Amante and Faria (2014), who argue that digital technologies enrich teaching practices by creating more engaging and meaningful learning environments. Likewise, Duarte (2012) emphasizes that technology should function as a cross-curricular pedagogical resource that enables educators to diversify instructional strategies and support children's holistic development. The positive attitudes demonstrated by the participants therefore reflect a growing awareness of the educational value of technology in contemporary early childhood education.

The interviews further revealed that educators regularly integrate digital resources such as YouTube videos, educational applications, digital literacy programs, interactive language games, and multimedia presentations into classroom instruction. These resources are used to introduce new vocabulary, develop listening and speaking skills, and support literacy through

songs, stories, and interactive activities. In addition, educators reported using technology both inside and outside the classroom. Within the classroom, digital resources support reading, writing, vocabulary development, and language comprehension, whereas outside the classroom they are employed during school celebrations, morning assemblies, rehearsals, and communication with parents regarding children's learning progress. These findings demonstrate that digital technologies extend learning opportunities beyond the traditional classroom and strengthen home-school partnerships.

**Benefits of Digital Technologies for Children's Language Development**

Participants identified numerous educational benefits associated with the use of digital technologies. They reported that digital resources enhance children's creativity, encourage independent learning, improve reading and writing skills, strengthen oral communication, and increase classroom engagement. Furthermore, exposure to multimedia materials enables children to develop vocabulary and communication skills in multiple languages, particularly Portuguese and English.

These findings support those of Habowski and Conte (2020), who argue that digital technologies foster communication, interpersonal relationships, creativity, and higher-order thinking skills. Similarly, Neves et al. (2015, as cited in Taborda, 2019) maintain that the appropriate use of digital technologies positively contributes to children's cognitive, social, and emotional development. Consequently, when integrated into developmentally appropriate pedagogical practices, digital technologies can become powerful instruments for promoting children's language acquisition and overall learning.

An important finding of this study is that educators perceive digital technologies not only as tools for delivering instructional content but also as resources that create authentic opportunities for children to communicate, collaborate, and express themselves. Such experiences are particularly important in early childhood education because language development occurs most effectively through meaningful interaction and active participation.

**Challenges in Using Digital Technologies**

Although participants acknowledged the educational benefits of digital technologies, they also identified several challenges that require careful consideration. One of the principal concerns relates to children's excessive exposure to smartphones at home. According to the educators, some children spend extended periods using mobile devices before attending school. As a consequence, these children are often reluctant to communicate with teachers and peers and demonstrate reduced participation in classroom interactions. Such behaviour may limit opportunities to practise oral language, which remains fundamental to children's linguistic development.

This finding supports Vygotsky's (1991) socio-cultural theory, which emphasizes that language develops primarily through social interaction. When children's interaction with adults and peers is replaced by prolonged individual screen time, opportunities for meaningful communication may be reduced, thereby affecting language acquisition.

Another challenge concerns educators' professional competence in educational technology. Although participants expressed confidence in using basic digital resources, they also acknowledged the need for continuous professional development to improve their technological and pedagogical knowledge. In particular, educators highlighted difficulties in selecting high-quality educational applications and integrating technology effectively into

language-learning activities. These findings suggest that successful technology integration depends not only on the availability of digital tools but also on educators' digital competence.

**Effective Strategies for Promoting Language Development through Digital Technologies**

The findings indicate that educators employ various pedagogical strategies to maximize the educational benefits of digital technologies. These include the integration of educational applications, interactive language games, digital storytelling, audiovisual materials, songs, rhymes, and multimedia presentations. Participants emphasized that these resources should be combined with traditional play-based activities, including storytelling, singing, drawing, role-playing, and collaborative games.

These findings are consistent with the Reference Framework for Early Childhood Education Policies (RPPEP, 2012), which recommends that preschool children's language competencies be developed through songs, rhymes, games, music, dance, and artistic expression. Consequently, digital technologies should complement rather than replace active and socially interactive learning experiences.

Furthermore, participants emphasized the importance of balancing digital and non-digital learning activities. Such balance prevents children's excessive dependence on technology while ensuring that digital media remain meaningful educational tools. This balanced approach reflects current perspectives in early childhood education, which advocate the pedagogically appropriate integration of technology instead of unrestricted exposure to digital devices.

**Availability of Digital Resources in the School**

The findings reveal that the availability of digital resources remains one of the main limitations affecting technology integration within the school. Although educators regularly use videos, songs, digital stories, and educational applications, these activities rely almost entirely on their personal smartphones and portable speakers because the school lacks computers, projectors, televisions, and other technological infrastructure. Such limitations restrict educators' opportunities to diversify digital learning experiences despite their positive attitudes toward educational technology.

The participants also emphasized the need for more digital learning materials in the Tetum language. Currently, most available digital resources are produced in Portuguese or English, whereas Tetum remains the primary language spoken by most children before entering school. Developing culturally and linguistically appropriate digital resources would therefore facilitate children's language development while simultaneously supporting the preservation and promotion of Timor-Leste's national language.

Overall, the findings demonstrate that digital technologies have considerable potential to support young children's language development when integrated into developmentally appropriate pedagogical practices. However, maximizing these benefits requires adequate technological infrastructure, continuous professional development for educators, stronger collaboration between schools and families, and greater investment in digital educational resources that reflect the linguistic and cultural context of Timor-Leste.

## CONCLUSION

This study examined the use of digital technologies by early childhood educators in supporting children’s language development at Creche Knua Labarik, Dili, Timor-Leste. The findings demonstrated that digital technologies had become an integral component of

contemporary early childhood education and provided opportunities to enhance children's language learning when integrated through developmentally appropriate pedagogical practices.

The study found that educators perceived digital technologies as valuable instructional resources that enriched teaching and learning activities. Multimedia resources, including videos, songs, educational games, digital stories, and language-learning applications, were widely used to stimulate children's interest, improve vocabulary acquisition, develop listening and speaking skills, and encourage active participation in classroom activities. Furthermore, digital technologies contributed not only to language development but also to children's cognitive, social, emotional, and creative development.

The findings also indicated that digital technologies provided opportunities for children to access multilingual learning resources, particularly in Portuguese and English, thereby expanding their vocabulary and communication skills. In addition, technology facilitated communication between schools and families by enabling educators to share children's learning activities and progress with parents. These findings suggested that digital technologies could strengthen partnerships between schools and families while extending learning opportunities beyond the classroom.

Despite these positive outcomes, the study identified several challenges. Excessive and unsupervised use of smartphones at home could reduce children's social interaction and oral communication with teachers and peers. In addition, the school experienced limitations in technological infrastructure, relying mainly on educators' personal smartphones and portable speakers due to the lack of computers, projectors, and other digital equipment. Participants also emphasized the need for continuous professional development to strengthen educators' digital pedagogical competencies and their ability to select appropriate educational resources.

Overall, the findings indicated that digital technologies should complement rather than replace traditional play-based and socially interactive learning experiences. Their effectiveness depended largely on educators' pedagogical competence, balanced technology use, parental involvement, and the availability of appropriate educational resources. When these conditions were met, digital technologies could serve as effective tools for promoting children's language development and supporting high-quality early childhood education.

Based on the findings of this study, several recommendations are proposed. First, the Ministry of Education should strengthen technological infrastructure in early childhood education centers by providing computers, projectors, interactive displays, internet access, and other digital learning facilities. Second, continuous professional development programs should be provided to enhance educators' digital literacy and pedagogical competencies in integrating technology into language learning. Third, the development of more digital teaching and learning materials in the Tetum language is recommended, considering that Tetum is the primary language spoken by many children before entering formal education. The availability of culturally and linguistically appropriate digital resources would support children's language development while contributing to the preservation and promotion of Timor-Leste's national identity.

Finally, this study was conducted in a single early childhood education center with a limited number of participants. Therefore, future research should involve a larger number of schools from different regions of Timor-Leste and employ mixed-method or quantitative

approaches to provide broader evidence regarding the effectiveness of digital technologies in supporting children's language development.

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