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A Systematic Review on How Parental Involvement in ICT Enhances Digital Literacy and Language Learning

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A Systematic Review on How Parental Involvement in ICT Enhances Digital Literacy and Language Learning

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Abstract

Early childhood is a crucial period for developmental progress, where the involvement of parents and the integration of Information and Communication Technology (ICT) play significant roles. where parental involvement and the integration of information and communication technology (ICT) significantly influence digital literacy and language learning. This study systematically reviews existing literature to understand the impact of parental involvement and ICT use on digital literacy and language learning in early childhood education to examine how parental engagement in ICT-based learning environments enhances children's educational outcomes. Unlike previous research, this study provides a holistic analysis that integrated both digital literacy and language learning within early childhood education. The findings highlight that active parental participation not only fosters academic success and socio-emotional development but also mitigates some challenges associated with ICT use. While ICT enhances language acquisition and digital skills, concern such as cognitive strain, online safety risks, and disparities in internet access pose significant barriers to its effectiveness. This research underscores that necessity of structured parental involvement, equitable digital policies, and targeted ICT training for both educators and parents. Implementing these strategies can optimize children's learning experiences and bridge existing gaps in digital literacy education, ensuring a more inclusive and effective integration of ICT in early childhood education.

Kata Kunci/Key Words: Digital Literacy; Early Childhood Education; ICT; Language Learning; Parental Involvement.

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Introduction

Early childhood is a critical time for major developmental progress. The term "early childhood" is primarily determined by age. According to the National Association for the Education of Young Children (NAEYC) early childhood encompasses the age range from birth to eight years old, who is covered in educational programs in child care, in the family child care home, pre-school education both private and public, kindergarten, and elementary school (Practice, 1997). Furthermore, according to the international organization UNESCO, education is classified into seven levels under the International Standard Classification of Education (ISCED). According to this classification, early childhood education falls under level zero, namely the preschool level with ages ranging from three to five years. On the

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other hand, according to the Law Number 20 of 2003 on the National Education System, specifically Article 1, Paragraph 4, defines early childhood education as developmental efforts targeted at children from birth to six years old. These efforts involve educational stimulation to support physical and spiritual growth, preparing children for subsequent educational stages (Habe & Ahiruddin, 2017).

The integration of information and communication technology (ICT) has significantly risen in recent years, becoming an essential component of education systems, including early childhood education (Aldhilan, 2024). Besides that, the impact of early childhood education on improving children's academic results and long-term prospects has been recognized by governments in numerous countries (Hedges et al., 2016). Early childhood education generally equips young children with essential social skills, including sharing, taking turns, and tolerating others (Sari, 2020). Based on the Ministry of Education and Culture, digital literacy in early childhood is the attitude, knowledge and skills of early childhood in using digital media around them to search for and utilize information, learn, play, or get entertainment properly with adult assistance those around them (Hasbi, Adiarti, 2020).

Integrating information and communication technology (ICT) into early childhood education has gained significant importance, as it provide valuable opportunities to enrich learning processes and support the development progress of young children. Utilization of Information and Communication Technology (ICT) allows us to obtain information, communicate with other people, or influence the environment by using electronic devices or digital devices (Siraj-Blatchford et al., 2002). However, the early childhood are building critical thinking, problem solving, and communication skills, all of which can be strengthened through the effective use of digital tools (Jørgensen et al., 2023).

ICT in education is becoming more intensive and is entering all lines and levels. Hatzigianni & Margetts (2012) argue that ICT provides young children with novel opportunities for exploration and discovery. Interestingly, incorporating digital devices into early education is crucial for enhancing young children's early digital literacy and overall literacy development (Waltje, 2014). It introduces engaging challenges and caters to their natural curiosity. The integration of ICT into early childhood education can differ significantly from its integration into primary or secondary education (Campbell & Scotellaro, 2009). In today's digital era, young children are introduced to technology from an early age, making parental guidance essential, while research indicates that integrating ICT enhances their self-efficacy and resourcefulness (Aldhilan, 2024). In formal education, ICT is expected to enhance a child-centred approach, while in early childhood education this approach is already largely established (Kerckaert et al., 2015). Moreover, ICT can offer distinct opportunities for scaffolding and assisting children with special learning needs, as well as those from culturally or linguistically diverse backgrounds (Bolstad et al., 2004).

Within a broader context of ICT in early childhood education, particular attention has been given to its role in enhancing digital literacy and supporting language learning, both of which are crucial skills for young learners in today's digital era. The Digital technology can provide the early children with innovative and engaging learning experiences, and allow them to be empowered and connected in new and exciting ways (Orcid, 2018). For the early childhood applying digital literacy, it is anticipated that children will develop adaptability and social interaction skills, be inventive and productive, and foster independence and critical thinking (Anggita et al., 2022). Furthermore, ICT also plays crucial roles in language learning for young learners, as it enhances learning through e-learning platforms, digital media, and interactive technologies (Wati et al., 2025). In conclusion, as digital literacy and language learning becomes increasingly essential, language learners, including young children, are expected to develop digital skills and effective learning strategies, with their readiness playing a crucial role in achieving success in digital learning environment (Hubbard, 2013; Son et al., 2017).

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Today, many young children are born into households equipped with a wide array of digital devices and are exposed to them from an early age (Marsh et al., 2017). As a result, digital devices have become integrated into the daily routines of young children (Story et al., 2017). Despite their limited reading and writing abilities, young children often possess more advanced digital skills than their parents might assume. For instance, 50% of four-year-olds and 25% of two-year-olds can independently use tablets (Kabali et al., 2015). In line with that, digital literacy has emerged as essential aspect of communication in the twenty first century, influencing how people access, evaluate, and share information (Pires Pereira et al., 2023). When parents actively engage in their children's digital education, they not only help in enhancing technological proficiency but also significantly contribute to the development of language and literacy skills.

In the learning process, parents as those who are at the forefront of children's education, parental involvement includes academic expectations, homework supervision, support for school task, and school participation and making parental involvement essential during this time (Castro et al., 2015). At this stage, parental involvement allows children to develop their understanding through meaningful social and physical interactions (Bailey et al., 2004). Parents must understand and adhere to fundamental parenting principles in the digital age. Along the same lines, the parenting dimension of parental involvement encompasses parents' attitudes, values, and practice in raising young children, where a nurturing, warm, and responsive parent-child relationship in child-centred activities plays a crucial role in fostering positive learning outcomes in early childhood (Zeynep, 2016). Although children can quickly learn to use digital media, they require parental guidance and oversight to ensure they engage with it effectively, wisely, and constructively. In conclusion, the primary educational role in a child's life is fulfilled by parents (Mungai, 2015).

Children's education benefits greatly when parents from diverse ethnic, educational, and socio-economic backgrounds actively participate (Mungai, 2015). In a comparable way, socio-economic factors and cultural barriers hinder the expected level and type of parental involvement, emphasizing the need to targeted interventions and support system to ensure meaningful participation across diverse context (Arfé et al., 2019). Specifically, socio economic status influences children's educational success, both negatively through material deprivation and positively through parental involvement and aspirations. Limited resources can hinder parental support for their children's education, while greater involvement and higher expectations contribute to better academic achievement and overall child development (Sacker et al., 2002). Therefore, for young learners, the significant role of parental involvement in early childhood education suggests it has a major impact on educational outcomes (Unique, 2016).

When parents are involved, children tend to do better in school, regardless of age, economic status, gender or any other known factors (Mungai, 2015).

For parental involvement to be impactful, it needs to be developed and maintained with clear intent and significance (Unique, 2016). For young learners the consistent of parental involvement also leads to better behaviour, fostering discipline and responsibility of the young learners. Moreover, the major nation of parent involvement was that parents know what they want for their children and thereby should be involved in the school (Tekin & Ph, 2011). Specifically, parents should actively participate in their children's digital media activities, rather than focusing on their own knowledge or confidence, the most effective way to support their children with technology is by engaging in conversations, playing, and learning together (Orcid, 2018).

In families with a strong foundation of love, children learn about family bonding and mutual trust, especially parents as the family member also help developing children's mental and intellectual strength (Naomee, 2012). Moreover, parental involvement bridges the gap between home and school, ensuring that children receive consistent support and encouragement in both settings. Considering the information and concepts discussed, it is

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now anticipated that parents will be more engaged in all aspects of their children's lives, particularly during the early years. Parents fundamentally figure their children into adults through their influence and guidance (Baumrind, 1971). Parenting serves as a reflective process in the parent-child relationship, encompassing a range of specific attitudes and behaviours that individually and collectively impact child outcomes and foster an emotional bond through the parent's actions (Darling & Steinberg, 1993). Parents' attitudes and objectives are among the most essential factors influencing children's language and literacy development (McCoy, E, Cole, 2011). This implies that parents' perceptions of their children's language learning significantly impact their language development. Parents who hold positive views about their children's home language learning are more likely to support their children's language development actively (Mosty, 2013). Summarize, by integrating ICT effectively into language learning, parents can significantly contribute to their children's early literacy development, preparing them for future academic success and helping them navigate the digital world safely and effectively.

Previous studies have widely explored the use of ICT in early childhood education.

However, this research conducts a systematic literature review to comprehensively examine parental involvement in enhancing young children's digital literacy and language learning. The novelty of this research lies in the systematic review approach, which synthesizes the latest scientific evidence on the role of parents in utilizing ICT for both digital literacy and language development. Moreover, most previous studies have focused either on ICT and digital literacy or ICT and language learning separately. In contrast, this research integrates these two critical aspects holistically, analyzing how parents support both skills simultaneously through their engagement with ICT. This presents a new perspective on parental involvement in early childhood education.

The work discussed in this paper aims to systematically review existing literature to understand the impact of parental involvement in the use of ICT for early childhood digital literacy and language learning. The key questions addressed include: (1) how does parental involvement influence the effectiveness of ICT in enhancing digital literacy and language learning in early childhood education? And (2) what are the challenges and opportunities associated with integrating ICT in early childhood education, and how do parent concern about ICT use impact children's cognitive and socio-emotional development? This research seeks to provide useful theoretical and practical recommendations for parents and educators.

Methodology

This research involves a systematic literature review of existing literature on parental involvement with ICT in early childhood education. The review was conducted following the guidelines established by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline.

Search Strategy

The articles relating to parent involvement in the use of ICT for early childhood student were sourced from the following relevant databases: Springer Link and ERIC (education resources information centre), these two databases provided access to the majority of applicable studies. The researcher studied these articles from the databases from 2019 to 2024 (5 years). The keywords the researcher used were "Parent Involvement in early childhood education", "Parent Involvement in the use of ICT for early childhood", "Parent Involvement in the use of ICT for early childhood digital literacy" and "language learning". The search feature of the databases was utilized by combining keywords with AND.

Inclusion and exclusion Criteria

In this research, articles were selected based on specific inclusion and exclusion criteria:

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Inclusion Criteria:

- Early childhood learning
- Peer-reviewed journal articles
- Focusing on the parent involvement of the early childhood education
- Articles released in the last 5 years (2019-2024)
- Being published in English
- Clearly stated objectives and adequately describes context
- Findings that were clearly stated
- Research conducted in various cultural and geographical context

Exclusion Criteria:

- Articles published before 2019.
- Studies focusing on older children or adults.
- Non-peer-reviewed articles
- Research not directly related to ICT, digital literacy, or English language learning.

Research Procedure

The articles were collected from Springer Link and ERIC databases published within the last five years start from 2019 to 2024. The connection word "and" was employed for keywords connection such as in the databases the researcher searched the articles using combination of keywords "digital literacy and language learning". Initially, searches were conducted without applying any filters. In a subsequent search, filters were applied based on publication year, subject area, and document types. The results of these searches are detailed in Table 1.

No	Keywords	Non-filtered result	Filtered result
1	Parent Involvement in early childhood education	11.527 Documents	1588 Articles
2	Parent Involvement in the use of ICT for early childhood	1405 Documents	183 Articles
3	Parent Involvement in the use of ICT for early childhood digital literacy	1222 Documents	287 Articles
4	Parent Involvement in the use of ICT for early childhood language learning	435 Documents	124 Articles
5	Digital Literacy "and" Language Learning	167 Documents	148 Articles
Total		14.756	2330

The process for selecting articles was carried out in several stages. First, search results were screened by title and abstract to identify potentially relevant articles. Second, the articles of potentially relevant studies were retrieved and assessed for eligibility based on the inclusion and exclusion criteria. Third, if the articles met the criteria, the researcher

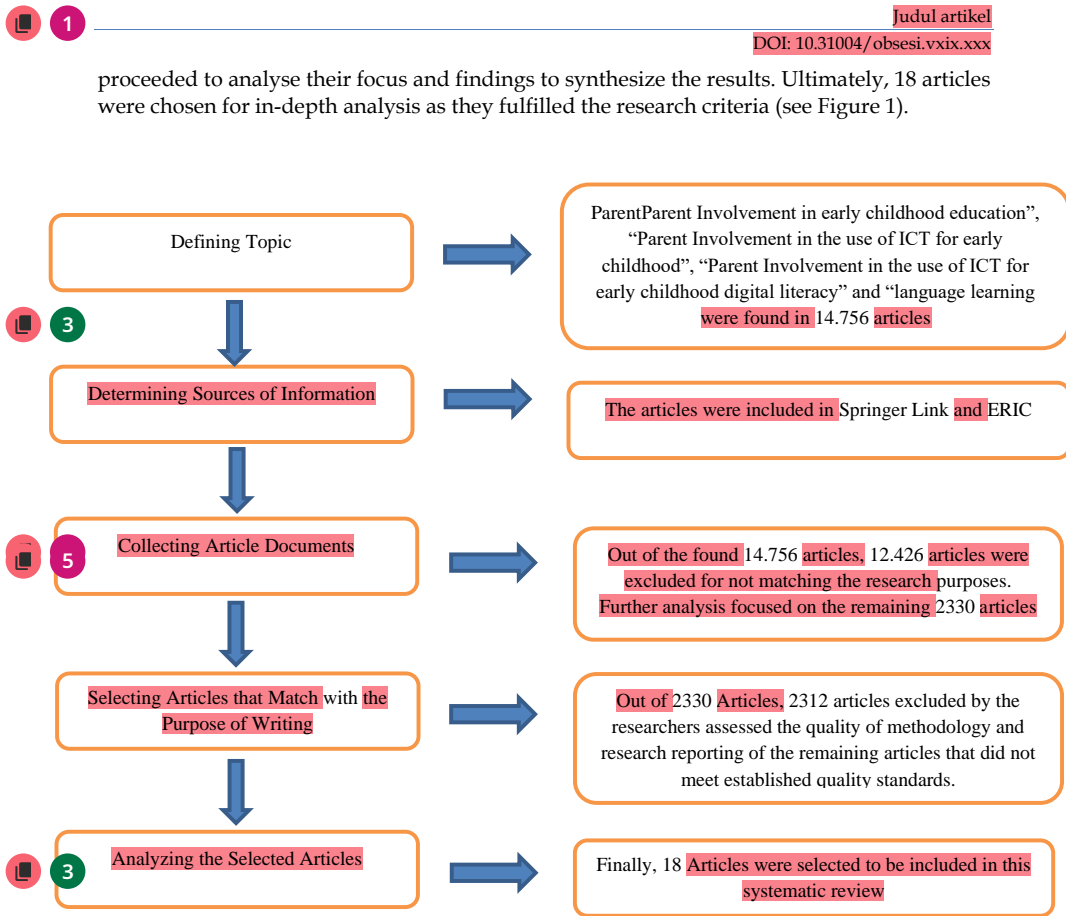


Figure1. The process of selecting the articles

Using the PRISMA approach, 11.527 articles were found. To ensure the credibility and relevance of the selected studies, this research employed the CASP (Critical Appraisal Skills Programme) checklist. Each study was evaluated based on key criteria, including research clarity, methodological rigor, validity of findings, and relevance to the study's focus on parental involvement in ICT for early childhood digital literacy and language learning. Only studies meeting the minimum quality threshold were included in the final synthesis. From the data initial screening, 18 studies met the CASP quality criteria, while those with low methodological rigor or insufficient data validity were excluded. This quality assessment

The extracted data were analysed using thematic analysis following Braun & Clarke (2006) approach to identify recurring pattern related to parental involvement in ICT, digital literacy, and language learning in early childhood education. The analysis involved familiarization with data, generating initial codes, identifying and refining themes, and synthesizing findings into a structured narrative. Key themes were manually coded and categorized to ensure consistency across studies and provide a comprehensive synthesis of insights.

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Findings and Discussion

Parents Involvement in Early Childhood Education

Parental involvement in the early childhood education refers to parents' active engagement in their children's learning and development (Hanssen & Mamonka, 2021). In fact, parental involvement in early childhood education plays a crucial role in supporting children's academic achievement, social and emotional growth, and overall well-being (Raver & Knitze, 2002). Grasping the significance of parental engagement in early childhood education is essential for both parents and educators to recognize (Hanssen & Mamonka, 2021). The parents and educators can provide the necessary support to help children reach their full potential and prepare them for a successful future by being involved. In a wider perspective, early home learning is important to early development, the engagement of parents in the learning process for young children is essential (Dighe & Seiden, 2020). Following this pattern, the family plays an essential and closest role in shaping young children's developmental competencies (Bronfenbrenner, 2013). Young children's curiosity about their daily lives and the world around them improves scientific concepts, knowledge, skills, and attitudes (Uludağ & Erkan, 2023).

While parental involvement is generally beneficial, its role and perspective vary. Parent's input supported educators but was often seen as less authoritative (Heiskanen et al., 2021). In contrast, In the same vein, López & Cabello (2022) revealed that while parental involvement had positive effects, negative impacts also emerged, such as frustration, impatience, disinterest, or an overly controlling approach that hindered children's learning. These challenges become even more apparent during significant disruptions in education. The main findings of the study pertain to how parents' engagement in their children's education was influenced by external factors, such as the suspension of face-to-face schooling during the pandemic (Alharthi, 2023). Given these complexities, supporting parents in fostering their children's development during preschool becomes crucial, as it enhances school readiness, minimizes behavioural issues, and strengthens social skills (Rock, 2024). On the other hand, these dynamics have also shaped school environments, leading to culturally centred institutions where staff members reflects the community they serve (Pleski et al., 2021) that caused the schools are culturally centred, and staff represents the families' communities (Pleski et al., 2021).

~~The main findings of the study pertain to how parents' engagement in their children's education was influenced by external factors, such as the suspension of face to face schooling during the pandemic (Alharthi, 2022).~~

Parent Involvement in the use of ICT for Early Childhood Digital Literacy and Language Learning

The parenting aspect of parental involvement includes parents' beliefs, values, and approaches to raising young children, where a supportive, affectionate, and responsive parent-child interaction in child focused activities is essential for promoting positive early learning outcomes (Zeynep, 2016). According to (Orcid, (2018), parental involvement in digital activities such as playing, conversing, and learning together is more effective than merely relying on their own knowledge and confident. Similarly, Akman et al (2023) highlights that parents are responsible for guiding their children in navigating digital world, ensuring both digital literacy and language skills. The use of digital technology effectively is essential (Wilson et al., 2023), as E-learning relies on parental involvement to provide necessary resources for learning (Tomczyk & Walker, 2021). This findings align with Vygotsky (1978), social learning theory, which emphasizes that children acquire knowledge through interactions with more knowledgeable others, including parents. Studies by Rahmatullah et al (2021) and Danet (2020) further support this view, showing that parental mediation in digital literacy enhances children's cognitive and language

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development. However, challenges remain, as parental involvement can be influenced by factors such as socioeconomic backgrounds (Pitsia, 2022), digital literacy skills (Wilson et al., 2023), and access to technology (Marchlik et al., 2021). Therefore, ensuring equitable digital learning opportunities requires both parental guidance and broader educational support.

Meanwhile, on the other side parents expressed concerns about the impact of mobile technologies on child development. They believe that while early exposure to ICT is beneficial, it could also potentially impair children's reasoning skills (Danet, 2020). Children's misbehaviour is frequently attributed to inadequate parenting. Parents are seen as the primary educators and partners in their children's development, yet many lack the necessary knowledge to effectively nurture their children (Rahmatullah et al., 2021), for instance it is advised to restrict toddlers' media exposure, particularly for those under 18 months of age (Danet, 2020). Parents play a crucial role in their children's development, yet many lack the knowledge to effectively support their learning. This includes guiding ICT use to enhance digital literacy and language development while also managing screen time, as limiting media exposure for toddlers ~~toeders~~, especially those under 18 months, is recommended for healthy growth (Danet, 2020; Pitsia, 2022; Rahmatullah et al., 2021; Wilson et al., 2023). Beside on that, not only parents but also many teachers relied on their personal computer equipment, IT skills, and educational materials to navigate or learn how to use free platforms and social media (Al Mazrooei et al., 2022). Furthermore there are seven common fears of parents by Danet (2020) about the effects of ICT use they are first is about online safety and privacy, the second is cyberbullying especially victimization, he third concern is hyperconnectivity, which is seen as disrupting opportunities for developing real life friendships and social skills. The fourth worry is technoference, which refers to disruptions in parent child relationships caused by digital device use. The fifth issue is the creation of alternative identities, while the sixth is the potential impairment of cognitive development due to multitasking on digital devices. Lastly, there is the concern about sleep loss that might result from ICT use.

Several factors hinder parental involvement in early childhood education, including socioeconomic status (Magwa & Mugari, 2017; Park & Holloway, 2017), teachers' social competence (Jafarov, 2015; Sari, 2020), and school climate (Berkowitz et al., 2021; Ekinci-Vural, 2021; Hornby & Blackwell, 2018). Previous research highlights that parents' socioeconomic status is influenced by factors such as education, occupation, income and savings, as well as their social standing and financial resources (Ribeiro et al., 2023; et al., 2017), all of which significantly impact their level of involvement in their children's education. Interestingly, following this pattern educated parents are more likely to invest in their children's learning environments, including digital literacy tools which enhance cognitive development (Macmillan & Tominey, 2023).

Parental Role in Supporting ICT Effectiveness for Digital Literacy and Language Learning in Early Childhood Education

Digital technologies have become an essential tool in early childhood education, shaping how children acquire knowledge and develop literacy skills (Gruchel et al., 2024). When digital technologies are used, the quality of the media and the support by parents and others play a crucial role (Orcid, 2018). Furthermore, many have highlighted the difficulty of maintaining physical activity, which is a key aspect of teaching methods for this age group (Marchlik et al., 2021). However, as digital learning becomes more prevalent, the quality of parental support plays a crucial role in ensuring that children engage effectively with ICT while balancing their physical and cognitive development (Gruchel et al., 2024).

Conversely, in the similar vein, the use of digital devices may impact children's cognitive and socio-emotional development, with potential negative effects, including the risk of addiction (Danet, 2020). Moreover, while internet access at home is often assumed to support learning,

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disparities in connection quality and access to educational resources can hinder effective digital engagement, further influencing children's learning experiences (Marchlik et al., 2021). ~~These factors can also impact children's academic success and overall well-being, as well as promote suitable leisure activities to enhance academic success (Pitsia, 2022). Indeed, many parents were highly concerned that excessive use of digital devices could become a dominant activity for children and potentially lead to addictive behaviours (Danet, 2020).~~

Discussion

Parent involvement in early childhood education emerges as a crucial factor influencing children's academic success and overall well-being. The dynamic contribution of parents to their children's learning experiences, as highlighted by (Hanssen & Mamonka, 2021), supports social and emotional development, contributing significantly to children's educational outcomes. This finding resonates with (Dighe & Seiden, 2020), who emphasize the pivotal role of early home learning facilitated by parental engagement. However, López & Cabello (2022), highlights that while positive parental involvement enhances learning, frustration and overly directive behaviour may hinder progress. ~~The unforeseen shift to e-learning during the pandemic further underscored the evolving nature of parental involvement. The shift to e-learning further emphasized the evolving role of parents, requiring them to adapt to new educational demands (Alharthi, 2023). This shift compelled parents to adapt their roles, highlighting the dynamic interaction between external circumstances and parental engagement in children's education. Moving forward, initiatives to raise parental awareness and collaboration with educators, as suggested by This shift required parents to adapt, emphasizing the link between external factors and parental engagement. Raising awareness and strengthening collaboration with educators are crucial for enhancing children's learning (Pitsia, 2022), are essential for optimizing children's learning experiences.~~

Parental involvement is essential in enhancing the effectiveness of ICT for children's digital literacy and language learning, as structured support improves their ability to use technology for educational purposes (Gruchel et al., 2024). ~~The integration of ICT in early childhood education expands learning opportunities and strengthens parent-teacher communication (Wilson et al., 2023), yet its impact on cognitive and socio-emotional development depends on proper utilization and guidance, as excessive screen time, addiction, and technoference remain concerns (Danet, 2020; Marchlik et al., 2021). Additionally, challenges such as online safety, privacy risks, and disparities in internet access hinder equitable digital learning (Marchlik et al., 2021). Addressing these issues requires collaboration between parents, educators, and policymakers to enhance parental digital literacy and promote the responsible use of ICT in early childhood education, ensuring optimal learning outcomes (Danet, 2020; Wilson et al., 2023).~~

Despite the benefits of ICT in early childhood education, challenges like socioeconomic disparities hinder equitable access and implementation. Parents with higher education and financial stability can better support structured digital learning, while those from lower-income backgrounds face limited access to quality internet and educational tools (Macmillan & Tominey, 2023; Marchlik et al., 2021). ~~Concerns about cyber security, privacy, and inappropriate content also make parents hesitant to allow unrestricted ICT use (Danet, 2020). Thus, digital literacy's effectiveness relies on parental mediation, accessibility, and responsible ICT integration in learning environment (Gruchel et al., 2024).~~

Conclusion

A review of 18 journals reveals key insights on parental ICT involvement. Parental involvement is a pivotal factor in enhancing children's academic success and overall well-being. ~~Addressing these challenges requires collaborative efforts from parents, educators, and policymakers to ensure equitable access and responsible ICT use in early childhood education.~~



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control or frustration may hinder progress. The integration of ICT in early childhood education offers substantial benefits, including improved language acquisition and digital literacy, but also presents challenges related to children's cognitive and socio-emotional development. High-quality digital resources and structured ICT training for both parents and children is essential to optimize ICT's potential while mitigating risks.

In practice, schools should implement structured parental involvement programs, including ICT training sessions and digital literacy workshops. Educators can facilitate hands-on training and guidance to help parents integrate technology effectively at home, while policymakers can support initiatives ensuring equitable access to high quality digital resources. Additionally, schools should establish regular communication channels and digital platforms to enhance parental involvement and provide on-going support. Future research should further investigate the long-term effects of ICT on child development, particularly through quantitative studies measuring parental ICT involvement and its direct impact on learning outcomes. Additionally, qualitative research is needed to explore parents' lived experiences, challenges, and perceptions regarding ICT use in early childhood education. Such studies can provide deeper insights into cultural and socioeconomic variations, helping to develop context-specific strategies for enhancing parental engagement in digital learning environments.

Declaration of Interest

The authors report there are no competing interests to declare.

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