Digital parenting and its impact on early childhood development: A scoping review

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Abstract

Digital parenting refers to the parenting practices that maximize the benefits and minimize potential risks of children's interactions with digital media and online spaces. Balancing the pros and cons of early digital usage is a challenge for many caregivers. This scoping review synthesizes evidence regarding digital parenting practices and their impact on children's digital use and development, drawing from 40 studies published in international peer-reviewed journals between 2010 and 2023. Four themes have emerged from this scoping review. Firstly, parental perspectives on early digital use diverged into positive views (as 'educational aids'), negative views (as 'distractions'), and cultural differences. Secondly, children's digital use was influenced by digital parenting practices, specifically parental modeling, parenting style, parental mediation and the intended purpose of children's digital use. Thirdly, a correlation was noted between varying results of digital parenting and children's digital use, with outcomes manifested in children's digital literacy, parent–child relationships, social-emotional and language development, behavioral issues, and emergent literacy. Fourthly, influential factors were child ages, parental and family-related factors (including gender, socioeconomic status, ethnicity, family structure, religion, and parents' digital literacy), and the type of digital resources. The review suggests that future research should concentrate on training programs to enhance parental digital literacy skills and employ monitoring tools to better assess children's digital use.

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In our current digital age, young children are aptly described as 'digital natives', necessitating a pivot towards digital parenting at the earliest stages of their development (Cao et al., 2021). Digital parenting encompasses a nuanced blend of technological literacy, management of children's digital device use, and imparting knowledge about the potential gains and drawbacks of digital engagement (Dong et al., 2020). While existing research has been heavily skewed toward online risks and safety (Collier et al., 2016; Lei et al., 2018; Wahyuningrum et al., 2020) and the ensuing parental mediation within this sphere (Cao et al., 2021; Dong et al., 2020), there is a palpable gap in studies addressing how digital parenting tailors young children's initial encounters with digital tools, encapsulating both online and offline scenarios, risks, opportunities, and their associated outcomes.

Furthermore, the COVID-19 pandemic and the consequential lockdowns of 2020–2022 precipitated a paradigm shift in early childhood education and learning methods (Timmons et al., 2021). Children worldwide, specifically within the 0–12 age bracket, increasingly relied on digital tools for play and learning within home environments (Dong et al., 2020; Lau & Lee, 2021). This dependence has endured and likely will continue as the standard model for education undergoes essential changes in the post-pandemic era (Lewis et al., 2023). This shift saw school-aged children engage in online learning, while preschool providers reached their students digitally (Lewis et al., 2023; Stites et al., 2021). However, the abrupt transition to digital parenting at home often caught parents unprepared, leading to a pervasive sense of vulnerability and despair (Cao et al., 2021).

To address these challenges, it is crucial to understand how parents execute digital parenting during the formative years and to tailor initiatives that bolster parents' capacities through training and support frameworks (Dias et al., 2016; Levine et al., 2019). Despite this, there has been a conspicuous absence of systematic reviews over the past decade synthesizing empirical evidence to delineate outcomes, influential factors, and glean insights that could inform policy and practice. Consequently, this scoping review seeks to fill this knowledge void by methodically assessing the body of research on this subject published between 2010–2023.

1 Digital use in the early years

In the contemporary digital age, the immersion of young children in technology has consequences that are pervasive and crucial (Cao et al., 2021; Dong et al., 2020; Rideout, 2019). Digital devices are not merely tools for entertainment; instead, they serve as conduits for transformative and inspiring learning journeys, fostering children's empowerment, interconnectivity, and resulting in significant advances in learning and developmental outcomes (Kaye, 2016). With well-structured parental guidance, digital devices can act as catalysts for enhancing children's early literacy and emergent digital literacy skills (Levy, 2009; Neumann, 2015; Thurlow, 2009). As such, these tools are pivotal in accelerating the academic development of children and shaping their future paths in this era dominated by digital technology.

However, despite its educational benefits, the exponential growth of digital technology has resulted in increasing incidences of overuse among young children,

causing a surge in concerns among scholars and interested parties about its potentially harmful effects (Konca, 2021; Rideout & Robb, 2020; Wang et al., 2023). This delicate balance between digital usage and overuse cannot be underestimated.

Excessive digital use poses a real threat to the physical and mental health of young children, encompassing problems which range from obesity, visual impairment, to sleep disorders, attention deficits, impaired executive function, and socio-emotional difficulties (Buabbas et al., 2021; McCarthy & Bhide, 2021; Mehta & Murkey, 2020). The escalating daily screen time has sparked worries among parents, scholars and public health institutions (Wang et al., 2023). Guidelines from the World Health Organization (WHO) suggest strict limits to digital use, however compliance with these recommendations is a significant issue globally with a reported average of 2–3 h of screen time daily for preschoolers in countries like China and the U.S. (McNeil et al., 2019; WHO, 2019; Wang et al., 2023). The prevalence of screen addiction among children from 18 months to 12 years old being reported at 28.1% (Cao & Li, 2023), signifies a pressing issue that warrants immediate global attention and concerted research efforts.

Critical factors promoting early digital overuse and problematic use often originate from within the family environment, emphasizing a role that ought not to be disregarded (Wang et al., 2023). A child's screen time is closely intertwined with parental practices and policies, which encompass their personal digital addiction, their mental health, and their parenting style (Lam, 2015). In essence, parental use of digital devices likely mirrors and impacts their children's digital behaviors (Dong & Mertala, 2021); therefore, it is urgently needed to understand digital parenting and its relationship with young children's developmental outcomes.

2 Digital parenting for young children

Digital parenting, an evolving concept in our technology-rich world, plays a crucial role not just in child protection, but in fostering responsible digital citizens. The journey began with Rode's (2009) representation of digital parenting as a technique for shielding children from the dangers of digital devices. However, over time, scholars have built upon this understanding to introduce a more comprehensive role for parents. Chou et al. (2016), as well as Mascheroni et al. (2018), for example, endorsed an approach that fully engages parents in their children's relationship with digital media, encapsulating aspects like parent–child interaction and parental discipline in a digital environment.

Importantly, digital parenting has been further elevated by Fidan and Seferoğlu (2020), who view it as a literacy form that empowers and protects children in the digital realm. Advocating for parents to have a grasp of basic digital skills, this perspective aims for parents to manage and balance the opportunities and threats that digital environments pose for their children (Fidan & Seferoğlu, 2020). Following this blend of parenting and digital technology, a transcendent parenting movement has been on the rise (Mascheroni et al., 2018; Wahyuningrum et al., 2020). In this context, parents harmonize their children's online and offline experiences, interactions, and the timeless nature of digital exposure (Lim, 2016). Consequently, this

complex and evolving role of parents now shapes children's educational, leisure, and social interactions, impacting their early growth crucially (Benedetto & Ingrassia, 2021).

Therefore, it's essential to consider the unique needs and vulnerabilities of early childhood when discussing digital parenting. It's a critical period for nurturing digital citizens since children at this stage are highly receptive to guidance but also susceptible to digital overuse (Işıkoğlu et al., 2021; Montag & Elhai, 2020; Wang et al., 2023). Enhanced brain sensitivity and underdeveloped self-regulation make them particularly vulnerable to the impacts of early digital exposure (Li et al., 2014; Wu et al., 2023). Herein lies parents' vital role in offering necessary support and guidance to ensure safe and beneficial exploration of the digital realm. In particular, the influence of parents extends to their beliefs, attitudes, and views on digital use, shaping how their children navigate digital technology (Darling & Steinberg, 2017). Parental attitudes can correlate with the extent of digital resources at home (Cao et al., 2021; Nikken & Schols, 2015; Sivrikova et al., 2020), and the amount of time the child spends on digital devices (Jago et al., 2014; Lauricella et al., 2015; Nevski & Siibak, 2016).

Given these considerations, our study seeks to encapsulate digital parenting into four core components: digital skills, parental mediation strategies, awareness of digital risks, and balancing digital usage effects. With a motive to unravel the influence of digital parenting on children's digital behavior, we aim to conduct a comprehensive scoping review, a first-of-its-kind endeavor, to assemble existing evidence.

3 Digital use, digital parenting, and child development

The interplay between digital use, child development, and digital parenting forms a multidimensional topic of deliberation. The impact of digital usage on child development is shaped by both beneficial and potentially harmful influences. On the bright side, digital access is associated with enhancements in critical developmental areas like fine-motor skills, executive functions, mathematics, digital literacy, and problem-solving abilities (Bedford et al., 2016; Dong et al., 2021; Herodotou, 2018; Huber et al., 2018; Mallawaarachchi et al., 2022; Xie et al., 2018). High-quality stimulation from digital tools, when executed under considerate guidance from caregivers, can foster the development of cognitive networks crucial for early learning and language development (Rohr et al., 2018). Conversely, studies have frequently associated excessive early digital use with developmental delays and future educational and behavioral challenges (Madigan et al., 2019; Pagani et al., 2016). Alarmingly, empirical data indicates a compromise in the integrity of white matter in brain regions linked to language and attention control following excessive television exposure in early years (Hutton et al., 2020). While the impact of digital use on child development is irrefutable, the struggle lies in maximizing the benefits while minimizing potential risks.

The role of digital parenting is central to how these digital influences shape child outcomes. This involves an array of factors, ranging from the socioeconomic status of parents (Oh, 2005), parenting style (Anandari, 2016; Keya et al., 2020), parental attitudes (Dong et al., 2021; Park & Park, 2014), to parents' own digital habits (Rek

& Kovačič, 2018; Wartella et al., 2014). For instance, children's digital habits significantly mirror their parents' media usage, which could potentially heighten the risk of digital overuse in children (Wartella et al., 2014). Parental attitudes also play a significant part – a positive parental outlook towards digital devices promotes use in children and enhances digital literacy (Dong et al., 2021). Moreover, parents with higher education levels often endorse digital and online learning as tools for refining their children's self-expression, social abilities, and language skills, encouraging more digital interactions (Lepicnik-Vodopivec & Samec, 2013).

Subsequently, the challenge for parents becomes maintaining a careful balance in fostering and regulating children's digital practices, a balance often affected by individual, familial, and contextual factors (Dong et al., 2021). For instance, families with higher education and income levels tend to enforce more stringent screen time boundaries (Dong et al., 2021; Konok et al., 2020; Nevski & Siibak, 2016), potentially sheltering these children from digital overuse. Here, parental mediation strategies, including restrictive and active mediation along with co-use or co-viewing measures, play a crucial role (Clark, 2011; Livingstone & Helsper, 2008; Valkenburg et al., 1999). Additionally, close supervision and technical safety measures like parent-installed applications for online safety contribute to protective digital parenting (Cao et al., 2021; Nikken & Jansz, 2014).

Digital parenting practices, encompassing aspects like parenting scaffolding, parental mediation, parenting styles, and guidance, play a substantial role in optimizing children's beneficial digital use and minimizing the potential risks, thus contributing to overall child development (Dong et al., 2021; Rohr et al., 2018). However, the intricate relationship between children's digital use, digital parenting, and child development is far from simplistic. Instead, it's an entwined, dynamic, and multi-layered tripartite framework. Despite this, a significant portion of existing literature predominantly explores these aspects in isolation, seldom delving into the interplay that exists between two or among all three spheres. Therefore, our study brings these elements together through a comprehensive scoping review, intending to foster an all-embracing understanding of these factors and their subsequent outcomes. The goal is to gain an encompassing portrayal of digital parenting practices and how they operate within this tripartite relationship.

Consequently, we propose a representative model (Fig. 1) to guide this review, which synthesizes existing literature to understand the interplay between these elements better. Accordingly, the following research problem guided this scoping review:
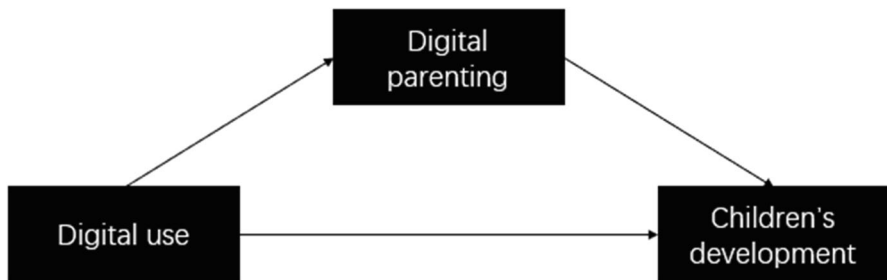

Fig. 1 The model

What are the major findings of digital parenting studies in early childhood?

4 Method

Scoping review method is widely employed to assess the extent of research on a particular issue, summarize research findings for users, practitioners, and policy-makers, identify research gaps, and suggest future directions (Arksey & O'Malley, 2005; Levac et al., 2010). This approach is appropriate for this study, which intends to examine the scope and depth of existing research on digital parenting among children, identify research gaps, and recommend future research possibilities. The objective of this research is to perform a thorough search, identify, collect, and review prospective sources relevant to the research objectives in a way that maps them to the key concepts and themes driving the research questions. The current scoping review was divided into five phases: (1) articulating the research; (2) identifying relevant studies; (3) selecting studies; (4) charting the data; and (5) collating, summarizing, and reporting the findings.

4.1 Phase 1: Articulating the research questions

The leading research problem was subdivided into four distinct yet interrelated and sequentially progressing research questions: 1) What are the parents' views regarding their children's digital use in the early years? 2) How does digital parenting impact children's early digital use? 3) How does digital parenting affect early child development? 4) What factors affect digital parenting in the early childhood period?

4.2 Phase 2: Identifying relevant studies

This search encompasses three databases and covers a comprehensive range of electronic resources. (i.e., Scopus, and Google Scholar, Educational Resources Information (ERIC)) took place in May 2023. The goal of the literature search was to find all research publications on "digital parenting in early childhood" that were published between 2010 and 2023. The specified review timeframe, spanning from 2010 to 2023, has a rationale deeply connected to launch of the 4th Generation (4G) of mobile communication standards on the 14th of December, 2009 (Iqbal et al., 2012). This groundbreaking development introduced Long Term Evolution (LTE) networks, facilitating higher data rates and offering more rapid access for mobile wireless users. Consequently, enhanced data transmission capabilities and speed catalyzed an "anytime, anywhere" internet culture, encouraging user-centric, affordable internet access as highlighted in Iqbal et al. (2012). The compelling changes wrought by the advent of 4G technology signify this era as a critical inflection point in the study of mobile communication dynamics. Hence, this timeframe serves as an insightful window into the transformative

influence of 4G technology on user trends and behaviors, justifying the selection of the period from 2010 to 2023 for our review.

The four keyword sets with the two Boolean operators (AND and OR) were used to search and extract relevant information from the databases: (digital parenting) AND (strategies OR practice OR mediation) AND (early childhood OR early child OR kindergarten OR preschooler OR young children OR preschoolers OR infants OR toddlers OR 0–6 children OR 0–3 children) AND (touch screen OR media OR digital technology). We developed the search phrases after doing extensive piloting.

4.3 Phase 3: Selecting studies

We ensured that only full-text, peer-reviewed journal articles that met our study's goals were included in our systematic review. The following were the inclusion criteria:

(1) Publications in journals reported on digital parenting about children using the internet;
(2) Results reported on digital parenting covering young children aged 0–12 years;
(3) Research used the quantitative method and the quantitative part of the mixed method including correlational studies, cross-sectional studies, experimental studies, and longitudinal studies;
(4) English was the written language.

Study designs that lacked empirical data, studies involving children with special needs, literature reviews, and commentary studies were omitted from our analysis. The screening and selection procedure was depicted in Fig. 2. A list of 40 studies that met the inclusion criteria was selected by reading the abstracts or scanning the full texts of references (in situations where the abstract material did not properly satisfy the inclusion and exclusion criteria). After that, any new research discovered was included. The first and second writers independently assessed and chose the papers based on the inclusion criteria, with 80% agreement. Then they examined the studies that were unclear about whether they were eligible or not until they came to a complete consensus. In the end, 40 papers satisfied all of the criteria and were included in the analysis.

4.4 Phase 4: Charting the data

The 40 included sources were charted to examine the types of research identified (see Appendix). The sources of quantitative methods and mixed methods were 34 and 6, respectively. All of the studies conducted a cross-sectional study ($n = 40$).

There are 6 sources containing very young children aged 0–3 (infants and toddlers), 17 include kindergarten children aged 3–6 (preschoolers), and 17 sources include children aged 0–12. All sources related to the language being studied were about English.
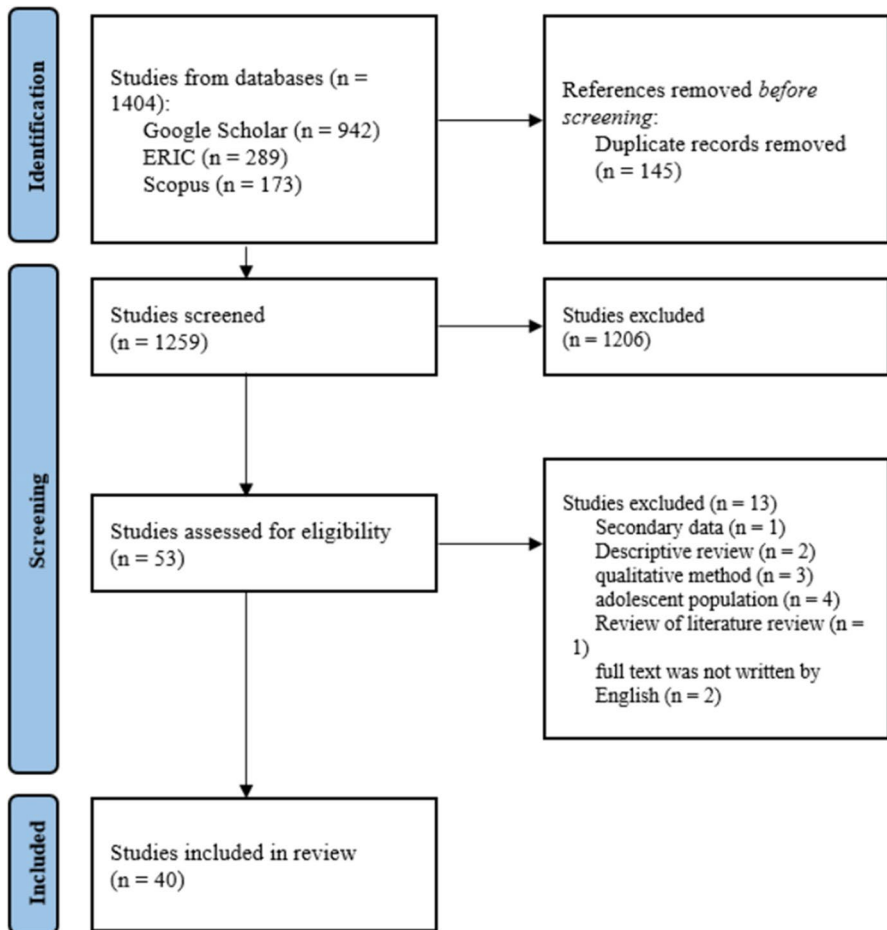
Fig. 2 The review process based on PRISMA flow chart

4.5 Phase 5: Collating, summarizing, and reporting results

The following information was collected and analyzed: authors, publication year, research method, age of children participating, language, research design, and analysis findings. The first author used a pre-established coding scheme to analyze the included articles independently. It analyzes and summarizes the sources in four aspects, including (1) Parents' views on early digital use; (2) digital parenting impacts on digital use; (3) the impact of digital parenting on children; and (4) influential factors of digital parenting. Consistency issues were resolved through a discussion with the co-authors (if any).

5 Results

This study identified and reviewed 40 quantitative studies published in peer-reviewed journals during 2010–2023. A summary of the most important characteristics and magnitude of the effects found in the included studies is provided in the Appendix. Evidence synthesis revealed various topics and measurements for both factors and impacts of digital parenting, and the summary was depicted in Fig. 3. This section will report the findings to address the four research questions.
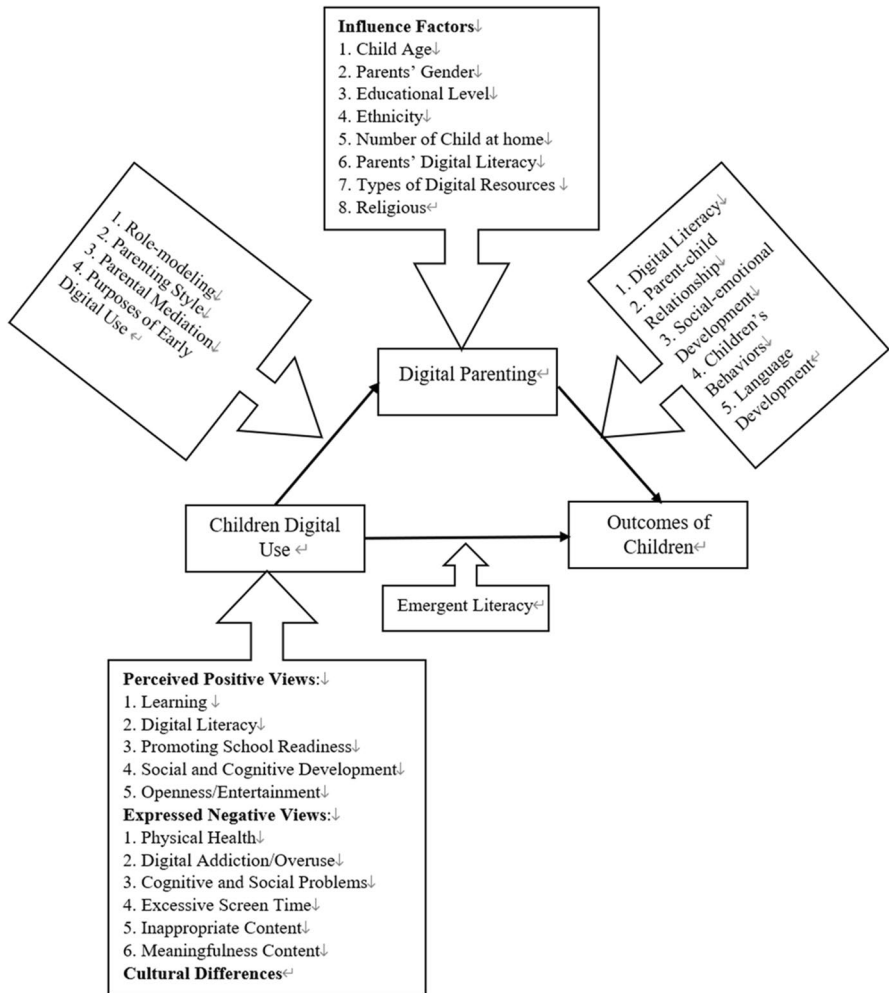

Fig. 3 The summary graph of digital parenting

5.1 Parents' views on early digital use

Parents' views on early digital use were coded, as it determines both digital parenting and early digital use (Konok & Szőke, 2022). Three types of views were identified from the existing 10 studies: optimists ($n=10$), pessimists ($n=8$), and mixed ($n=2$) as presented in Table 1.

Perceived positive views Ten studies consistently reported parental recognition of significant benefits associated with early digital use in children. The unanimous findings across all studies indicated that parents perceived the advantages of incorporating digital devices into their children's lives, contributing to their overall development, enhancing learning skills, and serving as effective parenting tools. The ten articles underscored parental acknowledgment of the positive impacts on children's cognitive, social-emotional, and learning domains (Cao et al., 2021; Dong et al., 2021; Fan et al., 2022; Gjelaj et al., 2020; Griffith, 2023; Papadakis et al., 2019; Huber et al., 2018; Konok et al., 2020; Dardanou et al., 2020; Isikoglu Erdogan et al., 2019). Parents asserted that, beyond formal and informal learning facilitated by digital devices, children experienced heightened creativity, cultural understanding, and enhanced skills, encompassing digital literacy, psycho-motor abilities, language proficiency, and life skills. Additionally, six studies highlighted these digital interactions promoted social-emotional development, including improved communication, prosocial behaviors, and social interaction, despite variations in digital devices, educational, and entertainment applications (Cao et al., 2021; Dardanou et al., 2020; Dong et al., 2021; Fan et al., 2022; Gjelaj et al., 2020; Griffith, 2023). Furthermore, four articles revealed that parents perceived benefits in allowing children to enjoy entertainment through digital devices and short video apps (Dardanou et al., 2020; Fan et al., 2022; Isikoglu Erdogan et al., 2019; Konok et al., 2020). Beyond children's developmental and entertainment perspectives, parents believe that electronic devices can serve as parenting tools to meet their own needs. (Cao et al., 2021; Dardanou et al., 2020).

Expressed negative views Eight studies also documented parents expressing concerns regarding digital use. The findings underscored parental apprehensions about integrating digital devices into their children's lives, with a focus on potential impacts on physical health, mental well-being, and overall development. The collective studies revealed that parents expressed concerns primarily related to physical health, including worries about myopia, insufficient physical activities, and fine motor skills even though all the parents' expressed their concerns from different countries (Cao et al., 2021; Dong et al., 2021; Fan et al., 2022; Gjelaj et al., 2020; Griffith, 2023; Konok et al., 2020; Dardanou et al., 2020; Isikoglu Erdogan et al., 2019). Additionally, four studies highlighted concerns about children's mental health, encompassing issues like addiction, excessive screen time, and sleeping disorders (Dardanou et al., 2020; Isikoglu Erdogan et al., 2019; Gjelaj et al., 2020; Konok et al., 2020). Beyond these expressed concerns tied to physical and mental health, six studies revealed that parents conveyed worries about children's development, involving attention problems, skill development, and social issues such as exposure to violence and inappropriate language (Fan et al., 2022; Gjelaj

Table 1 Parents' views on early digital use

Studies	Perceived Positive Views						Express Negative Views					
	Digital Literacy	Educational Benefits	Parenting Tool	Openness/ Entertainment	Cognitive	Language & Social	Physical Health	Mental Health	Content-related	Cognitive	Language & Social	Cultural Differences
Dong et al. (2021)	✓				✓	✓	✓					
Fan et al. (2022)		✓		✓		✓	✓		✓			
Gjelaj et al. (2020)	✓	✓			✓	✓	✓	✓	✓			
Griffith. (2023)		✓			✓	✓	✓					
Huber et al. (2018)					✓							
Konok et al. (2020)	✓	✓		✓	✓		✓	✓		✓		
Cao et al. (2021)	✓	✓	✓		✓	✓	✓			✓		
Papadakis et al. (2019)		✓			✓							
Dardanou et al. (2020)	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
Isiko-glu Erdogan et al. (2019)	✓	✓		✓	✓		✓	✓	✓			✓

et al., 2020; Cao et al., 2021; Dardanou et al., 2020; Isikoglu Erdogan et al., 2019; Konok et al., 2020).

Cultural differences Two studies (Dardanou et al., 2020; Isikoglu Erdogan et al., 2019) reported that parents' views might vary across cultures. Dardanou et al. (2020) revealed that 90% of Japanese parents had negative views about early digital use, but relatively fewer Portuguese (51%) and Norwegian parents (50%) shared this negative view. Meanwhile, Isikoglu Erdogan et al. (2019) surveyed five hundred parents of children (aged 4 to 6) from the U.S.A., Turkey, China, and Korea and found that Turkish and Chinese parents preferred digital play more than South Korean and American parents.

In summary, parents acknowledge the dual nature of early childhood exposure to digital technology, recognizing both its benefits and risks. Parents perceived positive views emphasized technology's potential to contribute significantly to holistic child development, while concerns underscored the need for prudent parenting practices, considering potential pitfalls in health, mental well-being, and child development. Cultural disparities played a crucial role in shaping parental viewpoints, indicated a spectrum of attitudes, emphasizing the necessity for tailored and individualized approaches to digital parenting.

5.2 Digital parenting impacts on early digital use

Altogether 18 studies have investigated the influences of digital parenting on the patterns of usage among young children. Specifically, these studies have delved into various aspects, including parental role-modeling ($n=8$), parenting style ($n=1$), parental mediation ($n=3$), and the purpose of digital use ($n=8$). The impacts of digital parenting strategies on children's early digital use are summarized in Table 2.

Parents' Role-modelling Eight studies consistently found that parents' habits of using digital media were positively related to children's viewing time of digital devices (Chia et al., 2022; Jago et al., 2014; Konca, 2021; Lauricella et al., 2015; Levine et al., 2019; Nevski & Siibak, 2016; Rek & Kovačič, 2018; Yaşaroğlu & Sönmez, 2022). For example, Jago et al. (2014) found that parents' screen viewing time positively correlated with children's screen viewing time, indicated that parents who watched more than 2 h of TV per weekday were likely to have children exceeding the recommended screen time. Similarly, other six studies (Chia et al., 2022; Konca, 2021; Lauricella et al., 2015; Levine et al., 2019; Nevski & Siibak, 2016; Rek & Kovačič, 2018) found that positive associations between parents' digital device use and their children's media consumption although these seven studies focused on varies of digital devices such as T.V, computer, smartphones, and screen time. Moreover, Yaşaroğlu and Sönmez (2022) investigated the primary students' parents' digital parenting level during the Covid-19 pandemic. The result indicated that parents who are not concerned about their children's online time are more likely

Table 2 Digital parenting impacts on digital use

Studies	Digital Parenting Strategies			Purposes of Children Digital Use				
	Parents' Role Modeling	Parenting Styles	Parental Mediation	Parenting Tools	Child Learning	Relaxation & Enjoyment	Rewards & punishments	Parents' Personal Time
Chia et al. (2022)	✓							
Jago et al. (2014)	✓							
Konca (2021)	✓							
Lauricella et al. (2015)	✓							
Levine et al. (2019)	✓			✓				
Rek and Kovačič (2018)	✓							
Yaşaroğlu and Sönmez (2022)	✓							
Konok et al. (2020)		✓						
Nevski and Siibak (2016)			✓					
Fitzpatrick et al. (2022)			✓					
Lewis et al. (2023)			✓					
Kulakci-Altintas (2019)				✓				
Eichen et al. (2021)					✓	✓		
Gjelaj et al. (2020)					✓			
Nikken and Opree (2018)				✓	✓			
Sivrikova et al. (2020)				✓				
Strouse et al. (2019)							✓	
Cao et al. (2021)				✓	✓	✓		✓

to set negative examples and neglect their children in the digital environment compared to parents who are partially concerned about this matter.

Parents' Behaviors Four studies investigated the correlation between parents' behaviors, encompassing parenting styles and parental mediation, and children's utilization of digital devices. Parents exhibiting an authoritarian style or employing implied restrictive mediation tended to restrict children's exposure to prolonged screen time and mobile device usage. In contrast, permissive and authoritative parents, along with those utilizing co-viewing strategies, were found to be associated with extended screen time, despite variations in research contexts, such as during children's bedtime (Fitzpatrick et al., 2022; Konok et al., 2020). Similarly, parents utilizing restrictive mediation demonstrated flexibility in adjusting rules related to time and location, while content-related rules remained unchanged amid the pandemic context (Lewis et al., 2023). Conversely, parents employing restrictive mediation methods might have increased infants' device usage frequency (Nevski & Siibak, 2016).

Parents' purposes of digital use Eight studies explored parents reported purposes of digital use (Cao et al., 2021; Eichen et al., 2021; Gjelaj et al., 2020; Kulakci-Altintas, 2019; Levine et al., 2019; Nikken & Opree, 2018; Sivrikova et al., 2020; Strouse et al., 2019). The purposes included (1) child learning (Cao et al., 2021; Eichen et al., 2021; Gjelaj et al., 2020), (2) child relaxation and enjoyment (Cao et al., 2021; Eichen et al., 2021), (3) rewards and punishments (Strouse et al., 2019), (4) useful as parenting tools (Cao et al., 2021; Kulakci-Altintas, 2019; Levine et al., 2019; Sivrikova et al., 2020), and (5) parents' personal time (Strouse et al., 2019).

In summary, the findings highlighted the substantial impact of digital parenting on children's early digital use. The positive correlation observed between parents' digital behaviors and children's engagement across diverse devices emphasized the influential role of parental role-modeling. Notably, the adaptive capacity of parents in adjusting rules during the pandemic reflected the dynamic nature inherent in parenting practices. Understanding diverse motivations, from child learning to personal time allocation, emphasized the intricate complexities in integrating digital media into parenting strategies. These insights underscored the intricate dynamics wherein parental modeling, behaviors, and digital use purposes collectively shaped children's early digital engagement.

5.3 The impact of digital parenting on children development

As delineated in Table 3, 10 studies have examined the principal repercussions of digital parenting, encompassing early digital literacy ($n=2$), parent–child relationship ($n=2$), social-emotional development ($n=4$), and language development ($n=1$). In addition, to securitizing the effects of digital parenting, the current literature had also investigated the outcomes of early digital engagement on children ($n=1$).

Table 3 The impact of digital parenting on children

Consequences	Studies	Findings
Early Digital Literacy	Dong et al. (2021) Purnama et al. (2022)	• Active mediation positively influenced children's digital literacy • Authoritarian parenting and restrictive mediation negatively affected children's digital literacy
Parent–child Relationship	Beyens and Beullens (2017) Strouse et al. (2019)	• Restrictive mediation on tablets increased parent–child conflict • Co-use strategy is associated with less parent–child interaction with digital books
Social-emotional Development	Nur'Aini and Minsih (2022) Gou and Perceval. (2023)	• Digital parenting strategies might improve children's social behavior • Content restriction and co-use negatively correlated with social-emotional delay
Children's Behavioral	Wu et al. (2014) Yang et al. (2022)	• Cartoon content with antisocial behaviors is linked to children's aggressive behaviors • Restrictive mediation lessens smartphone problems, while inconsistent strategies worsen them. Inconsistency in mediation is linked to problematic smartphone use in children
Language Development	Medawar et al. (2023)	• Joint engagement and verbal scaffolding enhance infants' language development during computer use
Child Outcomes of Early Digital Use	Neumann (2015)	• Greater access to tablets positively impacts children's emergent literacy skills

Early digital literacy Two studies examined the relationship between digital parenting and early digital literacy (Dong et al., 2021; Purnama et al., 2022). Dong et al. (2021) identified a positive correlation, indicating that children's digital literacy benefited from parents using active mediation approaches. Conversely, Purnama et al. (2022) found a negative impact on digital literacy associated with authoritarian parenting styles, where children were limited to viewing videos and images without independent device access.

Parent–child relationship Two studies have explored how digital parenting affected the parent–child relationship (Beyens & Beullens, 2017; Strouse et al., 2019). In particular, Beyens and Beullens (2017) found that parents who adopted more restrictive mediation on tablet use positively associated with parent–child conflict, while parents who applied co-use strategy moderate the parent–child conflicts. However, using parents' reports, Strouse et al. (2019) found that compared with the printed book, the digital book had less parent–child interaction when parents adopted the co-use strategy.

Social-emotional development Two studies examined how parents' mediation affects children's social-emotional development (Nur'Aini, 2022; Gou & Perceval, 2023). Nur'Aini (2022) found that parents implemented various digital parenting. The most digital parenting strategies were supervision, followed by restrictions, response to children, and positive assessment of parents on digital devices, reported by parents. Another important finding is that implementing digital parenting might improve children's social behavior development. For example, students spoke with the elderly softly and less social swearing after implementing digital parenting strategies for their children during digital use. Gou and Perceval (2023) found that social-emotional delay was found to be negatively correlated with parental mediation in the form of content restriction and co-use strategy, particularly in the sub-competencies of social communication and interpersonal interaction. However, the important findings indicated that children were more likely to be exposed to online risks when parents adopted a more co-use strategy.

Children's behaviors Two studies explored that digital parenting contributes to children's behaviors (Wu et al., 2014; Yang et al., 2022). Wu et al. (2014) found that antisocial behaviors in cartoons viewing by children would increase the tendency of children's behavioral problems, and children's negative behaviors were associated with parents who mostly applied restrictive mediation. Moreover, Yang et al. (2022) focused on parent–child conflict resolution approaches and explored how Singaporean mothers employed various mediation strategies in their young children's problematic smartphone use. The resolution of conflicts between parents and children may involve beneficial or detrimental methods. Negative tactical strategies include physical assault and psychological violence, whereas positive tactile strategies include reason and nonviolent discipline. The findings revealed that restrictive and inconsistent maternal mediation strategies had different effects on children's

smartphone use; the former attenuated while the latter worsened a child's problematic smartphone use.

Language development Only one study examined the relationship between children's early language, digital use, and parents' scaffolding. Medawar et al. (2023) found that parents with joint engagement and used verbal scaffolding increased infants' lexical density (measures word use) during co-used with computer time while decreasing infants' lexical density and sentence use (comprising the ability to abstract language from its immediate context and the evocation of past and future events, locations, or persons who are not present.) with T.V. time.

5.4 Child outcomes of early digital use

Apart from the outcomes of digital parenting, the existing literature also examined the child outcomes of early digital use. Only one article mentioned how using digital devices impacts children's emergent literacy skills (Neumann, 2015). For example, Neumann (2015) found that children with greater access to tablets had better name writing skills and letter sounds.

In summary, the findings elucidated the nuanced impact of digital parenting on early child development, underscoring the intricate interplay between parental strategies and resultant outcomes in the digital era. Positive correlation observed in digital literacy uncovered the salience of engaged parenting, while adverse associates with authoritarian style accentuated the imperative of facilitating children's independent access. Contrasting effects of mediation on parent–child relationships and social-emotional development showcased the intricate nature of digital parenting outcomes, dependent on the type of digital media. Digital parenting assumed a pivotal role in shaping children's behaviors, with judicious approaches serving to attenuate adverse outcomes, especially consistent digital parenting.

5.5 The influential factors of digital parenting

As presented in Table 4, 13 studies have examined the influential factors of digital parenting. Two dimensions of influential factors were generated from analyzing the existing studies, including demographic factors ($n=7$), parental factors ($n=5$), and the type of digital resources ($n=1$).

Demographic factors First, four studies found that children's age influenced the adoption of all digital parenting practices, including parental mediation and parental scaffolding (Neumann, 2018; Nevski & Siibak, 2016; Nikken & Schols, 2015; Rek & Kovačič, 2018). As children grew older, parents tended to prefer using restrictive mediation to mediate children utilize of digital devices, especially time restriction (Nikken & Schols, 2015; Nevski & Siibak, 2016; Rek & Kovačič, 2018). Also, parents of children aged three and above were more likely employed active mediation and provided more technical scaffolding, while parents of children under three years

Table 4 The influential factors of digital parenting

Type of Factors	Influential Factors	Studies	Findings
Demographic Factors	Child Ages	Nikken and Schols (2015) Nevski and Siibak (2016) Neumann (2018) Rek and Kovačič (2018)	• Parents tend to set more restrictive time limits on older children • Younger children received more supervision and restrictive mediation • Older children subjected to more active and restrictive mediation • Technical assistance decreased with child age
	Parents' Gender	Nikken and Schols (2015)	• Mothers tended to adopt more supervision mediation
	Educational Levels	Rek and Kovačič (2018)	• Higher-educated parents were less likely to adopt technical restrictions
	Ethnicity	McCloskey et al. (2018)	• Hispanic parents differed in co-use approaches
	Number of Children	Yaşaroğlu and Sönmez (2022)	• Family structure affects the level and type of digital parenting
	Religious	Purnama et al. (2022)	• High religious beliefs parents tended to result in strict parenting styles
Parental Factors	Digital Literacy	Nikken and Opree (2018) Pons-Salvador et al. (2022)	• Basic skills aligned with active and co-use. Advanced skills linked to restrictive mediation • Proficient literacy leaned towards technical restrictions. Higher competence correlated with ongoing supervision
	Parents' Views	Nikken and Schols (2015) Nikken and de Haan (2015) Nikken and Opree (2018) Griffith. (2023)	• Positive views connected with active mediation, co-use, and supervision • Negative views led to restrictions and heightened supervision • Parents' perception of media's impact affected the adoption of parental mediation • Parents who supported early digital use might choose to active mediation, co-use and supervision
Digital Resources Factor	Toys Type	Istenic et al. (2023)	• Less mediation with non-screen toys, co-viewing and restrictions common in digital play. Participatory learning strategies employed in mediation

old used supervision to monitor children's use of applications (Neumann, 2018; Nikken & Schols, 2015; Nevski & Siibak, 2016).

Second, parental and family demographic features also influence digital parenting, including (1) gender (Nikken & Schols, 2015; Yaşaroğlu & Sönmez, 2022), (2) the educational level (Nikken & Schols, 2015; Rek & Kovačič, 2018), (3) ethnicity (McCloskey et al., 2018), (4) religious and (5) number of children (Nikken & Schols, 2015; Yaşaroğlu & Sönmez, 2022). In particular, mothers tended to adopt supervision mediation more and were also more attentive to effectively using technology and preventing children from risks in online environments, compared with fathers (Nikken & Schols, 2015; Yaşaroğlu & Sönmez, 2022). In addition, parents' educational level exhibited a correlation with digital parenting strategies. Parents with higher education levels demonstrated a tendency to employ restrictive mediation, particularly concerning content and time restrictions (Rek & Kovačič, 2018). However, this educational influence did not extend to adopting technical restrictions to mitigate children's usage of digital devices (Nikken & Schols, 2015). Also, only one study examined the correlation between ethnicity and digital parenting. McCloskey et al. (2018) found differences in technology co-use between Hispanic and non-Hispanic parents. Hispanic parents were less likely to co-use for personal enjoyment or quality time compared to non-Hispanic parents. However, they were more likely to employ co-use when concerned about inappropriate content with children, in contrast to non-Hispanic parents. Besides, Furthermore, two studies investigated the relationship between number of child and digital parenting. In particular, parents might implement different types of mediation (such as supervision, restriction, technical and active mediation) but not a co-use strategy when more children were involved (Nikken & Schols, 2015). Recently, Yaşaroğlu and Sönmez (2022) found that parents' practices (efficient use and protection from risk) with only one child were more efficient and prevented their children from risks during digital use compared to parents with two or more children.

Parental factors First, two studies found that parents' digital literacy influenced their digital parenting (Nikken & Opree, 2018; Pons-Salvador et al., 2022). In particular, parents with basic technology skills tended to implement active and co-use approaches. Those with basic and advanced technology skills were inclined to adopt restrictive mediation, such as restricted content and time limitation. However, parents with advanced digital literacy were squinted toward technical restrictions approaches such as filtering, and setting passwords (Nikken & Opree, 2018). Similarly, Pons-Salvador et al. (2022) found that parents with higher digital competence tended to continually supervise their children's online activities.

Second, four studies explored how parents' views affected their digital parenting (Griffith, 2023; Nikken & Opree, 2018; Nikken & Schols, 2015; Nikken & de Haan, 2015). Parents with negative views of early digital use and unwilling to adopted new technology were tended to implement restrictive mediation and more supervision regarding their digital use and behaviors (Nikken & Opree, 2018; Nikken & Schols, 2015), while parents held with positive views of early digital use might prefer active mediation, co-use, and supervision (Griffith, 2023). In addition, parents realize the media's beneficial or even more detrimentally children's development experienced

more challenges in adopting various of parental mediation compared to parents who had a more neutral perception (Nikken & de Haan, 2015).

The type of digital resources Only one study explored that the type of digital resources influenced parental mediation of children's digital use. Istenic et al. (2023) revealed that the influence of different types of digital resources on parental mediation in children's digital usage. The resulted indicated that traditional toys were perceived as more efficacious in fostering meaningful parent–child relationships compared to digital play. Parents commonly utilized co-viewing and restriction strategies for managing their children's digital play. Intriguingly, lesser parental mediation was observed when children engaged with non-screen digital and electronic toys, and when mediation did take place, parents tended to adopt participatory learning strategies.

In summary, these discoveries highlighted how digital parenting was both dynamic and complex, shaped by different factors like child age, parents' gender, educational level, ethnicity, religious, digital literacy, parental views, and the nature of digital resources. As children grew older, parents tended to adopt more restrictive approaches, showing the evolving challenges in managing digital interactions. The influence of demographic factors emphasized the need for personalized strategies, recognizing the diverse contexts within families. Digital literacy became crucial, stressing the importance of giving parents skills to navigate the digital world. Parental views impacted the need for comprehensive education, offering detailed insights into the pros and cons of digital media. The relationship between digital resources and parental mediation suggested the importance of considering the digital environment in designing effective interventions.

6 Discussion

This scoping review delves into the contemporary literature spanning 2010 to 2023, exploring parental perspectives on early digital use, the implications, consequences, and influential factors of digital parenting. This section elaborates on the key findings while identifying gaps in current research and their implications for future exploration in this field.

Firstly, the review highlights that parental perceptions of early digital use vary widely. These perceptions, whether positive or negative, derive from a combination of factors such as cultural influence, parental age, and digital literacy. In particular, ten studies underscored that parents with positive perceptions tended to correlate with a higher degree of digital usage among their children (Dong et al., 2021; Fan et al., 2022; and others). An important insight emerges from two studies noting the cultural intricacies tied to these attitudes (Dardanou et al., 2020; Isikoglu Erdogan et al., 2019), prompting future exploration into 'cultural differences' in parental views on early digital use.

Secondly, it's evident from twelve studies that a significant association exists between parents' behaviors and children's digital use (Chia et al., 2022; Jago et al., 2014; Konca, 2021 and others). Also, only one study has explored the relationship between parental role modeling and purposes in the context of children's digital use. However, most of these studies rely exclusively on parent-reported surveys, potentially being influenced by social desirability biases, and few of studies investigated the parents digital use behaviors and purposes significantly influence children's behaviors and perspectives regarding digital device usage. Therefore, future research would benefit from implementing triangulation of methods/informants or employing longitudinal study designs, and elucidate the nuanced connections between parental actions, intentions, and their impact on children's digital behaviors and attitudes, providing valuable insights for effective digital parenting strategies.

Thirdly, our review discerns that digital parenting can significantly impact early digital literacy, and a variety of socio-emotional and developmental outcomes. However, the broad conclusion risks overlooking intricacies and nuances between different aspects of child development and specific patterns of digital parenting. Here, it is noteworthy that while certain digital content may induce behavioral problems like aggression (Wu et al., 2014), effective digital parenting may offset such behavior and nurture positive traits (Nur'Aini, 2022; Yang et al., 2022). Hence, future studies should aim to decipher how digital parenting can better mediate child development in this digital era, extending beyond just minimizing behavioral problems to enhancing early learning outcomes.

Finally, influential factors can be categorized into two distinct dimensions: demographic and family-specific. On the demographic front, characteristics like child age, parent gender, education level, ethnicity, religious, and the number of children play significant roles. On the other hand, the family factor includes parents' digital literacy and views on technology usage. Interestingly, despite some contradicting views, general trends indicate parents with positive attitudes and robust digital competency lean more toward active mediation strategies (Nikken & Opree, 2018; Rek and Kovačič, 2018). As conflicting perspectives emerge on the role of parental education levels in implementing restriction strategies, further investigations are necessitated here. Moreover, future research should also consider family dynamics, including the influence of siblings on digital practices.

Nevertheless, this scoping review presents a comprehensive examination of existing evidence to help shape a coherent model of digital parenting. Yet, important research gaps endure, which merit attention for enriching our understanding of this highly complex and intangible tripartite relationship of digital use, digital parenting, and child development.

7 Limitations and implications

Although this study has contributed valuable findings, it is important to acknowledge two specific limitations. Firstly, the study relied exclusively on three comprehensive full-text databases: Scopus, Google Scholar, and Educational Resources Information Center (ERIC). Despite their breadth and inclusivity, these databases may not encapsulate all possible pertinent studies. Future research should also explore additional databases, including ProQuest, Web of Science, EBSCO, and JSTOR, to ensure a more

exhaustive collection of literature. Secondly, this scoping review only included articles published in English from international peer-reviewed journals, thus excluding potential articles published in other languages. In order to capture a more comprehensive, culturally diverse perspective, it is suggested that future reviews consider incorporating journals published in other significant languages, such as Chinese and French, to account for diverse cultural discourses.

Despite its limitations, this study holds significant theoretical and practical implications. From a theoretical standpoint, the finding that factors like parent gender, level of education, and technological proficiency influence digital parenting strategies suggests a need for future research to concentrate on intervention programs aimed at enhancing parental practices. Additionally, the notion that different settings may have an impact on the parent–child relationship and digital parenting strategies indicates the need for more empirical studies focused on parental practices across varying digital contexts. Furthermore, since all of the studies used in this review involved surveys with parental reports, future research might benefit from observational methods to monitor children's digital use more accurately, such as the application of mobile sensor technologies to record precise screen time. On the practical side, this study highlights the significant role of appropriate parental beliefs and mediation in improving children's digital literacy, underscoring the importance of bolstering digital parenting skills. Moreover, the finding that access to digital devices plays a crucial role in parents' understanding of suitable digital practices for families suggests avoiding overly restrictive limitations on digital device accessibility for both parents and young children. In addition, in order to facilitate children's digital learning, there is a need to train educators in early digital education so they can effectively collaborate with families. Lastly, it is crucial for governmental entities to prioritize children's health and welfare in their development of digital parenting guidelines or regulations. This might include the introduction of a grading system to assist parents in determining appropriate digital content for their children.

8 Conclusions

This study marks the first scoping review to thoroughly investigate prevailing research on digital parenting. Firstly, factors such as child age, parent genders, education levels, technical proficiency, family structure, ethnicity and religious are found to play an influential role in digital parenting. This underscores the need for future Chinese research to delve into potential discrepancies within these predictors. Secondly, the majority of meaningful studies concluded that parental digital usage patterns could forecast the frequency of children's digital device use. This points out an additional layer for consideration in upcoming Chinese research – the habits of parents in their digital device use. Thirdly, some studies have ascertained that digital parenting practices influence children's digital use, learning, behaviors, and the parent–child relationship, signposting fresh avenues of exploration for future Chinese studies. Finally, this study has pinpointed parents' beliefs and attitudes towards children's early digital device usage. These attitudes could potentially sway their children's eagerness, capacity, and approach to digital device interactions.

Appendix

Table 5 Main characteristics of the included studies

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Wu et al., 2014 China	Parenting approaches and digital technology use of preschool age children in a Chinese community	385	3–6 years	Quantitative Method Chi-square test & Multiple Linear regression	• Among the three parental approaches (Instructive, Co-use, and Restrictive), only the 'restrictive approach score' emerged as a predictor • Children viewing antisocial behavior cartoons significantly increased the likelihood of behavioral problems in children
Jago et al. (2014) UK	Cross-sectional associations between the screen-time of parents and young children: differences by parent and child gender and day of the week	2326	5–6 years	Quantitative Method T-test & Logistic regression	• Significant correlations were found between parent and child screen viewing (SV), with distinct patterns on weekdays and weekends
Lauricella et al. (2015) USA	Young Children's screen time: The complex role of parent and child factors	2326	0–8 years	Quantitative method: Linear regression	• Child age emerged as a significant predictor of technology use, indicating an increase with age across devices, even when accounting for other variables • Older children's extended wake hours might offer more opportunities for screen media engagement than the youngest children • Strong associations were found between parental and child time with technology

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Nikken and de Haan. (2015) Dutch	Guiding young children's internet use at home: problems that parents experience in their parental mediation and the need for parenting support	785	0–7 years	Quantitative Method Hierarchical regression	• Issues in parental mediation practices correlated systematically with child and family characteristics, as well as parental attributes • A majority of parents expressed confidence in their mediation abilities
Nikken and Schols (2015) Dutch	How and why parents' guide the media use of young children	896	0–7 years	Quantitative Method Multiple regression analyses	• Children predominantly used touchscreens when parents perceived media as providing restful moments for the child • Parents employed various mediation styles based on their positive or negative attitudes about media • Child's media skills and activities were more strongly associated with parental mediation styles, while age showed no significant relationship
Neumann. (2015) Austrilia	Young Children and screen time: creating a mindful approach to digital technology	69	2–4 years	Quantitative Method Descriptive	• On average, children spent 80 min watching TV, 20 min on touchscreen tablets, 10 min on mobile phones, and time on other devices • Children had better name writing skills and letter sounds with greater access to tablets

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Nevski and Siibak. (2016) Estonia	The role of parents and parental mediation on 0–3-year olds' digital play with smart devices: Estonian parents' attitudes and practices	400	0–3 years	Quantitative Method T-test	• Associations between touch screen use among infants and toddlers and factors such as parent screen time, attitudes, and child's age • Parents primarily justify their child's touch screen use for education, entertainment, and behavior regulation • Parental mediation strategies vary based on the child's age and gender, with most parents combining different strategies to fulfill their role as mediators of young children's digital play
Beyens and Beullens. (2017) Belgium	Parent–child conflict about children's tablet use: The role of parental mediation	675	2–10 years	Quantitative Method Hierarchical regression analysis	• Increased tablet use in children was linked to more conflicts with parents, especially under restrictive mediation • Frequent co-use with parents correlated with reduced conflicts, indicating a moderating effect

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Huber et al. (2018) Australia	Detailing the digital experience: Parent reports of children's media use in the home learning environment	406	0–8 years	Quantitative Method Descriptive	• New data detailing young Australian (0–8 years) children's media use activities, focusing on how screen time is spent, rather than simply how long • Parent reports of the touchscreen applications that Australian children use most often • Parents' views on the apps their children use most often and the educational value of screen media
Neumann. (2018) Australia	Parent scaffolding of young children's use of touchscreen tablets	55	0–8 years	Quantitative Method Descriptive	• Parents conveyed tablet use and family and parents frequently employed cognitive scaffolding, with less reliance on technical scaffolding • A negative correlation between technical support and child age implies younger children might require additional assistance • Providing guidance to parents on effective scaffolding strategies during tablet activities holds the potential to enhance early learning

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Nikken and Opree. (2018) Dutch	Guiding Young Children's Digital Media Use: SES-Differences in Mediation Concerns and Competence	781	1–9 years	Quantitative Method Chi-square and Regression analysis	• Parents in low-income, low-educated, and single-parent families had lower basic media proficiency, while advanced proficiency was lower in low-educated and single-parent families • Basic proficiency was linked to ease of active co-use, restrictive mediation, and technical restrictions • Low-educated parents were less likely to adopt new media, and new media adoption was negatively linked to perceived mediation concerns but did not predict parental competence
Rek and Kovačič (2018) Slovenia	Media and preschool children- the role of parents as role models and educators	1087	1–6 years	Quantitative Method ANOVAs	• The extent of parents' media exposure has a statistically significant effect on media exposure of their children • Parents set stricter limits for children in the younger age group (1–3 years old) compared to the older one (4–6 years old) • The parents' opinion on selected positive and negative effects of media use on their children are statistically significant in the case of parents' education and the extent of their media use

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
McCloskey et al. (2018) USA	Parent perceptions of mobile device use among preschool aged children in rural head start centers	192	3–6 years	Quantitative Chi-square, Binary logistic regression and ANOVA	• Children's technology use was significantly associated with parent comfort with technology • Children's more frequent use of technology in families were parents reported higher comfort levels may indicate that parents were indeed the gatekeepers of devices in most families
Strouse et al. (2019) USA	Educational and Fun? Parent Versus Preschooler Perceptions and Co-Use of Digital and Print Media	48	3–5 years	Quantitative method Chi-square	• While parents were more often motivated and preferred to use print media with their children, children more often showed a preference for digital media • Parents reported that when they co-used digital media with their child, they were less likely to engage in facilitative behaviors than when they co-used print
Papadakis et al. (2019) Greek	Parental involvement and attitudes towards young Greeks children's mobile usage	293	4–6 years	Quantitative method Chi-square	• Parents' favorable view of mobile learning is hindered by a lack of knowledge in choosing educational apps • The potential issue of restricting children's access to smart screens might escalate

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Levine et al. (2019) USA	Mobile media use by infants and toddlers	326	0–3 years	Quantitative Method Multiple regression analyses	• Parents were more inclined to allow their child's use of MM for educational rather than non-educational purposes • Parent MM use positively predicted total child MM use • Frequency of child MM use alone was positively predicted by parent MM use, PMS non-educational motivation, and child's age. Parental educational level was a significant negative predictor
Isikoglu Erdogan et al. (2019) USA, Turkey, China and South Korea	Do Parents Prefer Digital Play? Examination of Parental Preferences and Beliefs in Four Nations	500	4–6 years	Mixed MANOVA	• Parental play preferences, emphasizing global significance in digital play • Parents generally favor traditional play over digital play, expressing concerns about technology's impact
Konca (2021) Turkey	Digital Technology Usage of Young Children: Screen Time and Families	537	3–6 years	Quantitative Structural Equation Modeling (SEM)	• A positive relationship between children's and parents' screen time, while family income exhibited a negative association with children's screen time

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Dardanou et al. (2020) Portugal, Norway and Japan	Use of touchscreen technology by 0–3-yearold children: Parents' practices and perspectives in Norway, Portugal and Japan	552	0–3 years	Mixed Descriptive	• Common concerns emerged, reflecting cultural influences on defining a 'good childhood,' the play-learning connection, outdoor activities, and worries about technology addiction • Norwegian parents, despite shared concerns, evaluated the benefits of their 0–3 s' touchscreen use more positively than Portuguese and Japanese parents
Konok et al. (2020) Hugaria	Associations between child mobile use and digital parenting style in Hungarian families	1270	0–7 years	Quantitative Principal Component Analyses (PCAs) and General Linear Model	• Children's increased MTSD use was associated with more permissive, authoritative, and less authoritarian parenting styles • Lower parental education, stronger mobile phone attachment, and positive attitudes towards early device use were also linked
Sivrikova et al. (2020) Russia	Parental reports on digital devices use in infancy and early childhood	97	0–8 years	Quantitative Cramer's V Somers' D	• Children's increased digital device use for learning was linked to age, with touch-screen devices favored for video viewing, self-development, and gaming • parents implementing restrictions on content and learning time

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Kulakci-Altintas. (2019) Turkey	Technological Device Use Among 0–3-Year-Old Children and Attitudes and Behaviors of Their Parents Towards Technological	500	0–3 years	Quantitative method Descriptive	• Parents allowed their children to use technological devices in order to do housework, silence the child when cried, to feed the child, to be able to make him/her sleep, to entertain her/him when he/she spoiled and to spend some time with friends, respectively • More than half of children gave response by crying, showing bad temper, behaving insistent and showing anger when they were not allowed to use technological devices
Gjelaj et al. (2020) Kosovo	Digital Technologies in Early Childhood: Attitudes and Practices of Parents and Teachers in Kosovo	100	3–6 years	Mixed method Descriptive	• Parents believe that the use of technology improves their children's overall development and school readiness
Dong et al. (2021) China	Profiles and Predictors of Young Children's Digital Literacy and Multimodal Practices in Central China	1953	0–8 years	Quantitative ANOVAs & Hierarchical regression	• All children had access to various digital technologies at home, with common practices being TV watching and smartphone use • 3 digital family profiles emerged: Low-level (62.9%), Middle-level (36.3%), and High-level (0.8%) • Child age, location, family income, home resources, parental beliefs, and mediation predicted children's digital literacy and multimodal practices at home

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Cao et al. (2021) China	Digital parenting during the COVID-19 lockdowns: how Chinese parents viewed and mediated young children's digital use	2491	3–6 years	Mixed Thematic approach	• Chinese parents expressed mixed views on early digital use, with 25.09% positive, 35.13% negative, and 32.64% ambivalent • Concerns about negative effects on early learning persisted • Parents predominantly saw themselves as guides (35.84%) and supervisors (32.04%), employing various digital parenting approaches like supervision, active mediation, restrictive mediation, and co-use or co-view
Eichen et al. (2021) Austria	Families' digital media use: Intentions, rules and activities	150	1–6.5 years	Quantitative Chi square	• Parental motives for digital media use vary between care and fostering institutions. Mainly focused on child learning and relaxation
Fitzpatrick et al. (2022) Canada	An examination of bedtime media and excessive screen time by Canadian preschoolers during the COVID-19 pandemic	316	3–6 years	Quantitative Multinomial regression	• On average, 64% of preschoolers spent over 2 h daily on digital media during the pandemic, with 56% exposed within an hour before bedtime • Parental mediation style was also significantly related to child media habits

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Pons-Salvador et al. (2022) Spain	Parents' digital competence in guiding and supervising young children's use of the Internet	1827	6–9 years	Quantitative Games-Howell test	• Parents exhibiting elevated digital proficiency are more inclined to have 6-to-9-year-olds engaged in internet activities • Parents consistently overseeing their children's online activities demonstrate superior digital competence compared to those who do so intermittently or not at all
Papadakis et al. (2022) Greek	Mobile device use among pre-school-aged children in Greece	625	3–6 years	Quantitative ANOVAs	• Parents with higher education levels demonstrated greater confidence in their digital skills and engaged in active mediation • The number of siblings played a significant role in influencing parents' mediation strategies
Yaşaroğlu and Sönmez. (2022) Turkey	Evaluating the digital parenting levels of parents of primary school students during the pandemic based on different variables	205	6–12 years	Quantitative Inferential statistical test	• Parents demonstrated both setting negative examples and efficient use of digital tools at high levels, while digital neglect and risk protection levels were moderate

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Fan et al. (2022) China	The Use of Short-Video Mobile Apps in Early Childhood: A Case Study of Parental Perspectives in China	266	2–6 years	Mixed Descriptive	• More than half children watch short-video app more than 30 min and the most popular platforms were Iqiyi and Qibabu • Parents tended to employ restriction mediation to mediate children's short-form videos viewing
Yang et al. (2022) Singapore	Inconsistent Media Mediation and Problematic Smartphone Use in Preschoolers: Maternal Conflict Resolution Styles as Moderators	154	3–6 years	Quantitative Ordinary least squares regression analysis	• The correlation between a mother's inconsistent mediation and her child's problematic smartphone use was notably stronger when mothers employed negative parent–child resolution tactics, such as psychological aggression and physical assault
Nur' AiNi and Minsih. (2022) Indonesia	The effect of parenting in the digital era on the behavior of elementary school students	75	9–12 years	Quantitative Linear regression	• Digital parenting significantly impacts student behavior. Various patterns, including supervision, restrictions, responses, and positive evaluations, have positive effects on student behavior after implementation

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Chia et al. (2022) Singapore	Associations between Parent Attitudes and on- and off-Screen Behaviors of Preschool Children in Singapore	425	3–6 years	Quantitative Chi-square	• The study found a link between parent–child digital media use. Child-TQ kids started using screens earlier, spending more time on digital media than child-BQ kids • Parents in child-TQ enforced guidelines less, influenced by lower qualifications and income
Purnama et al. (2022) Indonesia	Do parenting styles and religious beliefs matter for child behavioral problem? The mediating role of digital literacy	414	2–7 years	Quantitative Partial Least Squares SEM	• Religious beliefs might impact authoritarian parenting styles and exerted a negative influence on digital literacy
Gou and Perceval (2023) China	Does digital media use increase risk of social-emotional for Chinese preschoolers?	944	3–6 years	Quantitative Logistic regression	• Children faced reduced risks with heightened restrictive mediation but increased risks with elevated levels of parental co-use
Istenic et al. (2023) Slovenia	Surveying Parents of Preschool Children about Digital and Analogue Play and Parent–Child Interaction	306	1–5 years	Quantitative Chi-square	• More frequent mediation for digital screen toys and apps compared to electric and electronic toys. Common strategies included co-viewing and restrictions • Parental mediation was least observed for digital toys without screens and electric/electronic toys. When present, participatory learning strategies were utilized

Table 5 (continued)

Author/s (Year): Country	Research Topic	Sample Size	Age Range	Research Method	Major Findings
Medawar et al. (2023) Argentine	Early language outcomes in Argentinean toddlers: Associations with home literacy, screen exposure and joint media engagement	465	1.5–3 years	Quantitative Hierarchical linear regression	• Favorable impacts emerged from mothers literacy beliefs, PC time, and verbal scaffolding on language outcomes • Shared reading and screen experiences can stimulate language, provided there is active engagement, but passive screen exposure and insufficient content may detrimentally affect toddlers' language outcomes by potentially displacing socially significant interactions
Griffith. (2023) America	Parents beliefs and child media use: Stress and digital skills as moderators	822	4–8 years	Quantitative Linear Regression	• Favorable parental beliefs were associated with heightened co-use and engagement with educational content • Parental stress and, to a lesser degree, digital proficiency moderated the connection between beliefs and behaviors related to screen time
Lewis et al. (2023) Australia	Parent perspectives on young children changing digital practices: Insights from Covid-19	101	3–5 years	Mixed Paired sample T-tests	• Lockdown led to increased digital device use by kids. Parents adapted, becoming more flexible with screen time rules, allowing usage in varied contexts • Purposes of children digital engagement were serves as an occupier and substitute for missed opportunities

MM Mobile media

Declarations

Conflict of interests None.

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