Parent-Child Joint Media Engagement Within HCI: A Scoping Analysis of the Research Landscape

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ABSTRACT

Parents play essential roles in children's play and learning with various media, often leading to positive and productive engagement outcomes for both parties. As such, an increasing number of HCI research has focused on understanding parent-child joint media engagement (JME) and designing new technologies to foster productive joint media experiences for children and parents. However, we currently lack a systematic view of this emerging field, which hinders the research and design of new joint media experiences and technologies for families. In this work, we conduct a scoping review of parent-child JME research within HCI ($N = 89$) and analyze the included papers from three lenses: publication features, methodological features, and JME features. Based on these findings, we identify gaps and opportunities in parent-child JME research and further expand the theoretical framing of JME by developing a framework that captures different JME dimensions.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in collaborative and social computing**; **HCI theory, concepts and models**; • **Social and professional topics** → **Children**.

KEYWORDS

Joint Media Engagement, Parent, Child, Scoping Review, Framework Development

1 INTRODUCTION

Parents are deeply engaged in various aspects of their children's lives and are an indispensable part of their development. Particularly, with the ubiquity of technologies, children nowadays consume a lot of media and technology and are often referred to as "digital natives," i.e., people who grow up in the digital age and are comfortable with the Internet, electronic devices, and digital platforms [91]. Parents' engagement becomes even more critical for "digital natives" as many media and technologies may negatively impact children's lives and development, e.g., exposing them to age-inappropriate information like violence [83], resulting in excessive screen time [80], and causing anxiety and depression [2]. Therefore, parents have implemented various mediation strategies to help their children maximize the benefits and minimize the negative impacts from media usage. Examples include restricting children's media access and scaffolding children's learning with educational media [22, 31, 77, 128]. Among these mediation strategies, an important practice widely utilized by parents is using media together with their children, intentionally or unintentionally, such as playing video games together [105] and participating in their learning with educational apps [42], which is framed as "Joint Media Engagement" (JME) by HCI scholars (e.g., [110, 130]).

JME refers to the phenomenon of people using media together [110]. Parent-child JME has garnered considerable attention from HCI researchers in the past decade due to the significant roles that parents play in children's play and learning with technologies, such as project collaborator, logistics supporter, and learning opportunity broker [12, 29, 127]. Notably, such shared media use between parents and children is not only valuable for children's development and learning but also contributes to positive family dynamics and provides benefits to parents as well, such as increasing family bonding and aiding parents in learning new information about technology [87, 105]. Consequently, prior studies have explored parent-child JME across various media (e.g., video games [53] social media [27], and learning technologies [129]) and suggested design guidelines to facilitate productive shared media use. Simultaneously, to design more productive parent-child JME experiences and technologies, exploring different aspects of how parents and children interact with each other around technologies is necessary, especially considering that new domestic, entertainment, and learning technologies are consistently emerging. Ewin and colleagues conducted a systematic literature review in 2021 on mobile-device-based JME between parents and children, in which they included 27 papers and analyzed how parents and children interacted with each other and how mobile devices impacted the interaction [33].

However, this review specifically focused on mobile-device-based JME while excluding other media types, such as parent-child JME with smart voice assistants (e.g., [16]) and smart toys (e.g., [38]). Moreover, Ewin et al.'s review included only four papers from HCI venues due to its demanding paper inclusion criteria, although there are many HCI papers on parent-child JME. We still lack a comprehensive view of the current research landscape of parent-child JME within HCI, such as what media types have been explored, what JME aspects HCI scholars focus on, and how HCI scholars frame parent-child interactions. This gap may hinder further research and designs that aim to create innovative joint media experiences and technologies for families.

In this work, we conduct a scoping analysis of parent-child JME research within HCI by searching for relevant papers in the ACM Digital Library and major HCI journals archived in other databases. Our analysis, based on the curated papers ($N = 89$), focuses on understanding the overall research landscape of parent-child JME through three lenses: 1) *publication features,* i.e., publication years, venues, and contribution types; 2) *methodological features,* such as participants' demographic backgrounds, research methods, and participants' engagement length; and 3) *JME features,* i.e., media types, JME settings, theoretical perspectives, and analytical perspectives for JME. Our findings show parent-child JME is a relevantly new research field in HCI but has accumulated considerable attention from HCI scholars recently, who have paid attention to parent-child joint use of different media (e.g., educational media, communication media, and entertainment media) in various settings (e.g., homes, community centers, and fields). Interestingly, HCI scholars approach parent-child JME from various theoretical and analytical perspectives, such as leveraging theories from Communication, Learning Sciences, and Cognition, and framing parent-child interactions by highlighting the agencies of parents, children, or technologies. Based on these findings, we develop a JME framework consisting of essential components for understanding the phenomenon of people using media together, and further reflect on the gaps and opportunities for more research and design work on parent-child JME.

This work primarily offers three contributions to the HCI communities interested in designing and developing joint media experiences and technologies for families: 1) It provides a comprehensive overview of the landscape of parent-child JME research within HCI, the first and much-needed review of parent-child JME within HCI given the increasing interest in research and design for family JME; 2) It proposes a JME framework that can be employed by researchers and designers to guide the analysis and design of people's joint media engagement; and 3) It uncovers gaps and potential avenues for future research and design practices to support joint media use for families.

2 THEORETICAL UNDERPINNING: PARENTAL MEDIATION THEORY AND JOINT MEDIA ENGAGEMENT

HCI scholars often borrow the theoretical framing of *Parental Mediation Theory,* which originated from Media and Communication studies, to understand the shared engagement of parents and children with media and technologies. Parental mediation theory refers to the strategies parents use to help their children maximize the benefits and minimize the risks posed by media use [22, 53]. The theory encompasses three broad types of mediation: *restrictive mediation,* where parents set rules for and regulate their children's media use, such as restricting what media children can play with, when they can use the media, and the use length [50, 58]; *active mediation,* where parents explain or discuss media content and its use with their children, such as discussing Internet content or game strategies together [32, 53]; and *co-using,* where parents join their children's media activities, such as playing video games together [53, 105] or joining their children's learning with learning technologies [128]. However, as new technologies have evolved, media and HCI scholars have found the current framing of parental mediation theory inadequate. For instance, it falls short in capturing the nuanced details of parent-child interactions made possible by newly emerged, highly networked technologies [53, 128]. This has led to the development and application of new framings of parent-child interactions with technology, such as adding new dimensions to the framework [22, 53], framing the interaction through the lenses of parent roles [12, 29, 127], or creating new theoretical framings like Joint Media Engagement [110], which is the theoretical foundation of the present work.

Joint Media Engagement (JME) was coined by Takeuchi and Stevens in 2011 and is defined as *"spontaneous and designed experiences of people using media together"* [110, p.9]. JME has broad applicability and can occur across space and boundary as long as multiple people use media together [33, 110]. Therefore, JME has been widely cited by HCI scholars in studies involving multiple people in technology use, particularly in family contexts, such as families' online information search [87] and family co-making with creative computing technologies [130]. When researching and designing JME experiences and technologies, researchers and practitioners have paid particular attention to supporting "productive" JME, i.e., joint experiences that positively contribute to participants' shared media use. Such experiences can lead to a deeper understanding of media content, provide inspiration, or result in improved physical and mental wellbeing [70, 105, 110]. To facilitate these productive JME experiences, some design principles have been proposed. Examples include maintaining meaningful engagement for all participants, encouraging communicative interactions among participants, and scaffolding affective interactions [70, 110]. Overall, JME is an important research thread in HCI and computer-supported cooperative work, and it can contribute to more human-centered, productive, and engaging technology-mediated experiences among people. The present work focuses on a notable JME phenomenon–parent-child joint media use–and aims to better understand how HCI scholars approach parent-child JME through a scoping review, finally informing new designs of productive experiences and technologies for family use.

3 METHOD

We followed the PRISMA protocol [82] to structure our processes of paper search, analysis, and report, which are detailed in this section.

Table 1: The paper inclusion and exclusion criteria

Dimensions	Inclusion	Exclusion
Population	Parents: Including fathers and/or mothers in the JME, regardless of involving other family members	Only including none-parent family members (e.g., grandparents, older siblings) and no parents were included
	Children: Including young people between 0-18 years old in the JME	No children (0-18 years old) were included
Intervention	Parents and children co-engaged in the reported media experiences, in-person or remotely, regardless of the involvement of other family members like siblings	No media co-engagement between parents and children, e.g., solo engagement, sibling interactions, or only grandparent-grand interactions
Outcomes	Empirical data: provide clear, identifiable empirical accounts of parent-child interactions in the findings, i.e., readers can clearly tell which interactions belongs to parent-child dyads	Did not present empirical data about parent-child JME (e.g., argument papers and literature reviews), or which interactions belong to parent-child dyads cannot be identified like [68]
	Peer-reviewed full papers	Posters, workshop papers, work-in-progress papers, papers not published in not fully peer-reviewed venues, etc.
	Presented in English	Presented in other languages
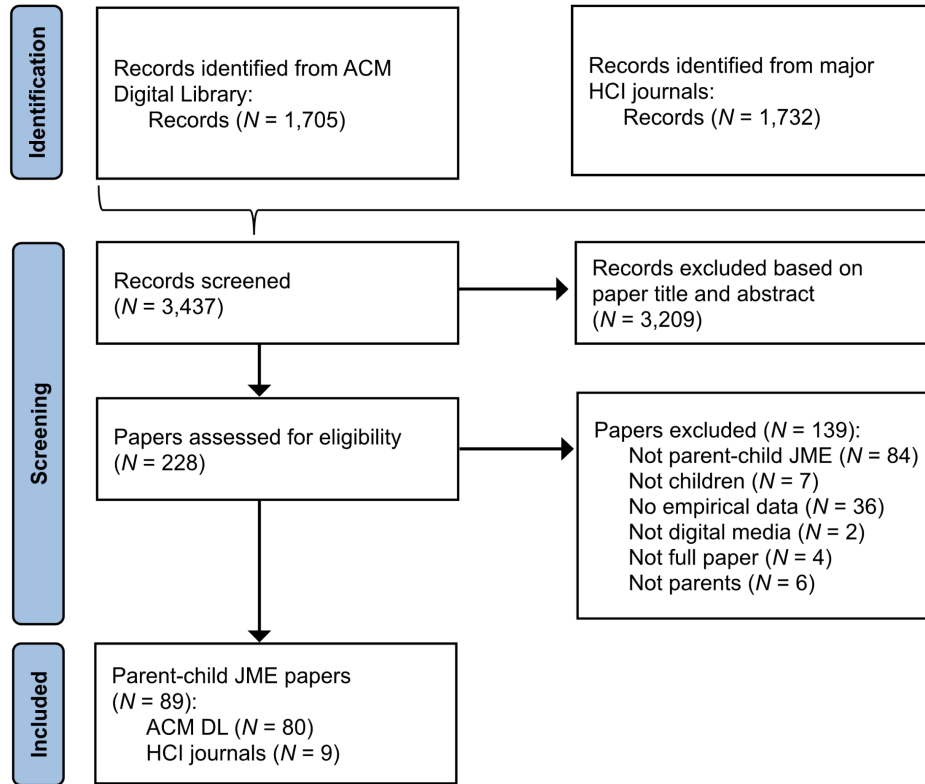
Figure 1: The paper search and screening processes

3.1 Collecting Papers

To locate papers about parent-child JME within HCI, we searched two data sources–the ACM Digital Library (the primary database archiving high-quality conferences and journals for HCI and Child-Computer Interaction, such as the ACM CHI, CSCW, and IDC conferences) and major journals for HCI and Child-Computer Interaction archived in other databases. The latter examples include the *International Journal of Human-Computer Studies, International*

Journal of Child-Computer Interaction, and *International Journal of Human-Computer Interaction.* We have provided a complete list of the selected HCI journals not archived in the ACM Digital Library in the appendix table (*N* = 29). We selected these journals by consulting the journal lists in the HCI Bibliography [85], Google Scholar's top publications on Human-Computer Interaction [74], and the journal rankings on Human-Computer Interaction by the Scimago Journal & Country Rank (SJR) [79].

We used the keyword combinations of {[*"Parent*"* AND *"Child*"*] OR [*"Famil*"* AND *"Joint Media Engagement"*]} in the paper abstracts for our data sources. We employed broad terms like "parent*" and "child*" in the search because many papers about parent-child interactions with media/technologies did not mention the phrase "joint media engagement," as the phrase is relatively new and not yet a universally applied term by relevant HCI scholars (e.g., [49, 96, 100]). The search was conducted in two rounds: the first in December 2022 to include all relevant HCI papers up to that point, and the second in June 2023 to include newly published papers from the first half of 2023. For the returned search results from the two batches ($N = 3, 437$), we first carried out a loose screening by reading the titles and abstracts of the papers to include those about parent-child or family interactions with technologies, resulting in 228 papers. Next, we applied a stricter filtering process to the 228 papers, which involved reading a paper's introduction, method, and findings sections to determine if it met the inclusion and exclusion criteria specified in Table 1. Note that we followed the definition of JME as *"spontaneous and designed experiences of people using media together"* [110, p.9] to decide if a paper covers parent-child JME, i.e., if a paper provides empirical findings on parent-child interactions around media, regardless whether other family members were involved. This process led to the inclusion of 89 papers in the review, comprising 80 papers from the ACM Digital Library and nine papers from HCI journals. It is important to note that to ensure the rigor of our paper screening and filtering, the second step was conducted independently by two research assistants (the second and third authors). Their results were compared to determine if a paper should be included. Any discrepancies were then discussed and resolved among all the authors. Figure 1 provides the documentation of our paper search and screening processes. The full list of the 89 included papers for this review can be found in the supplementary file.

3.2 Analyzing Papers

The analysis was structured around our research goal for this review, i.e., understanding the research landscape of parent-child JME in HCI. Specifically, we followed a content analysis approach [60, 90] and focused on three dimensions of the collected papers: 1) *publications features*, including publication years, venues, and contribution types; 2) *methodological features*, including participants' demographic backgrounds (i.e., geographical locations, ethnical backgrounds, socioeconomic status, children's ages and genders, children's special needs if any, and parents' genders), the employed research methods, and participants' engagement length; and 3) *JME features*, including media types, JME settings, theoretical perspectives, and analytical perspectives.

Three authors (referred to as A1, A2, and A3) participated in the data analysis process. Specifically, A1 and A2 divided the analysis work: A1 focused on the dimension of JME features, while A2 analyzed publication and methodological features. A1 and A2 each read through all the included papers to identify and label information related to their assigned analysis dimensions using the qualitative analysis software MAXQDA. Any uncertainties or questions arising from the analysis were discussed between the two researchers throughout this process. It's worth noting that

for most of our analysis, we did not need to develop codebooks as relevant information could be directly found in the included papers, such as the papers' publication features, employed methods, and theories. Therefore, the analysis largely involved finding relevant information from each paper. One exception was the analysis of contribution types under the publication features dimension, where we followed Wobbrock and Kientz's summary of seven research contribution types in HCI for deductive analysis (i.e., empirical research contributions, artifact contributions, methodological contributions, theoretical contributions, data set contributions, survey contributions, and opinion contributions) [120].

After labeling all relevant information, A1 and A2 came together to summarize their extracted information into findings. It was at this point that a higher level of information abstraction and knowledge generation occurred as the two researchers discussed and synthesized their extracted data. Examples include the taxonomy of media types and the development of a new JME framework. To test the reliability of the information extraction and labeling by A1 and A2, A3 independently analyzed 10 randomly sampled papers following the three analysis focuses and the developed codes by A1 and A2. The results were compared to those from A1 and A2, achieving Cohen's Kappa scores of .837 (*"Almost Perfect"* [61]) and .712 (*"Substantial"* [61]), respectively, demonstrating the high effectiveness of A1's and A2's analyses. Finally, A1 organized all the analysis results and summaries and further reflected on the findings with a specific focus on research gaps and opportunities for parent-child JME research.

4 FINDINGS

This section is structured based on our three analytical dimensions, i.e., publication features, methodological features, and parent-child JME features.

4.1 Publication Features

Publication features present the publication years, venues, and contribution types of the reviewed papers.

4.1.1 Publication Years & Venues. Our results show that the number of papers focused on parent-child JME has been increasing yearly from 2009 to 2023, see Figure 7.1 (a) in the appendix[1]. The majority of these papers were published within the last six years (from 2017 to 2023), totaling 64 papers (71.91%) of the overall number. In comparison, 25 papers were published between 2009 and 2016, constituting 28.09% of the total. The publication year distribution indicates growing research interest in parent-child JME within HCI. Regarding publication venues, we found a total of 18 different venues (Figure 7.1 (b)). The majority of papers were published in ACM conferences ($N = 80$, 89.89%), with only a few appearing in HCI journals ($N = 9$, 10.11%). More specifically, *The ACM Conference on Human Factors in Computing Systems* (CHI, $N = 27$, 30.34%), *The ACM Conference on Interaction and Children* (IDC, $N = 23$, 25.84%), *The ACM Conference on Computer-Supported Cooperative Work & Social Computing* (CSCW, $N = 14$, 15.73%), and *International Journal of Child-Computer Interaction* (IJCCI, $N = 7$, 7.87%)

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[1]Note that all figures starting with "Figure 7." are attached in the appendix

are the top four publication venues for parent-child JME research, accounting for 79.78% of the total papers. New scholars to JME research can focus on these venues for finding relevant research and publishing their work.

4.1.2 Contribution Types. Following Wobbrock and Kientz's research contribution taxonomy in HCI [120], we identified three types of contributions among the included papers: *empirical contributions* (N = 89, 100%), *artifact contributions* (N = 35, 39.33%), and *theoretical contributions* (N = 13, 14.61%). Because of the paper inclusion criterion, which mandates the inclusion of empirical data regarding parent-child JME, all 89 papers have made **empirical contributions** by providing descriptive accounts of parent-child interaction behaviors using various media and technologies. Out of these 89 papers, 54 of them (60.67%) are focused on empirically investigating parent-child interactions with existing technologies (e.g., [96, 105]). The remaining 35 papers (39.33%) report parent-child JME around new technologies developed by the researchers (i.e., **artifact contributions**), e.g., new technologies for families' co-building of Machine Learning models [114] or for parents' participatory mediation of their children's smartphone use [58]. Thirteen papers made **theoretical contributions**, i.e., involving the development of *"new or improved concepts, definitions, models, principles, or frameworks"* [120, p.41]. Among the 13 papers, five papers (38.46%) introduced novel concepts, models, or frameworks related to parent-child interaction or children's media use, such as the concept of Centering and Decentering that emphasize the agencies of both parents and children during JME [47], and children's ecological context of choosing media content [55]. The remaining eight out of the 13 papers (61.54%) expanded JME framing and related theories, such as broadening the scope of JME [65, 87], proposing fresh perspectives for analyzing JME (i.e., *Discord* [65], *Negotiation* [130], and *Family Values* [125]), and introducing new principles for productive JME [70, 125].

4.2 Methodological Features

We extracted and synthesized participants' demographic backgrounds and the methods employed to investigate JME.

4.2.1 Participants' Demographic Backgrounds. In this dimension, we extracted and synthesized participants' geographical locations, ethnical backgrounds, parent marital status, family socioeconomic status, children's ages, children's genders, children's special needs when applicable (e.g., children with disability), parents' genders, and parenting roles (i.e., father or mother). Regarding the paper count, if a specific dimension (e.g., age) covers a wide range, then all the covered categories under this dimension will be counted. For example, if a paper includes children ages 6-8 years and 15-17 years old, then the counts of both the "Middle Childhood (6-8 years old)" and "Teenagers (15-17 years old)" categories will increase by one. We applied this rule to the counts of participants' geographical locations, ethnic backgrounds, parent marital status, children's ages, and children with special needs. For the counts of children's genders, parents' genders, and family socioeconomic status, almost all papers involved different features (e.g., all papers involved/targeted both boys and girls), making the counting meaningless. Therefore, we followed the rule of *dominance*, i.e.,

if a specific feature dominates the category using the threshold of 70%. For example, "predominantly girls" means that 70%+ of the involved/targeted children were girls while less than 30% were boys.

Participants' Geographical Locations. We identified a total of 19 countries/regions from the 89 papers, see Figure 7.2. However, most studies were conducted in the USA (N = 65, 73.03%), followed by Canada (N = 6, 6.74%), the UK (N = 5, 5.62%), and South Korea (N = 3, 3.37%). The remaining locations included only one or two papers. A few papers introduced cross-cultural contexts and collected data from multiple locations (N = 7, 7.87%), such as those in both Austria and Middle Eastern countries [115], or the USA and Saudi Arabia [51].

Participants' Ethnic Backgrounds. Fourty-one papers (46.07%) reported White participants, 25 papers (28.09%) reported Asian participants, 20 papers (22.47%) reported Black participants, 19 papers (21.35%) reported Hispanic/Latinx participants, two papers (2.25%) reported Pacific Islanders, and one study (1.12%) reported Native American participants (Figure 7.3 (a)). Additionally, 10 papers (11.24%) reported participants of mixed races, all of whom were from the USA. Fourty papers (44.94%) did not disclose participants' ethnic backgrounds.

Family Marital and Socioeconomic Status. Twenty-one papers (23.60%) reported two-parent families, 12 papers (13.48%) reported divorced or single-parent families, while the majority of papers (N = 70, 78.65%) did not fully report the family marital status, see Figure 7.3 (b). Additionally, we did not find any of the 89 papers specifically mentions including same-sex households. As for the families' SES, the papers were more evenly distributed. Twenty-three papers (25.84%) focused predominantly on high SES, sixteen papers (17.98%) on predominantly low SES, and seven papers (7.87%) explored both. However, a significant portion of the papers (N = 43, 48.31%) did not disclose the families' SES.

Children's Ages & Genders. We categorized children's ages based on the eight developmental stages outlined by the US Centers for Disease Control and Prevention (CDC) [113]. Specifically, 83 papers (93.26%) provided detailed age information of the target children, whereas six papers (6.74%) did not define children's age information clearly. Overall, despite a wide age range being represented in these studies, the focus is on the middle childhood stage, i.e., children between 6-11 years old (Figure 7.4 (a)), including children in middle childhood (6-8 years old: N = 57, 64.04%; 9-11 years old: N = 54, 60.67%) and preschoolers (3-5 years old: N = 50, 56.18%). Young teens aged 12-14 years also constituted a significant group, being the focus of 34 papers (38.20%). Comparatively, research involving the youngest and oldest ends of the age spectrum was less common. Regarding children's genders (Figure 7.5 (a)), the majority of the papers, 49 in number, reported a mix of girls and boys, accounting for 55.06% of the total; Six papers (6.74%) predominantly reported boys (i.e., boys made up more than 70%); And four papers (4.49%) predominantly reported girls (i.e., girls made up more than 70%). The remaining 30 papers (33.71%) did not clearly state the genders of their target children.

Children with Special Needs. Eight papers reported children with special needs (N = 8, 8.99%), including those with visual impairments (N = 2, 2.25%), emotion regulatory difficulties (N = 1, 1.12%), developmental delay (N = 1, 1.12%), Autism (N = 1, 1.12%),

language delay ($N = 1$, 1.12%), sleep issues ($N = 1$, 1.12%), and attention deficit hyperactivity disorder ($N = 1$, 1.12%), see Figure 7.4 (b). The remaining 82 papers focused on typically developing children, accounting for 92.13% of the total papers. In sum, children with special needs are significantly underrepresented.

Which Parent. Thirty papers predominantly featured mothers (33.71%, i.e., mothers made up more than 70%), while a significantly smaller number, three papers (3.37%), focused primarily on fathers, see Figure 7.5 (b). Twenty-three papers (25.84%) reported a mix of fathers and mothers, and 33 papers (37.08%) did not disclose this information.

4.2.2 The Employed Methods for Investigating JME. We examined the research methods the reviewed papers employed to approach parent-child JME. Also, we analyzed participants' engagement length in each study.

Research Methods. We identified three paradigms for approaching parent-child JME: 1) Designing and developing new systems, and then conducting system evaluations with families ($N = 35$, 39.33%), i.e., the papers that made artifact contributions; 2) Selecting existing technologies and deploying them with families ($N = 34$, 38.20%) in various settings, such as engaging families in collaborative activities in community centers [130] and mailing smart speakers to families to explore their use experience [16]; 3) Examining families' existing media practices without deploying any technologies ($N = 20$, 22.47%) like investigating family's existing video call practices [4].

To document and investigate family parent-child JME experiences, various data collection methods were employed (Figure 7.6 (a)), mainly including interviews ($N = 60$, 67.42%), video recordings ($N = 40$, 44.94%), surveys/questionnaires ($N = 33$, 37.08%), system use logs ($N = 27$, 30.34%), field notes ($N = 15$, 16.85%), screen recordings ($N = 8$, 8.99%). Most papers ($N = 70$, 78.65%) employed multiple data collection methods, such as combining survey, video recording, and interview [125]; The remaining 19 papers (21.35%) only employed a single data collection method, either video recordings, interviews, field notes, or use logs (e.g., [17, 47, 127]). Additionally, among the 35 papers that made artifact contributions, 13 of them conducted **formative studies** to understand relevant design space and guide system design, using methods such as interviews, technology probes, and surveys.

Participation Length. Regarding the time duration during which participants were involved in the study, the data reveals a wide range, from less than 30 minutes to longer than one year (Figure 7.6 (b)). Tweety-four papers (26.97%) involved participants for 30 to 120 minutes, followed by papers spanning one week to one month ($N = 21$, 23.60%) and one to three months ($N = 12$, 13.48%). Eight papers (8.99%) did not disclose the engagement duration. Lastly, papers with engagement less than one day ($N = 39$, 43.82%) primarily consisted of interview studies or short activity interventions conducted in research labs and community centers, while studies spanning from one day to more than one year typically tracked families' interactions with researcher-deployed media or existing media.

4.3 JME Features

In the third dimension, we examined features of parent-child JME experiences, including media types, JME settings (i.e., where the JME experience took place), theoretical perspectives adopted by different papers, and their analytical perspectives (i.e., how parent-child joint experiences were described). Theoretical and analytical perspectives are included because they provide insights into how HCI scholars view and frame JME and reveal the richness and complexity of JME, which can help researchers and practitioners better understand and design for JME. They can further serve as a reference for researchers to decide on appropriate perspectives for examining and understanding JME.

4.3.1 Media Types. As depicted in Figure 7.7 (a), more than half of the papers reviewed ($N = 50$, 56.18%) focused on educational media, which are technologies designed for learning purposes, such as teaching children computational concepts [114], knowledge about energy [9], and emotional skills [104]. *Communication media* ($N = 21$, 23.60%), which support connection and communication between individuals, formed another significant category, such as video conferencing [4] and phone calls [23]. The remaining three media types received comparatively less attention from HCI scholars: *entertainment media* ($N = 8$, 8.99%) such as video games [26]; general *everyday devices* used by families ($N = 6$, 6.74%) such as iPads and smartphones [102]; and *information trackers* ($N = 5$, 5.62%) like physical activity trackers [99]. Note that some papers involved multiple types of media (e.g., [38, 71]).

4.3.2 JME Settings. Regarding the settings for the examined JME (Figure 7.7 (b)), the majority of them took place physically in-person ($N = 83$, 93.26%), while only a few papers focused on remote joint experiences ($N = 6$, 6.74%). Furthermore, we investigated the specific locations where the JMEs occurred and identified six types: the most common being participants' homes ($N = 58$, 65.17%), followed by community centers ($N = 15$, 16.85%), such as museums, libraries, and makerspaces; university labs ($N = 14$, 15.73%); field use ($N = 6$, 6.74%), such as natural environments and parks; children's schools ($N = 2$, 2.25%); and the researcher's home ($N = 1$, 1.12%). Additionally, two papers (2.25%) did not specify the locations of their JMEs, and six papers involved multiple locations, such as both university labs and participants' homes [20].

4.3.3 Theoretical Perspectives. Among the 89 papers, 52 (58.43%) specifically mentioned theoretical perspectives in their writing, which we classified into three main categories based on their application fields. Table 2 presents these three categories, along with the specific theoretical framings and the papers that utilized them.

The first category of theoretical perspectives is rooted in the fields of Communication and HCI ($N = 28$ out of 52, 53.85%) and includes 10 theoretical framings, such as *Parental Mediation Theory* [116], *Joint Media Engagement* [110], and *Parental Scaffolding Behaviors* [33]. We merge theoretical framings from Communication and HCI into one category because current theories framing parent-child interaction in HCI were mostly adopted from Communication studies and were often expanded by HCI scholars, making the boundary hard to define. For example, *Parental Mediation Theory* was developed by Communication scholars to describe parental involvement in children's television-watching practices [116] and

Table 2: The theoretical perspectives employed by the reviewed papers

Theory Domains	Specific Theoretical Perspectives
Communication and HCI (*N* = 28)	Joint Media Engagement [10, 16, 17, 20, 28, 29, 36, 48, 56, 64, 70, 75, 81, 87, 105, 125, 128–130]
	Parental Mediation Theory [15, 39, 45, 58, 75, 81, 105, 127–129]
	Communication Repair [16, 20]
	Discord/Negotiation [65, 130]
	Centering and Decentering [47]
	Differentiated Participation [26]
	Interaction as Performance [26]
	Othermother [102]
	Parental Scaffolding Behaviors [29]
	Pragmatics [16]
Education and Learning Sciences (*N* = 23)	Sociocultural Learning Perspective [1, 7, 17, 63, 96, 114, 119, 130]
	Culturally Responsive Computing/Cultural Forms [9, 51, 52, 96]
	Sensemaking Talk/Learning Talk/Self Talk [36, 66, 135]
	AI Literacy Framework [29, 114]
	Computational Thinking [43, 95]
	Constructionism [52, 135]
	Experiential Learning Framework [99, 104]
	Active Prolonged Engagement (APE) Framework [65]
	Discourse Scaffolding [16]
	Engineering is Elementary Model [135]
	Family Alignment of data Models and Stories (FAMS) [7]
	Information Problem-Solving – Internet (IPS-I) [87]
	Multiple Literacies [29]
	Problem-based Gaming [25]
Psychology and Cognition (*N* = 13)	Self-Determination Theory [49, 98, 100]
	Ecological Systems Theory [55, 81, 87]
	Reflection/Reflection-in-Action [25, 97]
	Empowerment Theory [123]
	Family Systems Theory [86]
	Family Resilience Framework [39]
	Self-Efficacy [102]
	Symbol Systems [89]

has been employed by HCI scholars to frame parental involvement in children's other media engagement, such as video games [75] and smartphone use [58]. The second theoretical category is centered around Education and Learning Sciences (*N* = 23 out of 52, 44.23%) and includes 14 different theoretical framings, such as *Sociocultural Learning Perspective* [62], *Experiential Learning Framework* [59], and *Culturally Responsive Computing* [101]. The third category is rooted in Psychology and Cognition fields and consists of eight theoretical frameworks from 13 out of 52 papers (25.00%), such as *Self-Determination Theory* [24], *Empowerment Theory* [112],

and *Self-Efficacy* [8]. Note that some papers combined theoretical perspectives from different domains, for example, using both the Family Resilience Framework (i.e., Psychology) and Parental Mediation Theory (i.e., Communication and HCI) when examining family technology in Asian Indian families in the USA during the COVID-19 pandemic [39].

Although theories from different domains were employed, they mainly served four purposes in the analyzed papers: 1) providing relevant background information and motivating research goals, such as introducing *Parental Mediation Theory* to provide background

Table 3: The analytical perspectives employed by the reviewed papers

Agency Orientations	Specific Analytical Perspectives	Explanation
Emphasizing parent agency (N = 50, 56.18%)	Parents' scaffolding and facilitation ($N = 25$) [4, 6, 9, 17, 20, 36, 37, 43, 49, 51, 54, 67, 73, 81, 88, 95, 104, 106, 111, 115, 125, 127–129, 135]	How parents scaffold and facilitate children's media engagement
	Parents' perceptions ($N = 20$) [36, 39, 40, 46, 49, 52, 56, 64, 69, 73, 97, 98, 102, 104, 105, 109, 115, 119, 122, 127]	How parents perceive children's media engagement
	Parents' regulation and restriction ($N = 12$) [15, 38, 39, 45, 56, 58, 71, 72, 76, 103, 128]	How parents regulate children's media engagement
	Parents' roles ($N = 6$) [14, 29, 39, 48, 92, 127]	The different roles parents play
Emphasizing child agency (N = 13, 14.61%)	Children's engagement ($N = 9$) [19, 36, 39, 49, 56, 81, 95, 106, 123]	Direct description of various physical interaction behaviors between family members
	Children's perceptions ($N = 5$) [36, 40, 52, 95, 104]	How children perceive media engagement
	Centering and decentering ($N = 1$) [47]	How children's participation is centered and decentered
Emphasizing both parent and child agency (N = 49, 55.06%)	Descriptive physical interaction ($N = 25$) [4, 7, 11, 14, 20, 23, 28, 35, 40, 44, 48, 52, 63, 75, 87–89, 92, 97, 102, 105, 114, 122, 124, 131]	Direct description of various physical interaction behaviors between family members
	Conversation/Communication ($N = 15$) [13, 16, 20, 21, 41, 46, 48, 63–66, 107, 121–123]	How family members verbally communicate with each other and technologies
	Collaboration ($N = 8$) [13, 17, 84, 87, 100, 106, 109, 134]	How family members collaboratively engaged in media
	Tension and negotiation ($N = 6$) [39, 56, 69, 87, 103, 130]	Tensions around engagement and family members negotiate with each other
	Engagement ($N = 4$) [26, 65, 70, 105]	Engagement levels and their alignment with productive JME principles
	Reflection ($N = 3$) [97, 99, 114]	How family members reflect on joint media experience
Emphasizing material agency (N = 37, 41.57%)	Technology roles ($N = 34$) [1, 9, 13, 15, 20, 25, 35, 37, 38, 38, 40, 46, 49, 58, 69, 71, 75, 76, 84, 86, 89, 92, 96, 97, 100, 103, 105, 107, 111, 115, 121, 122, 133, 135]	How technology mediates engagement
	Environmental influence ($N = 5$) [19, 38, 51, 123, 125]	How environments like cultural factors and family economic status impact engagement

for parent-child interactions around technologies [125, 129]; 2) providing data analysis directions or serve as analysis frameworks, e.g., using *Ecological Systems Theory* to analyze how families drew on different resources for joint information searching practices [87]; 3) functioning as design guidelines for activities and technologies to facilitate productive media experiences, such as incorporating *Cultural Forms* in children's computational learning tools [9]; and 4) serving as interpretation lenses to gain a deep understanding of findings and generate meaningful discussions, such as discussing how *Symbol Systems* were represented in families' collaborative coding activities and how this lens could help identify key collaborative learning moments and guide new learning tool design [89].

Particularly, we paid special attention to how *Joint Media Engagement* was employed by the 19 papers (21.35%) that included it as a theoretical perspective. We found that JME was mostly leveraged to provide background framing for parent-child joint media practice at the concept level ($N = 19$ out of 19, 100%). In other words, JME was used as a concept to describe the phenomenon of shared media experiences between parents and children (e.g., [16, 17, 48]). Additionally, three out of 19 papers (15.79%) employed the principles

for productive JME developed by Takeuchi and Stevens [110] as an analytical framework to examine parent-child joint media activities [17, 70, 105]. Two papers (10.53%) used JME to inform data analytical direction, focusing on interpersonal interaction for data analysis [10, 28]. Lastly, two papers (10.53%) situated their findings in JME to discuss the conceptual expansion of what productive JME means [125, 130].

To sum up, HCI scholars have borrowed theoretical perspectives from various research fields to design or examine parent-child JME experiences and technologies. Given the interdisciplinary nature of HCI research and the diverse family JME contexts (e.g., family communication, entertainment, and learning in different settings), leveraging theories from various research fields is often necessary and can yield enriching outcomes. This can enhance our understanding of parent-child interaction during joint media experiences by providing valuable insights from various dimensions not captured by the current JME framing, such as parents' various scaffolding behaviors [29], how to effectively support the intended learning goals [99, 104], and how to facilitate family members' reflection on their media engagement [25, 97]. Therefore, HCI scholars are encouraged to continue seeking and utilizing appropriate theoretical

frameworks from other fields to facilitate JME research and provide new JME perspectives.

4.3.4 Analytical Perspectives. In this dimension, we examine how different papers describe parent-child JME and classify these analytical perspectives into four broad categories based on whose agency is emphasized (Table 3): emphasizing parent agency, child agency, both parent and child agency, and material agency.

The number of papers ($N = 50$, 56.18%) framing parent-child JME from perspectives that highlight parents' agency is the highest. These perspectives include parents' scaffolding and facilitation behaviors (e.g., [6, 129]), parents' perceptions of their children's media engagement (e.g., [39, 56]), parents' regulation and restriction behaviors (e.g., [71, 103]), as well as parent roles in children's media engagement [29, 48]. Comparatively, a much smaller number of papers ($N = 13$, 14.61%) specifically emphasize children's agency. These child-agency perspectives include framings around how children initiate and lead media engagement (e.g., [19, 81]), how children perceive media engagement [40, 95], and how children are centered and decentered for participation [47]. Additionally, 49 papers (55.06%) include analytical perspectives that highlight both parents' and children's agency during JME, i.e., direct descriptions of parent-child physical interactions (e.g., turn-taking [75, 124]), conversations and communication (e.g., utterances and dialogues [16, 41]), collaboration (e.g., [87, 134]), tension and negotiation (e.g., [56, 130]), engagement (e.g., principles of productive JME [70, 105]), and reflection (e.g., [97, 99]). Lastly, 37 papers (41.57%) describe parent-child JME from the perspective of material agency, including how technologies mediate the engagement (e.g., [15, 115]) and how environmental factors like cultures impact the engagement (e.g., [38, 51]). It is worth pointing out that these different analytical perspectives are not mutually exclusive and often coexist in the reviewed papers, as shown in Table 3 where the same paper references appear in different categories. In brief, the reviewed papers employed various analytical perspectives to frame parent-child interactions during JME, such as parents' scaffolding and facilitation behaviors (e.g., [104, 129]), tensions and negotiations (e.g., [56, 130]), and the roles of technology in mediating joint experiences (e.g., [96, 103]). These perspectives highlight the agency of different components involved in parent-child JME activities, including parents, children, tools, and environments.

5 DISCUSSION

Parent-child JME is a relatively new research field within HCI, with the first paper published in 2009 at IDC [124]. However, there has been an increase in attention to understanding and designing shared media experiences for parents and children, especially in the past five years. To this end, this work offers a comprehensive view of the state-of-the-art research landscape of parent-child JME within HCI through a scoping review, which can be beneficial for researchers, designers, and practitioners who are interested in understanding, supporting, and designing joint family media experiences. In this section, we reflect on the implications of our review results, with a focus on 1) theoretical development for JME based on the findings of theoretical and analytical perspectives, and 2) future research and design opportunities for parent-child joint media experiences based on the overall findings.

5.1 Opportunities to Advance JME Theorization

Our findings show that HCI scholars employed theories from different disciplines (e.g., Communication, Learning Sciences, and Psychology) and various analytical perspectives (e.g., parental regulation tension and negotiation, and technology roles) to structure, situate, and/or communicate their JME research. Such a wide application of theoretical and analytical perspectives, especially those borrowed from other fields, underscores JME as a complex social phenomenon. This complexity is influenced not only by the participants involved but also by the type of media selected and the intricate sociocultural and physical environments in which the joint use is situated. Simultaneously, the wide use of theories from different domains and the diverse employed analytical perspectives further shed light on the opportunity to advance the theorization for JME. Specifically, as a relatively new term emerged in 2011, JME has not been theorized yet and remains at the conceptual level, namely, a terminology to describe the phenomena of people engaging media together [110]. Therefore, it is not surprising that much of the analyzed literature used JME to provide a background framing for parent-child joint media practices (e.g., [16, 17, 48]) rather than as an analytical perspective. However, lacking relevant theoretical frameworks for JME may not be productive in facilitating JME research and practice, as researchers and practitioners will need to search and find appropriate theoretical frameworks and analytical perspectives from other domains that are not tailored for JME, as shown in Table 2 and Table 3. In other words, HCI scholars interested in people's shared use of media still lack a handy, operational JME theory to guide their exploration and understanding of the joint experience. As such, we call for more research from HCI scholars to advance the theorization of JME.

Given the diversity and complexity of JME, theorizing JME may not be easy. Here, by connecting to the features of theory, we propose some potential directions for JME theorization. Across different research paradigms (e.g., positivism, interpretivism, and pragmatism), the meanings of theory remain largely the same – a theory is a set of propositions that are logically related, expressing the relation(s) among several different constructs and propositions to explain and even predict phenomena [57, 117, 118]. Accordingly, **the goal of theory building for JME is to develop such propositions that help us understand, explain, and even predict a specific type of JME phenomena.** Under this grand theorization goal, there could be multiple concrete and actionable directions, which include but are not limited to [30, 57, 118]: 1) **descriptive JME theories** that characterize a specific type of JME phenomena, such as theories that describe parent-child interaction patterns with educational digital media or sibling interactions with analog toys; 2) **explanatory JME theories** that clarify and/or predict the relationships between different constructs in a specific type of JME phenomena, such as how entertainment media like video games mediate family members' interactions; 3) **critical JME theories** that sort out power dynamics among media participants in a specific type of JME phenomena and question the status quo to create more equitable joint media experiences, such as how children's voices are centered and decentered when using educational media together with their parents [47]. Although this work is grounded in and aimed at the HCI community, these different JME theory-building

directions are not limited to HCI. For example, researchers in Media Studies, Family Studies, and Learning Sciences can develop JME theories in their specific domain contexts. For instance, a learning scientist could develop a descriptive JME theory that articulates how JME can facilitate productive learning outcomes. Conversely, HCI scholars, who focus on the interaction between humans and technology, might orient their attention more toward the interaction between media partners and technology, as well as how to facilitate such interactions through media design.

Practically, HCI scholars may consider two methodological approaches to develop potential JME theories based on relevant theory development practices. **First, researchers can follow the Grounded Theory approach [78] to extract and abstract the features, constructs, and their relationships of specific JME phenomena based on empirical data.** For instance, Barron et al. [12] extracted and summarized seven types of parent roles in children's development of technology fluency based on the interview data with parents following the Grounded Theory approach, identifying and summarizing roles such as being a teacher, collaborator, and learning broker. These roles as a whole can be viewed as a descriptive theory of parent-child interactions around technologies from the perspective of parent roles. **Second, researchers can borrow existing theoretical perspectives from other fields to form a new framework as theory building for JME.** Yip and colleagues [126], for example, combined theories of ecological systems, family resilience, funds of knowledge, and collaboration as a JME lens to understand and explain how immigrant English-language learning families collaboratively search for online information. Note that the two proposed approaches can serve as methodological references for other researchers building JME theory. Instead of strictly following existing examples of JME-related theory building (e.g., [12, 126]), researchers have the freedom to choose their own directions in terms of what JME theory to build and how to build it.

Lastly, it might be challenging to develop a *grand JME theory* that fits all JME phenomena given the vast diversity of people involved (e.g., intergenerational JME, siblings, and peers), media types (e.g., media for education, communication, and entertainment), physical environments (e.g., home, school, community centers, and remote), and sociocultural contexts (e.g., geographical locations, gender identities, and ethnicity and race), as evidenced in our findings. Therefore, grounding in a specific type of JME phenomena to develop *middle-ranged theories* that address interactions among media participants or *micro theories* that describe relationships at the individual levels (e.g., parent roles or child agency) could be more feasible and productive [57, 117].

5.2 Developing a Holistic Framework to Approach JME

Building upon our review findings on the methodological and JME features as well as acknowledging JME's complexity, we propose a JME framework that provides a holistic view for systematically approaching and understanding JME, see Figure 2. The framework comprises four dimensions: participants, media types, use contexts, and engagement. Based on these four dimensions, we posit that **a JME experience should be understood from the perspective**
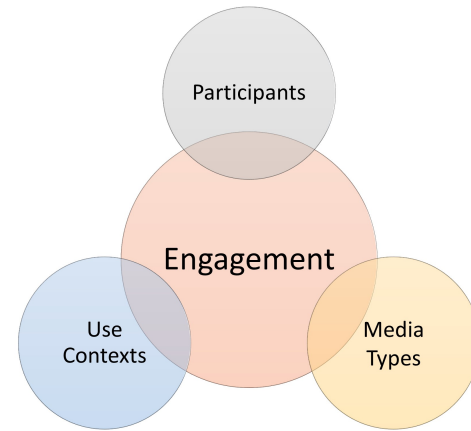

Figure 2: A holistic view of joint media engagement that emphasizes approaching JME by focusing on engagement (i.e., the how–engagement mechanisms) influenced by the dimensions of participants (i.e., joint by who), media types (i.e., what media), and use contexts (i.e., where–the physical and sociocultural environments)

of *engagement* as a result of who (*i.e., participants*) are engaged in what type of media experiences (*i.e., media types*) within specific physical, social, and cultural settings (*i.e., use contexts*):

- **Participants,** i.e., who are joint in the experience and their characteristics. Those who are involved are the foundation of a joint engagement experience. Therefore, it is essential to thoroughly consider the features of participants for JME, including their *demographics* (e.g., age, gender, and family socioeconomic status), their *relationships* (e.g., a couple, parent-child dyads, and siblings), and the associated *power dynamics* (e.g., the agency and autonomy of different participants and how they are demonstrated).
- **Media Types,** i.e., what media is used and the media's characteristics. Media and technologies play crucial roles in mediating parent-child interactions. Indeed, many papers directly frame the interactions through the lens of technology's roles (see Table 3). When considering the media dimension, the focus can be on its *purposes* (e.g., for communication, entertainment, or education), *formats* (e.g., mobile apps, web-based applications, or wearables), and *platforms* (e.g., running on smartphones, smartwatches, etc.).
- **Use Contexts,** i.e., where the joint media experience happens, including *physical* environments (e.g., home, school, or library), *social* environments (i.e., who else are involved and mediating the experience, e.g., facilitators), and *cultural* environments (i.e., cultural factors and how they influence participants' practices, e.g., parenting styles vary in different cultural contexts [5, 125]).
- **Engagement,** i.e., what the engagement looks like within participants around the media under the holistic influence of participant features, media types, and use contexts. Simultaneously, engagement can be further approached from

Joint	Media	Engagement	
Who: Participants	**What: Media Types**	**Where: Use Contexts**	**How: Engagement (Mechanisms)**

Participants' demographics, e.g.,
- Age
- Gender
- Ethnicity
- Geographical locations
- Socioeconomic status
- Special needs

Participants' relationships, e.g.,
- Family relationships (e.g., parents, grandparents, siblings)
- Household features (e.g., two-parent, single parent, same-sex parents)
- Friends and peers
- Teacher-student
- Colleagues

Power dynamics, e.g.,
- Participants' agency and autonomy
- Participants' abilities and inabilities

Media purposes, e.g.,
- Education
- Communication
- Entertainment
- News and information
- Health
- Social

Media formats, e.g.,
- Screen-based
- Tangible devices
- Virtual reality
- Augmented reality
- Mixed reality
- Full-body interactive installations

Media platforms, e.g.,
- Smartphones
- Wearables like smartwatches
- Tablets
- Desktop computers
- Interactive exhibitions

Physical environments, e.g.,
- In-person
- Remote
- Home
- School
- Museums
- Fields
- Office
- Research labs

Social environments, e.g.,
- Family environment
- Educational environment
- Digital environment
- Community environment

Cultural environments, e.g.,
- Community culture
- Ethnic culture
- Regional culture
- Religious culture
- Organizational culture
- Pop culture

Physical engagement, e.g.,
- Interaction with other participants
- Interaction with materials
- Interaction with environments

Cognitive and/or psychological engagement, e.g.,
- Conceptual understanding
- Creative thinking
- Emotional reactions
- Problem solving
- Reflections
- Social attachment

Engagement outcomes, e.g.,
- Learning gains
- Behavior changes
- Attitude changes
- Social gains/losses
- Perceptions (e.g., perceived strengths and weaknesses)

Figure 3: A checklist for various JME factors under the dimensions of participants, media types, use contexts, and engagement

three levels – *physical engagement* (e.g., the behavioral interactions between participants and how media impacts the interaction), *cognitive and psychological engagement* (e.g., conceptual understanding and emotional response), and *engagement outcomes* (e.g., participants' learning gains, perceptions, attitude changes, and behavior changes).

Through developing a holistic framework that delineates different JME dimensions and their relationships, we expand the JME framing of *"spontaneous and designed experiences of people using media together"* [110, p.9] and make the JME concept more operational. To make this framework even more tangible and actionable, we further create a checklist (Figure 3) for the four dimensions based on the findings from our three analytical lenses. The checklist lays out major consideration factors for the dimensions of participants, media types, use contexts, and engagement mechanisms. It is worth pointing out that these factors, summarized from and inspired by the review results of 89 papers, cover a wide range of JME factors and can serve as a comprehensive JME factor reference. However, these factors are by no means exhaustive, especially given that new technologies and media formats are consistently emerging. Accordingly, future research can continue to update the checklist.

In terms of application, the holistic framework and checklist offer a tool for researchers, designers, and practitioners to design and understand JME experiences from a systematic perspective. More specifically, **the framework and checklist, on one hand, can serve as an analytical guide to examine and understand JME experiences.** Using the *engagement* dimension as an example,

the framework and checklist can inform researchers about what kind of engagement they can pay attention to and help them decide what to focus on during a JME for their specific research purposes, such as physical engagement (e.g., behaviors interactions among participants, with materials, or with the environments) and/or cognitive engagement (e.g., learning process and reflection). On the other hand, **the framework and checklist can serve as a design factor reference for designing new JME experiences and technologies.** For instance, our framework and checklist can remind designers and practitioners to consider not just what media is used for their design, but also the features of participants and use contexts, ensuring a comprehensive consideration of different JME factors. It's important to clarify that we are not suggesting all future JME experiences should be analyzed or designed through the four dimensions of participants, media types, use contexts, and engagement. These dimensions instead provide a holistic reference for scrutinizing specific aspects of a joint media experience. For example, one can examine a joint media experience by combining specific elements from our framework and checklist as investigatory lenses and ignore other elements, such as exploring the cultural influence (i.e., environmental factors) on parent-child interactions (i.e., physical engagement) surrounding digital games (i.e., media types) while not necessarily needing to explore children's learning gains [125].

5.3 Gaps and Opportunities in Researching and Designing for Family JME

In addition to the theory gaps and opportunities above, our findings also reveal that current parent-child JME research covers a wide range of family groups in various geographical locations, using various media types in different media-use contexts. However, these different methodological and JME characteristics are not balanced, with the majority of the studies focusing on educational media in home settings from the USA. While families' use of other media types like entertainment technologies from other geographical and cultural contexts are significantly under-represented and under-explored. This imbalance unveils the gaps in existing parent-child JME research and highlights future opportunities for the design and research of joint media experiences and technologies for families of diverse backgrounds, which are further detailed as follows.

Expanding Analytical Perspectives for JME. Our findings show that JME encompasses different agencies, including the agency of parents, children, media, and environments. Nevertheless, some agencies are more explored than others – far fewer studies focus on children's agency and the influence of environmental factors on JME compared to papers emphasizing parents' agency. For instance, several studies present parent-child interactions by framing the different roles parents play, such as collaborator, teacher, and enforcer (e.g., [29, 127]), whereas none specifically name and describe the various roles children may assume. Future research on family JME can broaden the framings of parent-child JME by incorporating various perspectives, such as child agency and environmental factors.

Expanding Family JME Research to Various Geographical and Cultural Contexts. Previous studies demonstrate that parenting is a cultural practice and families from different geographical and cultural contexts may interact with each other in different ways [5, 18]. For example, parents in the USA and China engage in their children's digital gaming activities differently in terms of the roles they play and instruction styles [125]. Although many HCI studies have investigated and designed for parent-child JME experiences, the majority were conducted in the USA. Nonetheless, technologies and media activities developed and tested in the USA context may not optimize families' engaging experiences in other geographical and cultural contexts. Therefore, we advocate for more JME research for families from less explored geographical and cultural contexts to address this gap.

Increasing Family JME Research among Marginalized and Under-resourced Groups. Our findings indicate that families of different ethnicities and socioeconomic statuses are represented in current parent-child JME research. However, the distribution is disproportionally skewed. For instance, papers involving White families are the most common, often outnumbering the papers featuring families from other ethnicities such as Black and Hispanic/Latinx. Similarly, there are about 30% fewer papers focusing on low-SES families compared to those investigating high-SES families. Thus, we urge HCI scholars to continue researching and designing for historically underrepresented and under-resourced families.

Researching for Children with Special Needs. Only eight out of 89 papers reported children with special needs, such as children with Autism [69] and development delays [107], although these children need more parental support than their typically developing peers without these challenges do. Considering that a large percentage of children worldwide face various challenges and special needs [108, 132], we recommend HCI scholars employ their advanced knowledge and skills to investigate and create better joint media experiences for children with special needs.

Investigating and Promoting Father-Participated Family JME. Our analysis results indicate that compared to mothers, fathers are significantly less visible in current parent-child JME. Only three papers predominantly focused on fathers, while 30 papers primarily centered on mothers. It is not uncommon in many families for mothers to be more involved in their children's activities than fathers, largely due to societal expectations that mothers assume more childcare responsibilities while fathers focus on providing financial support [93, 94, 129]. However, fathers play an equally crucial role in their children's lives and development, contributing to aspects such as social and cognitive development and mental health [3, 34]. Therefore, future research should aim to examine how fathers engage in children's media experiences and design technologies that encourage father-participated family JME.

Suggestions for Reporting Family JME Research. While analyzing the included papers, we encountered difficulties extracting relevant background information from many papers, as the authors did not disclose it. This missing information included participants' ethnic backgrounds, families' socioeconomic statuses, children's ages and genders, parents' marital statuses, as well as parents' ages and genders, as shown in Figures 7.3, 7.4, and 7.5. Considering that family JME is a social practice heavily influenced by participants' backgrounds and their sociocultural environments [5, 18], missing this information could hinder our precise understanding of the investigated parent-child JME phenomena and the extent to which the findings can be applied to different family contexts. Thus, we recommend future family JME studies report families' background information (e.g., geographical locations, socioeconomic statuses, parents' marital statuses, parents' and children's genders and ages) and JME settings, as well as include researchers' reflections on how families' backgrounds affect their JME behaviors. This would allow other designers and practitioners to more accurately interpret the findings and apply them appropriately in their respective contexts.

Limitations

JME is a highly interdisciplinary research field, also explored by scholars in other research fields, such as Learning Sciences, Media Studies, and Communication research [33]. As HCI researchers, we have included papers only from HCI venues, which may not encompass all parent-child JME papers. Additionally, although we aimed to be as comprehensive as possible, there might still be some qualified papers that were not included in our analysis. Nevertheless, this review from an HCI perspective is valuable and meaningful for the HCI community, as it helps further the research and design for technology-mediated family media experiences by highlighting existing gaps and new opportunities, as well as enhancing JME framing through the development of a holistic-view framework.

6 CONCLUSION

We conducted a scoping review of parent-child JME research within HCI and analyzed the included papers through three lenses: publications, methodological features, and JME features. Our findings offer a comprehensive overview of the research landscape of parent-child JME within HCI and demonstrate an increasing research interest in this topic from HCI scholars. Based on these findings, we developed a JME framework and checklist that outline various dimensions to consider when designing and researching JME. Additionally, we highlighted current research gaps and opportunities in parent-child JME, such as expanding research into different cultural and marginalized groups. Ultimately, we hope this work will stimulate further research to better understand JME phenomena and design for families' shared use of media and technology.

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APPENDICES

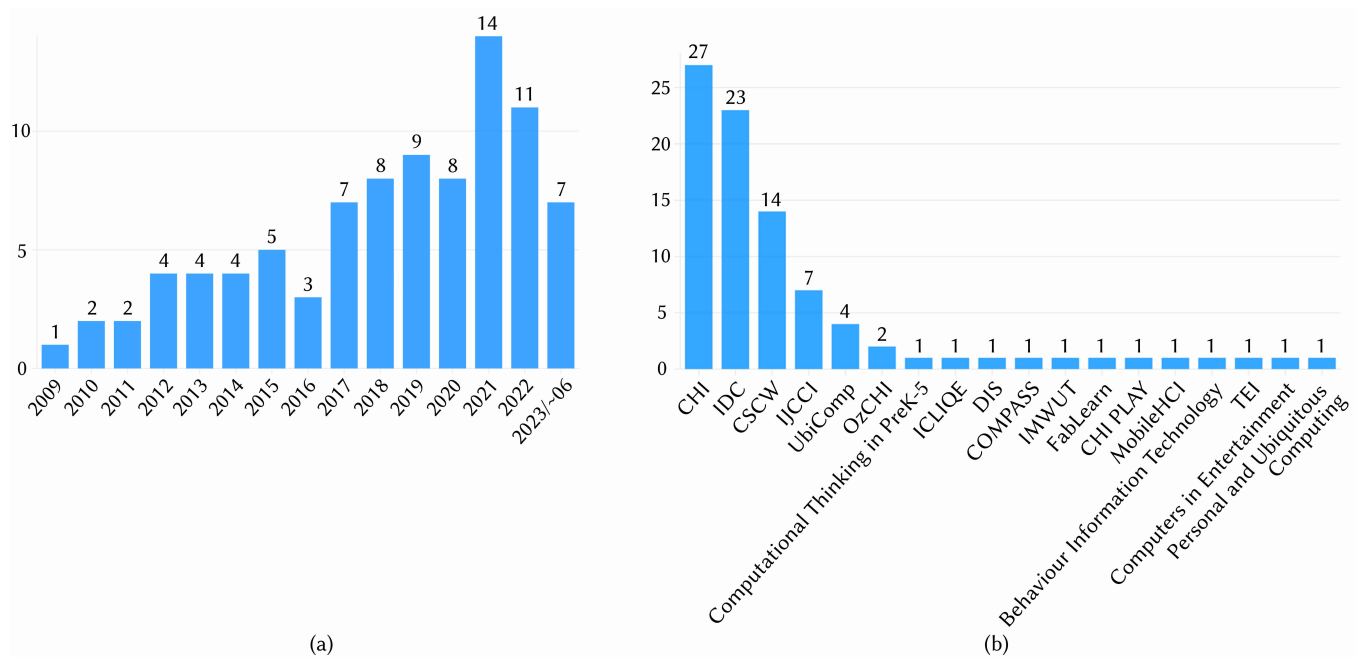# 7 APPENDED FIGURES FOR PUBLICATION AND METHODOLOGICAL FEATURES

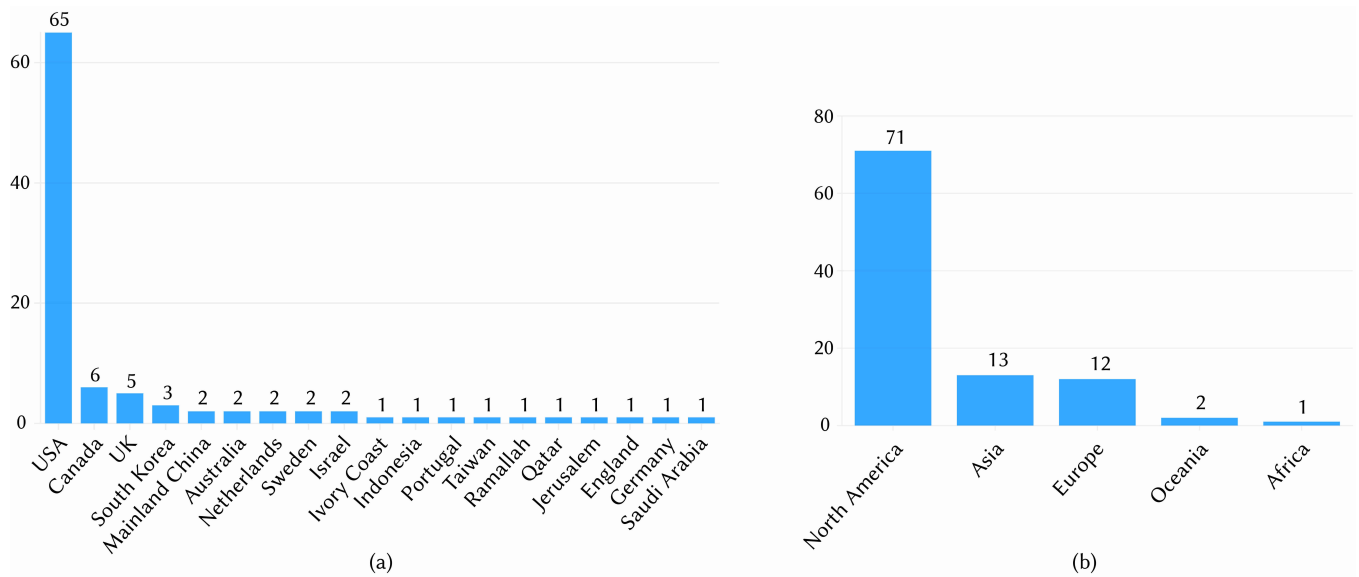Figure 7.1: Publication years (a) and venues (b) of parent-child JME research in HCI

Figure 7.2: The country/region contexts of the reviewed parent-child JME papers
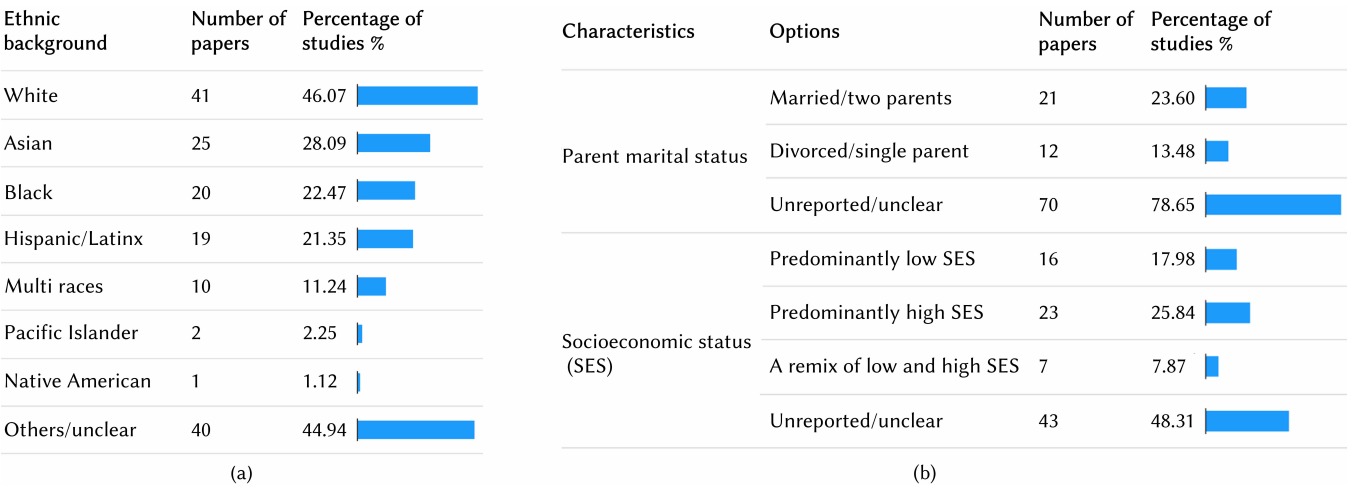
Ethnic background	Number of papers	Percentage of studies %	
White	41	46.07	
Asian	25	28.09	
Black	20	22.47	
Hispanic/Latinx	19	21.35	
Multi races	10	11.24	
Pacific Islander	2	2.25	
Native American	1	1.12	
Others/unclear	40	44.94	

(a)

Characteristics	Options	Number of papers	Percentage of studies %	
Parent marital status	Married/two parents	21	23.60	
	Divorced/single parent	12	13.48	
	Unreported/unclear	70	78.65	
Socioeconomic status (SES)	Predominantly low SES	16	17.98	
	Predominantly high SES	23	25.84	
	A remix of low and high SES	7	7.87	
	Unreported/unclear	43	48.31	

(b)

Figure 7.3: Participants' ethnic backgrounds (a) as well as parental marital status and family socioeconomic status (b)

Children's age	Number of papers	Percentage of studies %	
Infants (0-1 year)	5	5.62	
Toddlers (1-2 years)	8	8.99	
Toddlers (2-3 years)	13	14.61	
Preschoolers (3-5 years)	50	56.18	
Middle childhood (6-8 years)	57	64.04	
Middle childhood (9-11 years)	54	60.67	
Young teens (12-14 years)	34	38.20	
Teenagers (15-17 years)	18	20.22	
Unclear	6	6.74	

(a)

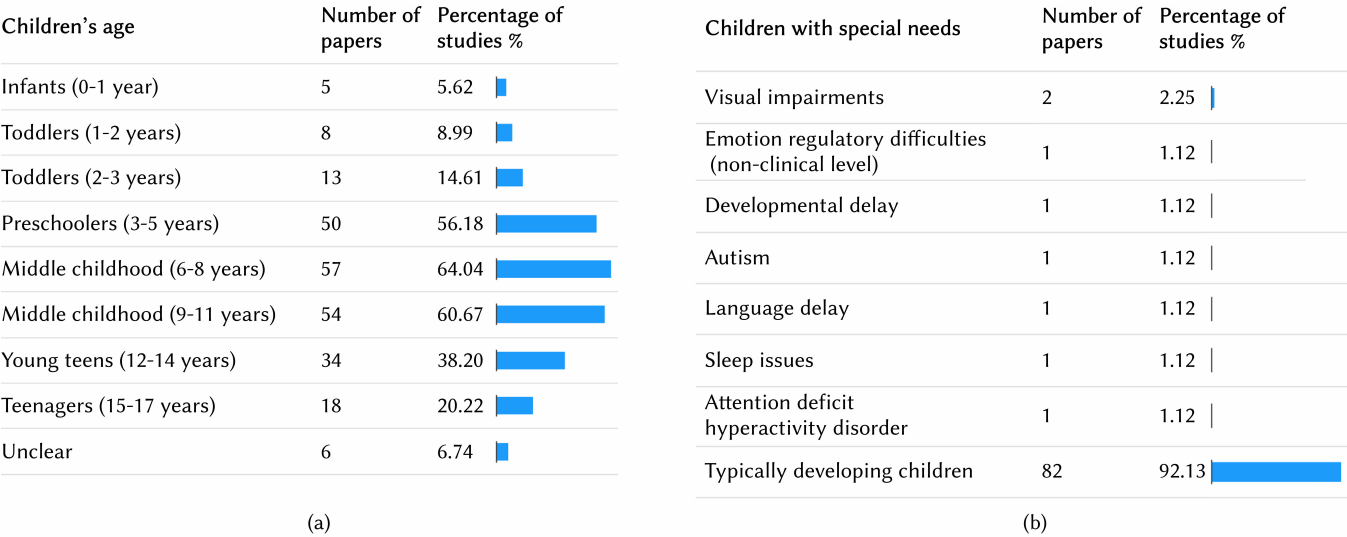| Children with special needs	Number of papers	Percentage of studies %	
Visual impairments	2	2.25	
Emotion regulatory difficulties (non-clinical level)	1	1.12	
Developmental delay	1	1.12	
Autism	1	1.12	
Language delay	1	1.12	
Sleep issues	1	1.12	
Attention deficit hyperactivity disorder	1	1.12	
Typically developing children	82	92.13	

(b)

Figure 7.4: Children's age (a) and special needs (b) in the reviewed papers

Children's gender	Number of papers	Percentage of studies %	
Predominantly girls	4	4.49	▮
Predominantly boys	6	6.74	▮
A mix of girls and boys	49	55.06	▬▬▬▬
Unclear	30	33.71	▬▬▬

(a)

Parents' gender	Number of papers	Percentage of studies %	
Predominantly mothers	30	33.71	▬▬▬
Predominantly fathers	3	3.37	▮
A mix of mothers and fathers	23	25.84	▬▬
Unclear	33	37.08	▬▬▬

(b)

Figure 7.5: The genders of children (a) and parents (b) in the examined papers

Data collection methods	Number of papers	Percentage of studies %	
Interview	60	67.42	▬▬▬▬
Video recording	40	44.94	▬▬▬
Survey/questionnaire	33	37.08	▬▬▬
Use log	27	30.34	▬▬
Field notes	15	16.85	▬
Screen recording	8	8.99	▮
Observation (without specifying data collection methods)	4	4.49	▮
Diary	4	4.49	▮
Audio recording of JME process	2	2.25	▮

(a)
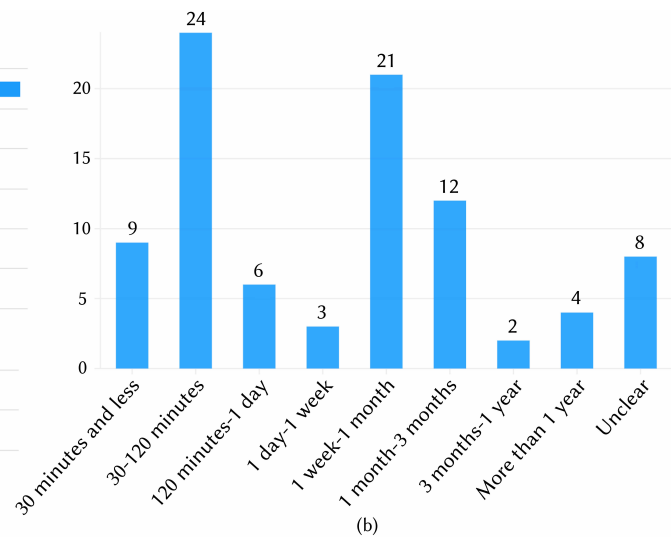
(b)

Figure 7.6: The data collection methods (a) and participants' involvement lengths (b) in the reviewed papers

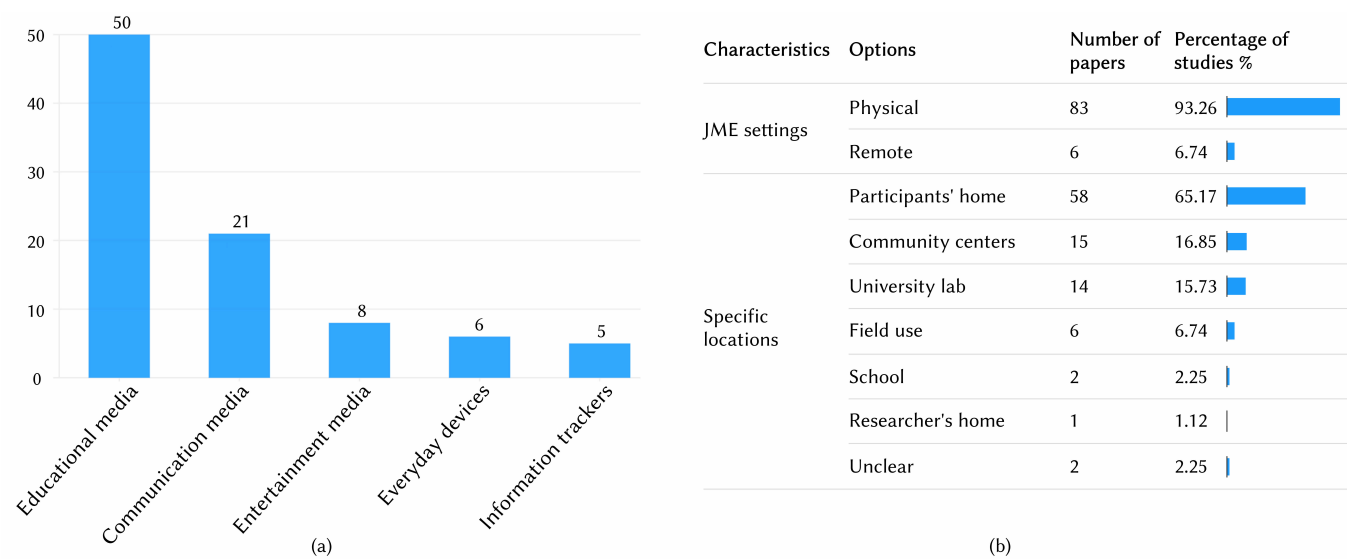| Characteristics	Options	Number of papers	Percentage of studies %	
JME settings	Physical	83	93.26	
	Remote	6	6.74	
Specific locations	Participants' home	58	65.17	
	Community centers	15	16.85	
	University lab	14	15.73	
	Field use	6	6.74	
	School	2	2.25	
	Researcher's home	1	1.12	
	Unclear	2	2.25	

(a)

(b)

Figure 7.7: The kind of media types (a) and JME settings (b) reported in the reviewed papers