



# Designing Dyadic Caregiver-Child Personas for Interactive Digital Media Use

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## ABSTRACT

This paper provides a framework that adapts a design tool known as personas to better capture the ways that caregivers mediate their children's use of interactive media. Interactive digital media has become a more pervasive part of families' lives and tensions have increased around children's engagement with digital media. Historically, caregivers have enacted various tactics to mediate their children's practices around digital media. However, the design of technologies for children fails to account for different approaches to caregiving and the relationships between caregivers and children, instead focusing on the caregiver and the child as separate entities. The goal of our framework is to enable designers to consider the caregiver-child relationship by adapting the persona design tool to account for the relationship between caregivers and children. Drawing from prior research from user experience on persona development and communication on parental mediation theory, the framework outlines five phases to be used as a guide to develop caregiver-child dyadic personas. A dyadic approach to persona design explicitly highlights the relationship between two individuals (in this case, caregiver and child). We suggest that designing with dyadic personas enables designers to be more aware of nuances in caregiver-child relationships and can surface opportunities to facilitate collaboration between caregivers and children around interactive media.

## Author Keywords

Parental mediation; Design; Parent-child dyad; Caregiver-child dyad; Persona

## CSS Concepts

•Human-centered computing ~Human computer interaction (HCI) ~HCI design and evaluation methods ~User models

## INTRODUCTION

Interactive media is an increasingly pervasive part of families' lives, leading to caregivers employing different strategies to mediate their children's use of and interactions with different types of media [6, 10, 15, 17]. Rather than focus solely on parents, we use the term caregiver to encompass diverse types of parenting situations that children experience. By doing this, we hope to more accurately and holistically cover the wide range of people that contribute to the child-rearing process. The digital media used within a family now includes social network services, digital games, mobile phone applications, and video streaming services [17, 38]. Often, children are the primary users of newer interactive media and caregivers adapt strategies of mediation to better accommodate for the new affordances of these innovations [10, 15, 17]. The ways that caregivers enact methods of mediation directly affects how children experience interactive technologies [37]. We claim that parental mediation tactics must be considered by designers when creating digital media for children. However, limited work has explored this and prior research on designing digital media for children tends to ignore elements associated with the relationship between caregivers and children.

The goal of this paper is to highlight the importance of considering the relationship between caregivers and children within the design of interactive media. We have developed a conceptual framework that enables designers to account for the caregiver-child relationship. This framework outlines an approach that adapts a design tool known as personas to explicitly highlight the ways that caregivers mediate their children's use of interactive media. Personas are often used in design to ensure designers are creating products that align with the interests of their users [25]. Our framework blends research from parental mediation theory with the design of personas to ultimately consider the relationship between caregivers and children. Thus, enabling designers to consider the dyadic caregiver-child relationship affords better understanding of the influence of different types of mediation strategies throughout the design of interactive media.

The incorporation of parental mediation into the persona design tool is the primary contribution of this framework as it relates to improving methods of interactive design for children. We outline a tool that encourages designers to consider the influence of the caregiver-child relationship in

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the design of interactive media. By interweaving theoretical contributions into persona research, there is potential to enhance the rigor of the personas design tool as it adapts to better consider the relationships within caregiver-child dyads. This is the second contribution of the framework as it presents a way to develop dyadic personas that include better description of the dynamics that exist within a dyad. An aspect that standard personas tend to ignore.

The rest of the short paper is structured as follows. First, we provide an explanation on related work around parental mediation of digital media and the personas design tool. We emphasize how personas have been used and adapted for use within the design of media for children and their use in incorporating relationships between users. Second, we outline the framework and discuss the five phases for design, followed by a brief section covering the use of the framework. Finally, we discuss future work.

## RELATED WORK

### Caregiver-Child Tensions around technology and interactive media

As interactive media have become a more pervasive part of young people's lives [38], caregivers' fears about their children's use of interactive media have also increased. Caregivers of children who are in middle adolescence to teenage years feel especially detached from the digital practices of their children. They also tend to have heightened fears around their children's use of technology [28, 29, 31]. Often, these fears stem from parents' and caregivers' perceptions of online spaces as being dangerous for their children, and therefore employ various practices to protect their children's online privacy [12, 16, 37].

Young people are also more connected than ever but are also particularly susceptible to many of the negative effects of the Internet such as privacy dangers [16, 35] and fake news [22]. These risks contribute to the ongoing narrative that caregivers must mediate their children's relationships with technology to mitigate negative effects and provide a scaffold for more mindful use. Caregivers express a variety of concerns regarding the use of technology by their children which include narratives of digital addictions, sleep loss, anxiety, learning and attention problems, and access to violent images [28, 29, 34].

Parents employ various strategies to certain forms of media, like television and video games, "hold different meanings or functions in each world, but can bridge gaps and facilitate communication between them" ultimately resulting in new understandings or growth" [10]. Digital media such as video games can provide a space to engage in co-playing scenarios such as creating shared character profiles and sharing controls between the caregiver and child, which have the potential to be a transformative space for both children and their caregivers. In these co-playing situations, caregivers and children have the opportunity to negotiate their identity

and social status within the family unit, shedding light on the rich space that the caregiver-child dyad presents [30].

Meanwhile, some caregivers highly value exposure to technology as a means to increase their children's digital literacy skills for the workplace [21, 32]. In a paper that sought to understand how migrant parents of primary school-aged children in Australia view the use of technology in their children's lives, Ekaterina Tour found that most of the migrant parents in her study supported their children's use of technology because of their hopes of upward social mobility for their children [32]. These parents were shown to view digital literacy as a necessary skill, providing a viewpoint quite representative of the current dialogues around the positives of digital literacy for people growing up in the digital age [1, 13, 19]. While there have been shown to be various approaches to parental mediation, it is also important to keep in mind that these often vary by socio-economic status and access to resources [16].

### Caregiver-Child Dyad

These conflicting narratives have resulted in a variety of strategies that caregivers employ for moderating the technology use of their children. One way to understand this is through parental mediation theory, which details the ways parents use tactics of interpersonal communication to mitigate the negative effects that they believe communication media have on their children [6]. Parental mediation has stemmed from literature and research on the ways that parents act to mitigate the perceived negative effects of the television in the home. This literature describes three main tactics that parents employ to moderate their children's television viewing habits: *active mediation*, when parents talk with their children about the content of the television program; *restrictive mediation*, or setting rules and regulations about children's television viewing; and *co-viewing*, where parents and children simply watch television together [6, 24, 33].

Parental mediation theory has been updated for newer, more interactive digital technologies. In an interview-based qualitative study of parent-child dyads on how parental mediation is practiced around video games, Jiow et al found that rather than falling into the aforementioned categories of parental mediation, parents engage in a range of mediation activities in 'dynamic combination' [15]. These mediation activities varied based on many factors, such as which games the children played, personality and behaviour, lifestyle constraints, and parents' knowledge of technology. The study found these behaviours fell into four main categories which serve to identify why parents partake in certain mediation strategies: *gatekeeping*, in which parents limit the amount of time or kind of game to limit their children's overall exposure; *discursive*, in which the parent-child dyad engages in discussions around video games; *investigative*, in which parents undertake information seeking and skill acquisition to learn to better manage their children's use of video games; and *diversionary*, in which parents encourage

their children to pursue other activities rather than video games [15]. The authors found these to work in tandem, both with each other and with the categories from traditional parental mediation theory.

As alluded to above, there continues to exist tension around caregivers' views of interactive digital media. Caregivers simultaneously fear that their children will be harmed socially, academically and physically if they use technology too much, but also fear that if they do not use technology enough, they will miss out on valuable family time and suffer in their future professional lives. These tensions create a fascinating and robust place of study and exploration on not only the relationship between caregivers, children and the technologies that they use, but also for the relationship that caregivers and children have with each other. These relationships are an essential consideration for designers of interactive media for children as they influence how children are able to use the products they design.

### **Personas**

Personas are tools used in the design process and involve the creation of a set of fictional users that are then used by the designers to ensure that products align with the goals and needs of actual users [25, 27]. These fictional users are referred to as personas and the technique of designing them can be traced back to Cooper's (1999) seminal book, *The Inmates are Running the Asylum*, in which he suggested that personas are a means to develop representative models of the actual users of a product. Cooper (1999) initially proposed the idea of developing personas within the context of software design. Personas were suggested as a way for designers to both avoid the trap of designing for only one type of general user and to ensure a better understanding of the goals and needs of different types of users.

Gaining a better understanding of the goals and needs of different users is important in any design activity and one of the benefits of using personas is that it makes the user's needs and goals explicit to the designers [5, 7, 25]. The design process is made easier through the use of personas as they allow one to consider an actual 'person' rather than raw data gathered from users [2, 5]. Personas have been a successful discussion medium within the design process and subsequently lead to improvements in engagement and communication among the design team [2]. Teams are able to validate potential designs through the use of personas and are able to discuss and deliberate on design decisions by contrasting them with the needs and goals of personas [2, 25].

The benefits associated with using personas has resulted in their adoption in a number of varied design-based contexts. However, there is still some amount of uncertainty regarding how to best adapt them to suit new contexts and how to then develop them within that context. The overarching question that seems to be common in many design activities aligns to what type of information should be included in the creation

of the persona, and how these personas then might be created and evolved over a design project [26].

A recent approach that is being used to improve persona creation involves the use of psychological theories that relate to the design context to then inform the development of personas [14, 20]. The incorporation of psychological theories into the design process has the potential to result in more nuanced understanding of users within the design context. Theories have the potential to inform what data should be collected and what information should be presented in the personas.

One example of where theory has been used to inform the design of personas is in the context of adapting them for use with children. Previous work has adapted child developmental theories into the persona creation process to better design for children at different stages of development [3, 4]. While this approach assisted the designers with understanding different developmental stages, it did not consider the relationships that exist within the caregiver-child dyad and how this might influence the design. The approach proposed by this framework seeks to expand on this work by being mindful of developmental stages and to consider the influence of the relationship within a caregiver-child dyad.

Personas that seek to explore the relationships within a dyad, or even more than one user, have had limited exploration. There have been studies that seek to explore the challenges of group persona development, which involved exploring the potential of personas to be used to represent more than one person [11]. This work highlights the importance of capturing group relationships in persona design activities as there is a need to consider group dynamics or relationships within many design contexts.

The framework seeks to add to the limited work on group-based personas and child-based personas by considering the relationships within a dyadic caregiver-child process. The framework uses the lens of parental mediation theory in order to better understand how the caregiver-child dyad might influence the design of interactive media for children.

### **FRAMEWORK**

Below, we detail a prescriptive framework for the design of dyadic caregiver-child personas. This framework consists of five phases that have been adapted from previous methods used to create personas for children and collections of individuals [3, 4, 11]. Parental mediation theory informs each phase and has made explicit the relationship between the caregiver and child. The process for adapting theory into the design of personas has been influenced by previous research that has adapted theoretical lenses into the design of personas [14, 20]. To ensure alignment with user research practices, this framework also consults user research design guidelines regarding the creation of personas [5, 23, 25].

It must be noted that while some user research design guidelines could be considered as an authoritative source for

creating personas, there is still no clear consensus on what designers consider to be the best practice. Nielsen [25], who provides detailed guidelines on the use of personas in user research, states that there is no combined agreement among designers on a single method regarding the creation of personas, nor on what the completed personas should look like. Hence this framework was adapted from multiple sources including both user research guidelines and academic research involving the use of personas with children groups.

The next section outlines the adapted framework. It describes the goals in each phase and briefly mentions the use of the framework. This prescriptive framework illustrates how to infuse considerations from parental mediation theory in the data collection for the design of caregiver-child personas.

### **Phase 1: Align design objectives and data collection strategy**

The goal of this phase is to consider the design objectives and data collection strategy of a project and ensure that they are aligned for working with caregivers and children. While the objectives of a project may not necessarily be directly related to caregiver-child co-interaction, we argue that any design project involving children needs to consider the caregiver-child relationship. For example, the objective of an interactive digital media design project might be around social-emotional development, but the design of the application still needs to consider the ways in which the experience will be mediated by different styles of caregiving.

Based on the objectives and the resources available to the project, a designer determines the appropriate data collection strategy that should be followed when interacting with the caregiver-child dyad. User research guidelines provide some potential ideas for determining a data collection strategy, which commonly include interviews, observations, focus groups and surveys [5, 25]. However, many common data collection strategies outlined in these guidelines fail to account for design situations involving children or the caregiver-child dyadic relationship [5, 26].

We suggest that during this phase designers adapt standard user research data collection strategies to better accommodate for projects involving both children and caregivers. Designers need to consider the structure of interviews, focus groups, or observations and how these might better accommodate a caregiver child dyad. For example, some studies involving caregivers and children have chosen to interview parents and children separately before conducting a joint interview with both members of the dyad, while other studies choose to use paper-based surveys before a joint interview [3, 8]. Depending on the objectives of the project, the designers would determine if they need to collect data in a joint session, separate sessions, or through different methods such as surveys.

### **Phase 2: Collect data from caregivers and children (interviews and observations)**

The goal of this phase is to implement the data collection strategy established in the previous phase. Data is typically collected through interviews, observations, and surveys that involve caregivers and children, but it could also involve conversations with experts such as developmental psychologists or educational professionals (Alissa N. Antle, 2008). Designers need to ensure that they collect both a diverse and accurate set of data to be able to create the dyadic personas, which requires that careful attention is given to the questions that are asked during this phase [18].

Previous guidelines on creating personas tend to offer ideas for questions that are often focused on understanding attributes from a single user's perspective. Some common sets of questions for creating personas include demographics, goals of the user, skill sets, technological experience, fears or pain points, and expectations or mental models [5, 23]. Other questions have been used by studies that incorporated theory into the creation of personas, including questions on motivation adapted from motivational theories [14], or questions on identity adapted from social identity theory [20]. While these questions are useful for persona design activities, they fail to address aspects of the relationships between caregivers and children.

We suggest that designers include specific questions in their protocols that address developmental stages of the children and mediation styles of caregivers. Parental mediation theory should inform the data collection by providing specific questions and concepts to explore in interviews and surveys. For example, the gatekeeping and discursive parenting styles would illustrate that questions have to be asked about the rules and regulatory practices around technology in the family, as well as what topics surrounding digital media are discussed by the parents and children. The investigatory parenting style would lead to questions that might probe caregivers monitoring or co-use activities and examine how they go about investigating children's practices with digital media. Finally, the diversionary style would suggest questions involving what activities are encouraged other than digital media use [15].

### **Phase 3: Analyse data and incorporate parental mediation theory into analysis**

Using the data collected in the previous phases, the goal of this phase is to identify the relationship within the caregiver-child dyad and the mediating tactics that the caregiver employs. The data should be analysed through appropriate methods that enable designers to explore common patterns and identify relationships across the collected data [23]. Survey data is commonly analysed using statistical methods and approaches such as factor analysis, while qualitative data requires use of coding schemes and methods such as thematic analysis [23]. Persona creation that is underpinned by a theory should use the theory to guide the data analysis, either by exploring quantitative factors or through deductive thematic analysis [14, 20].

We suggest that designers use parental mediation theory to establish a coding scheme to explore relationships between caregivers and children. In one example, mothers of teenagers were coded as authoritative, authoritarian, permissive, and neglectful to understand their ways of mediating the internet usage of their teenaged children [9]. We suggest choosing a coding scheme such as this depending on the age group, socio-economic status, and other factors.

#### **Phase 4: Craft into dyadic persona descriptions**

The goal of this phase is to use the results of data analysis to craft a set of dyadic caregiver-child persona descriptions that represent the relationship between caregivers and children. Analysed data should be used to group similar caregiver-child dyads together based on observed commonalities and patterns. This grouping process is commonly referred to as segmentation [14]. After segmentation, each group will be used to create dyadic persona descriptions. Persona descriptions should express information that allow designers to establish a sense of empathy and understanding towards those they are designing for [5, 25].

We suggest that dyadic persona descriptions include information that emphasizes explicitly states the relationship within a dyad. Segmentation for dyadic personas should focus on grouping common mediation patterns associated with the caregiver-child relationships. Parental mediation theories should then be used as a foundation to describe important information relating to the caregiver-child relationship. Dyadic caregiver-child persona descriptions can then be used during the design process to emphasize, with different degrees of mediation, within caregiver-child dyads.

The type of information that should be included within the caregiver-child personas should be guided by how it improves understanding of the dyadic relationship. Parental mediation strategies surrounding digital media often overlap [37]. For example, some caregiver-child relationships might have high levels of gatekeeping while also exhibiting elements of discursive mediation. Thus, the type of information on the caregiver-child dyadic persona should then reflect a continuum or score of various parental mediation strategies rather than the just most dominant strategy. A caregiver-child dyadic persona description might consist of a combination of high levels of some mediation strategies and low, or none, in others. Designers would then be able to use the dyadic persona descriptions to more holistically understand the context of the relationship.

#### **Phase 5: Consolidate and validate and the persona descriptions**

The goal of this phase is to consolidate the dyadic persona descriptions and validate them with feedback from both caregivers and children. We suggest that designer's experiment with different visuals to represent the relationality of the dyadic persona. Adaptations of personas, such as those used for children or groups, both emphasise the

importance of feedback and ensuring consistency between the data and personas [4, 20, 27].

The context of a project and its stakeholders can change over time and personas should be updated to reflect these changes [25]. We suggest that the design of dyadic personas should not be viewed as a linear process but rather as an iterative process. The dyadic personas should be updated based on continuous interactions with both caregivers and children. Designers need to be mindful of discrepancies between the representation of the relationship in the personas and the actual dyadic relationship observed through real life interactions. Discrepancies might suggest that dyadic persona descriptions need additional synthesis or require the collection of more data, which would mean returning to either phase four or two respectively.

#### **Use of the Framework**

Having now explored each of the phases in the framework, it is important to briefly consider how the framework might be used within the context of design. We argue that the use of dyadic caregiver-child personas will facilitate a more holistic approach to designing interactive digital media and technologies that involve children. Designers using the dyadic personas must acknowledge potential mediation strategies and relationships between caregivers and children within the design process. They also must acknowledge both caregivers' and children's needs. We argue that caregiver-child dyadic personas enhance the quality of design work for products and services aimed at either children or caregivers.

Caregiver-child dyadic personas may also provide designers with opportunities to better understand the tensions around caregivers' views of interactive media. We suggest that dyadic personas could be used to address these tensions and design digital media that might facilitate alternative mediation strategies. For example, when designing mobile applications to be used by children, designers tend to develop applications that allow parents to restrict or limit a range of features [36]. The designers seem to be designing with a particular parental mediation style in mind, most closely mapped to gatekeeping. In this instance, we would suggest that these mobile application developers had used caregiver-child dyadic personas. This approach would give designers an opportunity to more thoroughly understand and design for the myriad of caregiver mediation styles.

#### **FUTURE WORK**

In this paper, we have presented a framework that highlights the importance of the relationships between caregivers and children and the important role it should play the design of interactive digital media for children. This framework achieves this aim by incorporating parental mediation theory, which explains how caregivers mediate digital media for children, into the creation of personas. The incorporation of parental mediation theory into the creation of personas enables designers to better capture elements of the relationship between caregivers and children. These

personas could be considered as dyadic personas, rather than standard single user personas.

As we have established throughout this paper, the relationship between caregivers and children and the ways that they mediate their children's experiences with interactive digital media influences the ways in which children experience technology. We argue that this relationship is an essential aspect for designers to consider and must be explicitly considered in the design process. We envision this method could serve as a starting block for the exploration of the value behind the creation of caregiver-child dyadic personas and whether these might be applicable to other contexts where designing for a dyad is important. We recommend that future work explore these dyadic personas and the value they can add to a design process, especially in the context of designing caregiver-child dyads.

The framework is limited by not having been empirically tested in a design project. Future work should test the application of this framework to a project involving the design of digital media and interactive technology for children. One example of a future project would be to create dyadic personas for caregivers and children in order to better explore how they can be used by designers. This framework is part of an ongoing project where the next step is to use these dyadic caregiver-child personas during the design of interactive technology for children, such as educational video games like Minecraft and Roblox.

The different types of interactive digital media are only going to increase in number as technologies such as virtual reality, conversational agents, and robotics become more pervasive within the family unit. It will be crucial for designers in the future to consider the relationships among members of the family, especially those in the dyads of caregivers and children. The dyadic persona method we propose highlights these relationships in the design process. This method affords designers of interactive media for children a more holistic awareness of the impact of caregivers' mediation tactics. Designing with dyadic personas that account for the nuances in caregiver-child relationships can surface opportunities to facilitate collaboration between caregivers and children around interactive media, turning tensions around digital media into quality time.

## SELECTION AND PARTICIPATION OF CHILDREN

No children participated in this work

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