Intimate Narratives: An Assets-Based Approach To Develop Holistic Perspectives of Student Mothers' Lives and Their Use of Technology in Parenting

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This paper details our collaborative approach in capturing a holistic understanding of parental technology use through an assets-based framework. We steer the focus away from the design of technology as the central force of technological innovation, and instead support participants to reflect and describe intimate details that highlight specific use-contexts of technology in their lives. We leverage a group of foreign graduate student mothers' self-described unique strengths to gain an in-depth account of their lived experiences with technology. As research participants and co-authors, our collaborators elicit intimate narratives about meaningful events in their lives, bringing social and cultural aspects of their lived experience to the forefront, and thus providing broader context of their use of technology. We detail and reflect upon our approach of promoting user agency by creating an affinity group, fostering a safe and intimate space for research engagement, and describe the implications of using our adapted research methodology in intimate settings. We conclude by highlighting the various ways in which technology facilitates foreign student parenting, as well as the ways in which it serves as a temporary band-aid solution, prompting consideration of larger social issues.

Additional Key Words and Phrases: participatory research, affective writing, student mothers, auto-ethnography, assets-based

1 INTRODUCTION

Technology plays a vital role in facilitating the caregiving practices of modern parents [67]. Parents use technology to find support online [5, 83, 87], entertain and distract children inside the home through digital media devices [7, 22, 28, 33, 70, 86], and to engage them outdoors [14, 74]. Common methods of research used to understand contemporary parenting with technology include observation of participants' behaviours and practices in their naturalistic settings, interviews,

surveys, diary studies, and co-design sessions with stakeholders. These methods, while effective in engaging large groups of stakeholders [54], tend to focus on practices and attitudes concerning technology and, in doing so, may not provide particularly rich or context-specific insights about users themselves. Moreover, they often do not include direct interpretive input from the studied participants to validate if the findings indeed authentically portray their lived experiences as shared with observers [10]. In some cases, researchers may not be not fully aware of the specific dynamics of the technology usage environment [78], which can lead to the development of data gathering methods that elicit generic and/or superficial data. Such approaches tend also to focus primarily on existing patterns of technology use, with the aimed intention to develop more/better technological solutions for the target participant group [35]. Researchers adopting these methods often approach study groups as *friendly outsiders* [47], asking what participants need and suggesting solutions to meet those needs. However, such approaches may neglect or even erode the participants' sense of agency and control in the participation, by focusing solely on the 'here and now' of the context of technology use [103]. These approaches may not reveal an authentic biographical understanding of *participants' identities* that could influence their attitudes and motivations for technology use.

In highly personal contexts—such as understanding parents' attitudes and motivations towards using digital technology in the home—we need to capture a holistic perspective of parents' previous experiences and present values and practices. It also necessitates greater and continued involvement of participants in various stages of research for their personal experiences to be accurately portrayed and in a respectful way [61]. Recent research of relevance to these personal contexts proposes an assets-based approach, where the focus is on participants' strengths and capabilities which can be leveraged during investigations [44, 102, 104]. By empowering participants to share their experiences using the strengths available to them, researchers can engage them in the design process within a space of comfort and control [21]. In our work, we employ this approach to produce a biographical understanding of a particular subset of parents, that of foreign graduate students [*] who are mothers of young children, which situates their use of technology within the realities of their lives.

The prerequisite of developing that holistic understanding is to nurture a safe space fostering mutual trust and understanding among research participants and researchers. Work in this realm explores various roles that can be adopted by researchers, including advocate, facilitator, ambassador, or activist [16, 35, 56, 65], to ensure a greater level of participation from stakeholders. During such participatory research efforts, design researchers may share their personal identities, relevant experiences [94], and relatable aspects of their researcher identities [4] to establish trust and enhance participants' acceptance of the researcher as an authentic member of the community [35, 94]. In doing so, the researcher may take on multiple roles including community ambassador, liaison, and facilitator in addition to their primary role [94].

Similarly, the authors of this paper participated in this research by taking on the roles of researchers, facilitator, and AG members (detailed in section 1.2). The role of *researchers* draws from the concept of communities of practice, where experienced members of a community assume a position of responsibility, and are expected to initially perform at higher levels of expertise than other members [62]. Based on similar work where belonging to a community helped researchers to build upon an existing shared rapport with participants [55, 65, 94, 105], the first author *facilitated* the research process between participating mothers and other members of the research team. While all of the researchers planned and executed the work, the first author in particular had a natural affinity with foreign graduate student mothers. Her shared circumstances fostered a certain level of trust among them, enabling them to comfortably narrate their sensitive narratives. In doing so,

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[*]PhD students in the United States

the first author assumed the role of a researcher as well as member of the group, as opposed to being merely a friendly outsider. Together, the first author and foreign graduate student mothers formed an *affinity group (AG)* with shared circumstances, assets, motivations, and research goals [98]. Through reflection cues and writing scaffolds, researchers supported the AG members in describing their practices and interactions related to children and technology at home, allowing their stories to emerge organically over time. Although we use the term 'participating mothers' or 'participants' in the paper, as co-authors, the AG members were collaborators in the research, rather than research subjects. Except for section C, which has unaltered stories penned by the AG members, the remainder or the paper is a collaborative effort from all authors who owned the research while assuming a position of shared responsibility [64]. Thus 'participation' implies their involvement in the research as much as that of facilitator and other researchers. For readability purposes, we use the terms 'we' and 'our' in this paper when referring to the researchers (including the facilitator).

In our work, we define *assets* as the unique strengths possessed by the participating authors. The AG's self-described assets included their academic writing skills, tacit knowledge, and resilience. While they were not necessarily experts in this paper's domain of research, they were expert parents and graduate students, whose scholarly experience as graduate students made them valuable contributors to different aspects of researchers' own explorations, instead of being simply research subjects. Inspired by Cunningham and Mathie [26], researchers also tried to understand what motivates the AG members to share sensitive and intimate details about their parenting with technology, which could drive their continued participation and personal involvement in this research. Researchers helped AG members identify and utilize these existing, but often unrecognized assets through narratives[†], by describing how they acquired them. It is worth noting that the AG members are graduate students who are experienced at writing academic articles. Their writing skills were an asset available to them, which was leveraged in this research. However, academic writing is structured and closely follows norms established within the domain of study. In this research, writing was an asset but the personal and intimate nature of writing meant that the AG members were engaged in a relatively familiar yet still removed or strange activity. This, we believe, helped the AG members to move beyond mechanistic writing and to thoughtfully reflect on their lives and parenting practices. The remaining three researchers/co-authors of the paper brought their experiences and knowledge about assets-based approach, participatory research, feminist HCI, and design methods in HCI to the table. Thus, the co-authors came together with their unique assets to make this research endeavour possible.

In the subsequent sections, we describe our efforts in engaging the AG members by leveraging their unique strengths in research, and ensuring their privacy and comfort levels when eliciting intimate narratives about their lives as foreign graduate student mothers of young children. Enabled by the focus on their unique strengths, researchers assisted the AG members to present a sensitive, personal, and deeply felt view of their experiences with technology. Although this research was primarily conducted during the COVID-19 pandemic, the intimate narratives cover various aspects of the AG members' struggles as foreign graduate student mothers, while surfacing also the role of technology in different stages of their lives. While the individual narratives are presented as snippets of the everyday life of a foreign graduate student mother, when read together as a whole, they give much more contextual information about the choices and technologies used by mothers and young children, providing an holistic and longitudinal view of their lives. We reflect upon our approach of creating an affinity group, fostering a safe space for engagement in research, and the implications of using our adapted research methodology in intimate settings. We conclude by

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[†]We use the terms *narratives* and *stories* interchangeably due to their similar meaning in the context of this research.

highlighting the expansive ways in which technology facilitates foreign student parenting, and ways in which it serves as a temporary band-aid solution prompting consideration of larger social issues.

1.1 Contributions

Our primary contribution to the HCI and CSCW literature with this work is to present our adaptations of assets-based methodology in an intimate setting, focusing on engaging participants by expanding on their distinctive assets to present deeply personal narratives. Our methodological innovation emphasizes and allows for AG members' agency in the design and research of technologies, instead of the researcher or technology designer's agency, which has long been an issue in HCI and CSCW. We discuss what it means for researchers to care for the participants in a self-reflexive way, and discuss transferable learning from our work to inform research in a sensitive setting. We adopt this stance both to add to a growing body of CSCW scholarship focused on working with communities in diverse contexts, and to encourage participants from various backgrounds and identities to engage in similar enforcing efforts to provide more visibility for their experiences.

A secondary contribution of our work is demonstrating what it means to apply this methodology in a sensitive and highly personal context. We present the intimate narratives as the product of our methodological innovation, which provide insights into the lived experiences of the foreign graduate student mothers' lives, bringing socio-cultural aspects of their lived experience to the forefront, and situating their use of technology in the broader context of their lives. In general, the intimate narratives provide a rich view and deep understanding of the use contexts of technology by allowing AG members to speak for themselves. AG members self-narrations describe how *they* understand technology, and use it in *their* lives. This steers the focus from the 'design of technology' as the central force of technological innovation, which comes from the creators of technology. By empowering users to self-describe how technologies are being used in different specific use contexts, we elucidate how their meanings and values may move away from technology creator's initial design intention.

1.2 Positionality and Reflexivity

The facilitator. The first author came to the US on a scholarship to pursue higher education, and experienced pregnancy and childbirth during the first year of her graduate program. While she was coming to terms with the responsibilities of being a new mother and the primary caregiver of a young child in a foreign land (which was culturally very different from her home country), she was also learning to adjust and adapt to the US education system. She noted student mothers talking about their struggles on popular social media platforms such as Facebook and Twitter, yet strangely she had not personally met a single student mother in person during the first three years of her graduate program, despite living in a setting which is predominantly a mid-size university town (population 40, 000). She wondered why this might be the case? During a normal day, she felt too worn out to hang out with her friends, or to engage in the studies that she was invited to participate in via email listservs. This motivated her to begin to amplify her voice, and those of similar others, via a familiar medium that the collaborators were comfortable communicating in, namely writing and composing prose for publication.

The AG members. The four AG members in this research, who are also co-authors in this paper, had diverse parenting experiences but were unified by their identity as foreign graduate student mothers raising young children in the US. At the time of writing, four of the AG members had partners who were also enrolled in graduate programs. Two of the AG members have lived in the US without their children for a time ranging from 6 months to a year, as they focused on their

education while their children stayed back in their country of origin. To protect their identities, we use the first four letters of the alphabet as pseudonyms in quoting their experiences. *A* is a second-year PhD student living with her young child with a long-distance partner who currently resides in their home country. *B* is a fourth-year PhD researcher, whose partner is pursuing a Masters degree in the US. He is also working a full-time job to provide for their family back home, and feels he cannot dedicate as much time to childcare as her. *C* is a third-year PhD researcher who moved to the US for graduate studies, and lives with her child who is on the autism spectrum, while her partner is pursuing a graduate degree in another state in the US. *D* is finishing her degree in an interdisciplinary field and is struggling to obtain adequate resources to complete her dissertation. After separating from her husband, she currently finds support through her partner in the US and a very supportive mentor.

The researchers. While the first author had a personal commitment to complete this research project, she was mindful that the self-reported experiences may have some level of bias due to the AG's deep emotional attachment to the narratives. She collaborated with a team of researchers who, from one standpoint, are distant from specific inter-sectional conditions that foreign graduate student mothers of young children face but, from an intellectual and social orientation, care about the population and the challenges they face. One of the researchers is a mother of two young children and previously experienced life as a foreign graduate in the US. Two other researchers are male, one of whom was an foreign graduate student until recently, while the other is an involved father of three children. As feminist HCI researchers, all the members of the research team engage in centering human values and fostering care-centered futures. In this regard, the research team is seen to be in close periphery to the AG.

2 RELATED WORK

Our team of four researchers reviewed the literature as research domain experts to define the research scope, and developing a research strategy to enable the AG members to use their existing abilities and strengths while examining their lived experiences.

2.1 Equal and Empowered Participation

Participants' engagement with research for longer periods of time is dependent on various factors, including the researchers' understanding and the research subjects' concerns [57], empowerment through participant strengths, and the use of reflexive and flexible strategies to position them as 'co-researchers' [35]. To ensure equal and empowered participation from AG members as co-researchers, we engaged in participatory research to involve them at various stages of research, while benefiting from their involvement in different roles and degrees of participation [35]. Historically, participatory design (PD) was concerned with workers having input into the introduction and use of technology in the workplace [8, 16, 36]. As technology encounters expanded beyond the workplace, PD approaches evolved to involve people in the design process across diverse contexts [36, 88]. While the participants' roles and their degree of participation may vary, the central belief of people having agency and voice in being involved in matters of concern to their lived experience can be seen across diverse PD approaches (e.g., [11, 35, 43, 101]).

PD scholarship highlights various factors and configurations in involving participants in matters of concern to them [2, 16, 27, 35, 57, 58, 65, 88]. Broadly, we find two interrelated factors influencing the degree of participation. First, the need to establish trust and acceptance between research participants, and between participants and the researchers [25, 99]. This necessitates that researchers play various roles [65], sharing relevant experiences [94] and relatable aspects of their identities

[4] to establish trust and enhance participants' acceptance of the researcher(s) as a member of the community [35, 94].

The second factor influencing the degree of participation is the extent to which the participants' agency is supported during the engagement [8, 11, 43]. Indeed, there is an interesting tension here: participation can support participants' sense of agency, but participants' agency is critical in enabling participation. In this space, scholars argue that in some cases where design focuses on users' needs, it positions the users as dependents, eroding their agency and resulting in design for the 'here and now' [103]. In response, they propose assets-based design which involves leveraging and building upon the resources and strengths that are already available to the participants [31, 44, 60, 82, 102]. The focus on assets can enable participants to have greater power and agency in their participation [44, 104]. Furthermore, assets have been defined as "those strengths, attributes, and resources that can be brought into relevance to satisfy the inherent tensions between a member of a population's needs, their understood or experienced aspirations, and the structural limitations of the system" [42, pp. 9]. By bringing the AG members' existing assets to the fore, we sought to support the participants in experiencing a sense of confidence, comfort and control while they shared and reflected on sensitive narratives about their lives.

In this space, Wong-Villacrés et al. [104] posit three methodological commitments in conducting assets-based design: building trust with and among the participants, forming a collective, and engaging in incremental reflection together. We align with these values. In particular, to build trust and mutuality, the first author became part of the AG and sought to actively involve the AG members throughout the research journey. Our configuration of the research setting supported the development of trust among the AG members and the researcher, fostering a space where participants could share personal perspectives of their lives as foreign students who are mothers of young children. Furthermore, in our exploration of the situated use of technology by the AG with their young children, we tap into the AG's self-identified existing assets, most notably their writing and storytelling skills, to create a space that enabled them to feel empowered to share intimate details and to be vulnerable with one another.

2.2 Rich and In-depth Narratives

Research about the use of technology has challenges, such as obtaining insights about users' everyday lives and routines due to a lack of trust between researchers and users, inadequate methods of data collection and inquiry due to designers' unfamiliarity with the context of use, and possible reluctance of participants to be observed by an outsider [50, 77]. While research about designing technology in the domestic space has endeavored to actively include users during the entire design cycle [54], its focus is still on how new technology is embedded in users' lives instead of targeting the holistic understanding of users themselves. This broader understanding includes exploring various dimensions of participants identities, such as their attitudes and motivations towards using technology formed by their past experiences, and what value they perceive as a participant in the research. We strive to explore these dimensions of the AG's intersectional identities through auto-ethnographic narratives about their past and present experiences. These sensitive narratives are written with 'affect', unfolding experiences that can be 'funny, perturbing or traumatic', that 'do not await definition, classification or rationalization before they exert palpable pressures' [92]. We moved away from arriving at a definite, correct and meaningful conclusion [10], rather focusing on utilizing their potential as student researchers through participatory engagements.

Our choice of using narrative inquiry as a method of elicitation was motivated by its effectiveness in conducting intercultural research focusing on understanding the lived experiences of people through their own stories [23, 24, 80]. It can be useful for engaging diverse groups of individuals

in understanding their experiences within a wider social context [46]. It prioritizes the holistic understanding of the AG members' situated lived experiences through autobiographical, exploratory, and open-ended narratives [95]. To elicit these intimate narratives, we built upon Kotut et al's work in navigating technology design spaces by understanding and involving the community of use [61]. We used their work to understand the sensibilities of handling community stories while revealing diverse uses of technology, which can co-exist within the AG's traditional and modern parenting practices.

2.3   AG: Foreign Graduate Student Mothers of Young Children in the US

Pregnancy and childbirth are life transitions that can take a toll on parents physical and mental health [45, 85]. Studies show that new parents can experience social isolation and loneliness because of the full-time responsibilities of taking care of a baby [41]. Student parents in particular experience conflicting identities, where they strive to balance the time-sensitive demands of their distinct identities of being both a student and a parent [39]. Student parents who pursue graduate studies in the US may also be affected by variables such as financial difficulty, language barriers, and being cultural outsiders [13, 76, 105]. An important subset of these parents is student mothers, who may face added challenges in moving to a different country to pursue higher education and adjusting to unfamiliar environments while caring for their young children as a (possibly primary) caregiver [13, 68, 81]. These significant life changes can result in a crisis of self-identity [17], where the student mothers may question life choices including becoming a mother, pursuing higher education, or moving away from their familiar support structures. Research shows that female graduate students are twice as likely to give up on their academic role while bearing the burden of childcare in the absence of support from their children's grandparents, other non-working family members, and, in some cases, their partners [72, 73, 84].

The juxtaposition of cultural differences, gender-based disparities in responsibilities and opportunities, and the struggle to juggle between contemporaneous responsibilities of being a mother and a graduate student, may have repercussions on their attitudes and practices concerning technology. Childcare practices that are mimetic and passed down through families are often difficult to adopt for these mothers when they are raising children in a country with a significantly different culture from their homeland [96]. Foreign graduate student mothers often adapt (or even feel pressured to adapt) childcare practices that may be very unfamiliar to their family members at home, mainly because of the major shift towards a life balancing studies and work [96]. These practices may include using digital media and screens as a short-term solution for engaging children [12, 13] or working from home in the wake of the recent COVID-19 pandemic. Research on women's work-life balance while striving to maintain their mental well-being [75, 84, 90] tends to focus on one primary aspect of their identity: as a mother, as a graduate student, or as a foreign student. Through their auto-ethnographic accounts, we look at the intersection of our collaborators' attitudes towards technology and their context of technology use as a parenting tool by understanding their motivations, cultural backgrounds, and lived experiences as foreign graduate student mothers of young children.

3   METHODOLOGY: AN ASSETS-BASED APPROACH IN AN INTIMATE SETTING

By adopting an assets-based approach, we wanted the AG members to 'speak for themselves' [3] through their auto-ethnographic narratives while abstaining from being in a position of authority or direction. While our approach aimed to produce a meaningful auto-ethnographic [37] account of their lives to evoke empathy and compassion for people living in similar circumstances, we did not want to directly pose leading questions. Rather, our approach attempted to slow down the process of evaluative critique and representational thinking to give room to a contact zone of

analysis [23, 92]. We wanted to present the narratives as they were conceived and written, and pivot from analyzing them, (for example by using grounded theory), pivoting instead towards adopting a reflective stance on the complexities uncovered during the discussion sessions. Instead of referring to the AG member's experiences as *findings*, we refer to them as *'intimate narratives'*, in an attempt to respectfully position them as being beyond 'data'. Through these narratives, we attempt to slowly valorize the AG's tacit knowledge without decontextualizing, quantifying, or explicitly defining it [91]. This allowed the AG members to describe their vulnerabilities through intimate narratives about their lived experiences with technology, thereby strengthening their representation in the academic body of work to which they regularly contribute, but often not as subjects and co-researchers [35].

3.1 Ensuring Privacy and Comfort

Our efforts at creating a safe space for collaborators included concealing all identifying information such as the AG members' current ages, home country of origin, program of specialization, and ages and names of their children and spouses, from the narratives, which could potentially be linked with their author information. To avoid any occurrences where the AG's narratives could be associated with them due to explicit mention of their child's gender, we requested all AG members to refer to their children using masculine pronouns in their stories, which also differentiate from the feminine pronouns they chose to use for themselves. This did not alter the facts and events in their narratives. By doing so, we wanted to protect their personal and professional identity while being respectful towards their stories. The narratives contained vulnerable snippets of the AG members' personal lives that could be prone to scrutiny by potential readers and collaborators. Considering that as a possible hindrance to being candid about sharing their experiences, we tried to create a safe space by asking co-authors to submit their narratives to the facilitator, who embedded them in a text document after anonymizing the content. To ensure further assurance, our collaborative writing space was shared with the researchers only when the AG members had jointly edited the document. Researchers also maintained transparency and visibility by iteratively sharing pointers for review and discussion by the AG [10]. During the entire research process, the researchers and the AG did not communicate directly at any stage. The AG members were made fully aware that once published, their personal narratives may become vulnerable to scrutiny by the readers [38], but having their personal narratives guarded through anonymity allowed the AG to share, without risking their professional and personal identities [56].

3.2 Ethics

Prior to beginning our work, we contacted the Institutional Review Board (IRB) at our university for human subjects research determination, and the board informed us that our proposed research "appears to not be human subjects research, but would instead be considered to be oral histories". Thus, our study was conducted without IRB oversight. Our approach mirrors the collaboration between the co-authors in [29], where the studied participants are also co-authors on the manuscript, exempting them from IRB review as their narratives are self-reflexive and autobiographic. It is worth noting here that the AG members were made clear of their rights to drop participation at any point without any penalty and, as mentioned above, we prioritized ensuring that they were comfortable and had control over their participation. To this end, we also sought to involve them throughout the research journey, including in collecting the narratives, synthesizing the narratives, and finally, presenting the narratives to the public via this paper.

3.3 Collaboration Process

Our collaborative process is comprised of three stages with varying types and levels of involvement from the authors of this paper.

3.3.1   ***Research Formulation****.* The first stage brought together four researchers to define the research scope, formulate the research methods, and determine the roles each author would play. After reviewing the relevant literature (detailed in 2), they limited the research scope to understanding technology use and the lived experiences of foreign student mothers of young children. Specifically, they sought to focus on mothers who had a more recent experience of pregnancy, childbirth, and moving to a new country for higher education compared to mothers of older children, which could make it hard for them to recall those events in their lives more clearly. Considering that student mothers of young children already have significant responsibilities, the researchers decided to commence the identification of collaborators and the collection of narratives during the US summer months, when the AG would potentially have a break from their regular courses and some graduate research/teaching assistant duties.

In approaching potential collaborators for this research effort, a formal invitation for collaboration (listed in Appendix A) was developed and iteratively revised by the researchers. The first author, who assumed the three roles of researcher, facilitator and AG member, was responsible for identifying, approaching, and recruiting AG members. Potential collaborators were identified through the facilitator's interaction with women in academia (n=2) who were also mothers, through various professional activities (online courses taken together, professional workshops), through acquaintances and participants from a previous study (n=2), and through mothers' publicly available information on Twitter (n=8). In distinguishing student mothers of young children in the US, the facilitator traversed their publicly listed bios and tweets to ascertain their current country of residence, children's age, and occupation. In cases of ambiguity about the country of residence, the facilitator searched their username to see if it connected to their professional profiles. This search was aided by popular twitter hashtags (e.g. *#AcademicChatter, #PhDLife, #PhDChat*) and user profiles (e.g. *@Momademia, @mothersinsci*) tagged by these mothers in their tweets.

The researchers heard back from nine out of twelve potential collaborators. After further examination of participant fit, we ultimately limited our collaboration to four members (including the facilitator) in the interest of gaining depth and richness into their experiences [29, 30]. With a broad range of experiences, our AG members formed a fairly diverse group of foreign graduate student mothers. As a group of two Asian and two African mothers, the AG members were from diverse backgrounds (originating from three different countries), with varying parenting experiences (two co-parenting young children, while two of them were solo parenting as their partners lived in another US state/home country for studies or work). One of them was a mother of a child with special needs, and two of them had experienced living away from their young children for a period of six months to a year while they adjusted to their life in their new country.

Collaborating mothers met (virtually) three times in the span of three months (each meeting lasted about half an hour). As the timeline for submitting vignettes was very flexible, we could not estimate the total number of hours the authors put into completing them. The AG member's involvement in the research was voluntary, and they were allowed to leave the research endeavor any time and for any reason. We offered them a $50 gift card for as a token of gratitude, and an option to be a co-author in the publication. After the commencement of research, we felt that $50 may not have been a suitable compensation, so we reached out to the co-authors again, asking them what they think would have been an appropriate compensation for their time. All three collaborating authors stated their reasons of participation in this research to be beyond monetary compensation. One of them said and we quote (with their permission):

> *I didn't see the amount actually as a payment for the time spent in writing because I would have still done it even without the payment. Some of the reasons why I joined in the research is because the research work presented a very interesting topic which is of interest to me and also, the opportunity to co-author in a research paper which is important to us as a PhD student.*

*3.3.2   **Collecting Narratives***. During the the second stage, each AG member had a one-on-one virtual briefing session with the facilitator, where she described the motivation, goals, and likely outcomes of the research project; the minimum expectations from them for participation as a co-author; and a flexible timeline for meetings and writing contributions. During these individual meetings with each member, the facilitator also gave an anonymous introduction of the remaining AG members to build a certain level of familiarity among the co-authors without them directly meeting each other.

To provide a writing scaffold, the facilitator narrated her own story by writing vignettes[‡] that loosely answered the reflection cues detailed in the appendix (e.g. B). For each reflection cue, they were requested to write about 2 to 3 vignettes describing their experience. Compared to studies where participants narrate their personal stories in first-person singular pronouns [80], the AG members were asked to use pseudonyms to differentiate between their subject and writer identities in their narratives [92]. Pseudonyms were also used to protect their personal and professional identities while also promoting forthright candidness and deep authentic engagement with the research. The AG members were provided with an option to choose the writing platform that they were most familiar with, and all of them chose to complete their individual narratives using Microsoft Word. Initially, all of them worked on their narratives independently, and emailed their collection of narratives to the facilitator as a text document within two weeks of receiving the reflection cues.

Three weeks after the initial individual meeting with AG members, the facilitator emailed the AG members the collective draft of the narratives as an editable Google document (for ease of collaboration) for them to review, and invited them to identify anything that made them feel uncomfortable or they believed was inconsistent with their intent. In the same email, she also asked them to submit some short paragraphs describing their felt motivation for partaking in this research project, any distinguishing or prominent life facts about their experiences (to include in the positionality and reflexivity section), and their overall vision of technology for parents and young children. They were also requested to provide a suitable time for a second meeting to discuss their thoughts about the ongoing research, or provide feedback about the paper draft.

Despite having a choice of maintaining their anonymity, after reading the collective narratives, the AG members showed interest to the facilitator in meeting each other as a group on a live video-call. Hence during the second meeting (roughly a month after recruitment), the facilitator and the remaining AG members had a synchronous video chat (figure 1), where their identities were not concealed (similar to the study by Mankoff et al. [69]). The first draft of anonymized intimate narratives was agreed upon to be ready for researchers' review during this meeting. Although this meeting was initiated as a collective discussion, the AG members spent most of the time becoming acquainted with one other and sharing anecdotes of their lives as foreign student parents in the US. To ensure privacy, we have not quoted those private and intimate conversations anywhere in the paper.

*3.3.3   **Synthesizing Narratives***. The final stage is comprised of discussion and review sessions facilitated by the first author to reflect on key commonalities between the narratives, and to consider

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[‡]A brief evocative description, account, or episode, each of which is titled and may differ in length [93]

Fig. 1. AG meeting, where first author facilitated the discussion sessions

the strengths and limitations of the adapted methodology. During the first session, members of the research team (including the facilitator) read and extensively discussed the anonymized narratives to order them chronologically. They found an overlap between the AG member's formation of multiple identities before and after coming to the US. As such, technology use was found to be more prevalent in their life after coming to the US, as opposed to the moment in time when they decided to have children, or pursue higher studies outside their home country. We present representative intimate narratives in section 4 due to paper length restrictions, while the remaining (equally important) narratives are collected in appendix C.

During the third (and final) online synchronous meeting, the AG members reflected on the commonalities within the narratives, and provided further clarifications to the facilitator about insights which stood out for the researchers. Finally, the research team reflected on the strengths and the limitations of the adapted methodology. Sections 5.2 and 5.1 report outcomes of these two sessions. After each session, the facilitator invited the AG members to review and discuss the grouped narratives, and to provide feedback about how they viewed them with respect to the narration of their stories. With each iteration, the AG reviewed the manuscript in its entirety to identify any inconsistencies in the narrative. The AG members were particularly asked to read through the draft to scrutinize and identify points of information that they felt uncomfortable sharing, examine if their stories sustained their essence after anonymization, and remove redundant pieces of information. This was done to encourage dialogue about potential misinterpretation by the researchers, and to carefully mitigate any potential harm caused by any power differences between the people involved in this research [57, 59].

4 INTIMATE NARRATIVES

Instead of referring to the AG member's experiences as findings, we refer to them as "intimate narratives", in an attempt to respectfully position them as being beyond data. The narratives in this section are organized in the form of vignettes, which allow the reader to connect with and gain insight into their lives [30, 93]. Each vignette is titled to provide a summary statement of the section in a playful and meaningful way. These narratives are presented as they were written and co-constructed, correcting only for minor grammatical fixes and the agreed upon removal of redundant text. Vignettes are briefly prefaced with introductory text to maintain the transition into the next narrative.

We start with an intimate narrative that gives context to the AG's choice for having children and moving to the US for graduate studies. As these major choices made by the AG make them different from others, we consider them important in understanding their motivation for forging a new life.

> **Parenthood or student-hood?:** C was of age by her cultural norms to be a wife and mother, yet she struggled with the dreams of being a graduate student. The role of a woman in a developing country is more about keeping a home than anything else; a woman who does otherwise is an exception to the rule. She wanted to be an exception, and luck smiled on her when a friend from way back decided to be her partner while offering the promise of helping her to fulfil her dreams. During their courtship, they decided to hold on to extending their family to focus on the process of acquiring higher degree in the US, but life happened. Immediately after the wedding, she discovered she was pregnant.

One of the mothers discussed her life trajectory where she had to discontinue her PhD in her home country in an attempt to make her marriage work, elucidating the cultural context, and the contemporaneous roles she had to strive to maintain while trying to meet her academic goals.

> **Baby makes three:** D started her PhD at 22 and was on track to build her academic career. Everything was put on hold after marriage. She was promised that she would have an opportunity to finish her degree. But is it not a woman's place to compromise? Though she grew up in a family with modern ideologies, societal values forced her to make choices against her wishes. After multiple miscarriages, there came a rainbow baby. As a naive 24-year-old, she had failed to understand that when you marry a man from a traditional family, you marry his family too. She was an afterthought even before the marriage *henna*[§] had erased from her hands; Taken for granted, career aspirations put on hold, and be a prop in her spouse's arms. But she thought to herself, "What marriage is without its strife?"

The AG members described the role of their partner during their transition through multiple life-altering experiences in a short span of time.

> **The 'Power Couple':** Her baby was two months old when her husband left home, as he could not cope with the system of the country, inadequate power supply, and poor internet. His profession demanded the use of technology and access to proper facilities, and as a young couple they argued about finding a balance between meeting deadlines and attending to a crying baby. Truth was, both were very ambitious individuals; friends had tagged them 'the power couple' because they always spoke highly of their dreams. To support their life goals, he encouraged her to apply to schools in the US since this was where he intended to pursue his career. While studying for the tests required for studying in the US on her computer, she often sat with her son latched onto her breast.

For the AG members who were accompanied by their partners to the US, the process of moving and adjusting to a new country, while carrying out their responsibilities as a graduate student and mother, took a toll on their relationships, surfacing tensions between the partners [39].

> **Tinderbox:** Becoming a first-time parent in a new country, with her spouse arriving roughly one month before her expected delivery date, with no social support and money, and a qualifying exam in two months while exclusively breastfeeding? Sounds fun. Highly ambitious. Except that their relationship became a tinderbox. They knew it was going to be difficult, but they were naively hopeful. The level of difficulty B

[§]the powdered leaves of a tropical shrub, used as a dye to color the hair and decorate the body.

faced was beyond her expectations, making her question the decision of moving to the US. Why was a PhD so important, why could she not be just a stay-at-home, rather stay-in-the-home-country-with-family mom? She fed the baby, pumped milk for the baby when she left for classes, bathed and put the baby to sleep, prepared meals, and studied. But was she really studying, or just barely making it to the next assignment deadline? On one of those nights, she burst and told the husband she doing all the heavy-lifting, and slowly sinking under a load of self-imposed expectations of being a good wife, a good mother, and a good student. In that order.

The AG members narrated their hesitation as well as motivation in using technology as a parenting assistant while caring for their young children. For children born in the US, technology served as a means to bridge the geographical distance between children and their remote loved ones:

> **Oh, I know these people:** Born in a foreign land without family around, B's baby recognized family only as a face on the smartphone screen. It was definitely not an ideal introduction, but they wanted to acquaint him with close relatives including grandparents, uncles and aunts, and cousins. He did not seem to be as interested in the humans on the screen as he was for the cartoons, but that changed when they visited their home country six months after the baby was born. It was like having a 3D view of the 2D people he had been seeing all this time. When they were back in the US, the baby seemed more interested in hearing and engaging with the relatives back home, slowly starting to identify them according to their respective relationships as he grew older.

Screen-based technologies such as iPads and smartphones also helped two of the AG members communicate with their children who were living with their grandparents, while they tried to settle into their life in the new country:

> **Siri with a conscience:** Grandparents had gotten the baby an iPad when he was two so that he could *FaceTime* with his mother whenever he wanted. They lived in an isolated community in the US and books and the iPad were ways to claw out of boredom. Kids YouTube were D's kid's go-to app, where *Peppa pig* and *Dora* in Spanish were his best friends. She often thought what would she call a small AI-driven app or robot that curated videos and materials for her child and had all the attributes of an imaginary friend? A *Siri* with a conscience.

While smartphones and tablets helped them in communicating with their child from a distance, they struggled to keep them interested in the video-calls while not sharing the same physical space with them [13].

> **Cartoons vs humans** At the time B left for the US for her graduate studies, smartphones became the means of communication with both her husband and her three months old baby back home. Sometimes, the baby would not be interested. When she travelled back home, it took a few days before her child could recognize her. This made her feel so bitter and gave her teary eyes. With this experience, she decided to take the baby along with her to the USA. When abroad, she kept her baby in touch with father, grandmother and other family members using the smartphones. Even at that, her baby preferred watching cartoons to seeing humans.

The digital devices also aided one AG member's struggles as the only co-located parent of a child with special needs. The absence of her partner through her journey of adjustment in a new country

brought out a new set of struggles, such as an unexpected diagnosis of her child with autism. She described her use of technology to soothe and engage her child during times with challenging behaviors:

> **Tech bug:** C could not explain why her baby always tiptoed or why he would laugh hysterically, or the reason why his speech was not forthcoming like other kids his age. Her baby was two years old when the doctor diagnosed him with autism. She wondered what the implications of the diagnosis would be on her studies, as she was just getting by trying to understand the American educational system which was very different from that in her home country. She had a steep learning curve to rise to the demands of being a graduate student, and the diagnosis felt like a square peg in a round hole. However, her baby loved music since he was a newborn, as this was one of the things that kept him calm during his tantrums or behavioral patterns. When he got tired of his toy instruments very quickly, C turned to technology for help, and there was so much it could offer, from music videos to learning apps. The baby caught the tech bug easily and could spend two hours watching a music video while she utilized those hours to catch up on assignments. It turned out that the educational programs he watched improved his ability to identify things despite the diagnosis, but this limited her parenting time with him. She wished she could be more available to play along with him, but deadlines had to be met.

In other instances, the AG members used these devices to divert children's attention while they enjoyed some personal time to relieve physical and cognitive exhaustion, or snatched some intimate moments with their partners.

> **Television: the additional family member:** B got a television (TV) when her baby turned one, which was also the time when they were moving to a slightly bigger apartment. What they initially bought as an entertainment package for themselves somehow became a tool to distract the child, a childcare proxy of sorts. Since she had no help at home, she often sought help from the TV to engage her baby while she went to take a quick shower or prepared meals in the kitchen. As soon as she turned on the TV, it quickly grabbed her baby's attention, with the baby's state changing from 'distracting mama' to 'distracted from mama'. She even used it for having some breathing space to check stories on Instagram and Facebook, or for replying to texts on *WhatsApp* without being climbed over. When her husband came back home, they sometimes turned on the TV to talk to each other or have some intimate time together. In essence, the TV was that extra family member they sought to take care of their child while they unwound for a brief period of time.

They also performed activities facilitated by technology to bond with their children, which could enrich their communication with their children in the limited time they had:

> **Mother-child interaction:** She began watching the baby's favorite shows as the TV had been overtaken by his needs. She discovered a show that was arts and crafts inclined and decided it would be a good way to participate in his play. This turned out to be a great way to bond with the baby, making cardboard pieces, painting, and using play dough. It did not limit his use of technology as they explored new educational shows together. Her partner tried to be a part of the play but sometimes it was difficult to make the connection with the baby considering that the baby always preferred to be by himself.

Screen-based technologies were also used when children needed to be distracted outdoors:

Portable screens: A's baby got so used to her phone that she no longer has enough access to it. Not long after, the phone's screen had some cracks due to the poor handling by the child. Outside of the home, she used the smartphone to calm the baby in public spaces such as while eating in a restaurant when the cutlery was not enough to distract him, or during grocery trips when the baby would want to run around the store instead of sitting in the shopping cart. In church, smartphones came to her rescue to avoid him from running around the church. On long road trips, the smartphone was the baby's companion in the car seat, giving the parents enough time before getting to the next exit on the highway.

However, the AG members often felt that their choices of allowing more screen exposure than professionally recommended made them prone to judgment (or at least the perception of judgment) by family and friends:

Boon and bane: Being an only child who met or saw kids only when they went outside to run errands, it sometimes came as a surprise to people how B's baby remembered several rhymes and communicated what he wanted as a two-year-old, despite English being his second language which they did not speak at home. One time, while picking the baby up from a friend's place, the friend-parent commented on how the baby was excessively active and too chatty, followed by *"that must be because he watches a lot of TV as you are busy"*, the screen shaming too obvious to be hidden. Of course, her desperate circumstances lead her to adopt unwanted practices.

Despite the threat of possible screen-shaming, the AG overall had a positive attitude about the potential impact of early childhood media exposure on their young children's learning:

Outsmarting: A's baby outsmarted most kids of his age, and spoke fluently with clear sentences, despite limited interaction with children at the church or while visiting a friend who has young children. When she decided to enroll him in childcare, the amazed teacher commented: *"I don't think your child needs any improvement in any area, he is very smart and has passed all the assessments"*. She did not have time to teach her child, but the smartphone did the job well. Though screen exposure for kids is often criticized [20, 48], it seemed that technology's lap is the first school of a student parent's child.

As these narratives were written in an ongoing pandemic world, they also depicted life while navigating the challenges of COVID-19, where the AG members had to juggle their various identities of being graduate students and mothers in lockdown and at home with their young children.

Quarantine diaries: The pandemic hit right when D was a year away from graduation. Her baby was in the final quarter of pre-kindergarten and her husband had just completed his candidacy for a PhD, which meant that the bedroom had to be divided into work areas to accommodate online learning. What is this new world where she was a caretaker, mom, teacher, and, most importantly, a researcher looking to graduate? At least, she was lucky to have a partner who supported her dreams and goals as he suffered his own set of setbacks in the lab.

With COVID-19 bringing parents' predicaments to the forefront, where they found themselves ineffective in regulating children's use of technology, their narratives advocate for giving credence to digital media devices for making parents' lives slightly easier in challenging times.

Clash of times: Quarantine posed additional challenges for A as classes were online and graduate assistant duties had to be conducted via Zoom. While the baby enjoyed being near his mother every moment of the day, she used the tablet to distract the

baby while she attended class. During one of the exams, she tried different measures to keep the baby restricted to another room to gain maximum concentration, but he preferred to use the tablet beside his mother. As a result, she set up her office meetings during her baby's sleeping time. This resulted in a state of a quandary as the professor preferred having a particular time for all of his teaching assistants, whereas she was bound by the baby's nap time to avoid disturbance.

In addition to the insights about technology, the AG members revealed the struggles of having more than one child, which in several circumstances led to the decision to hold off from having more children, despite their initial aspirations of having a larger family. Apart from the financial strain, the AG members reported experiencing discriminatory and inconsiderate treatment from advisors who had never been in their shoes (experienced childbirth and/or being a primary caretaker while in academia).

> **Summer skies:** D did not do well in her first semester because she was always late for morning classes and had to leave earlier in her evening class, reaching home exhausted after sitting on a bus for 2 hours. She had to confide in her graduate student advisor, who had also been a mother during her post-graduate studies. It was like a match made in heaven to have an advisor who knew what it was like to be a mom and a student. Her advisor's recommendations came in handy as to where to find support, and her baby's daycare changed to an environment that was homely and subsidized by the state, this gave her some cash to save for the rainy day as her stipend had been spent entirely on rent and daycare costs. The major difficulty she faced was making time for her baby as assignments and submission deadlines began to pile up.

All in all, the AG members share a holistic view of their experiences through these narratives, presenting them "to be read, critiqued, or ignored by the viewer" [30]. They reveal their stories of raising children contemporaneous with graduate studies in the US, describe how various technological solutions facilitate their everyday life as a parent of young children, and share their attitudes towards the use of technology as influenced by their past and present experience.

5 DISCUSSION
5.1 Reflecting on the Methodology
In the discussion that follows, we summarize the research team's experiences of eliciting intimate biographical narratives through an assets-based approach, and elaborate on how it can be applied in different sensitive settings by examining the constraints of our methodology.

*5.1.1 **Creating an Affinity Group**.* Compared to work that involves a researcher as a non-member of the community, we built an intimate space with a researcher (the first author) joining the AG. Contrary to work where the researchers have limited shared experiences, being a researcher as well as a member of the AG allowed the first author to be a representative of, and empathetic to, these different perspectives. The AG members expressed confidence and assurance in the research process due to the personal involvement of the facilitator-researcher, who initiated the sharing of intimate narratives about her life with the other AG members. Their trust was strengthened by the fact that it was "research beyond convenience" for the facilitator-researcher, which helped convey that the personally meaningful auto-ethnographic narratives would be handled thoughtfully and with care. While the facilitator's position and identity may have enabled a degree of trust among the AG members, we believe that several decisions undertaken during the research were critical in this highly-personal space. Involving the AG members as co-authors ensured that their vulnerabilities were not presented in raw and unprocessed form, but rather cultivated and shaped with care by

themselves and fellow AG members, allowing for a respectful representation of their experiences [37, 38, 61].

Our approach of building trust through involving the researcher as a member of the affinity group ended up fostering a deeper and continued bond between the AG members due to renewed understanding of their shared circumstances, providing avenues to learn about and be inspired by one another beyond their limited social media interactions. During the parting meeting, one member of the AG even commented on how this proved to be like a short internship during the summer, piquing her interest to explore HCI research and encouraging her to develop a research agenda in the near future. The AG members described feeling proud of contributing to the research and saw this as an endeavor worth celebrating. Apart from the monetary and publication incentive, the AG members were keen to describe their stories to highlight their struggles that often go unnoticed. In a world where their merit is determined on different criteria – the number of children they have, their role in raising them, achieving academic milestones, and producing high-quality publications as a graduate student – the AG members looked at this engagement as an opportunity to define their vulnerabilities and strengths emerging from the amalgamation of these distinct identities. Consistent with work where participants found value in research engagement [18, 35] as research subjects that care [56], AG members were deeply interested in lending a voice to the travails of foreign graduate student mothers, as they viewed taking part in this research as an opportunity to connect with an inner strength that had been hidden by societal and professional demands. Apart from the self-described strengths, the "affinity" between AG members turned out to be an unanticipated asset in our research.

5.1.2 **Fostering a Safe and Intimate Space for Research Engagement**. The safe and intimate space in our research extended beyond the AG members' interaction with the facilitator. Members of the AG wrote and submitted stories at their own pace and from the comfort of their homes [18], which allowed them to reflect and engage with their past experiences while co-existing with their young children and technology (and, at times, their partners). In this safe space, which did not temper their interiority or emotional experiences [56], they were able to write their stories in a position of control, without the presence of a "third" entity such as researchers or facilitators probing them to elicit their narratives. This facilitated an in-depth engagement, allowing the AG members to reflect and engage with their lived experiences and share them in their own words, forming narratives that emerged naturally at a pace with which they were comfortable [19, 21, 46].

The reflection cues triggered traumatic memories or painful past experiences, which the AG members were not probed to share. Rather, they shared what they felt appropriate, encouraged by being a part of a close and caring community with shared experiences. Respecting their agency to describe their narratives helped in revealing their pleasant as well as uncomfortable experiences, which may have been omitted had we opted for traditional methods of interviews or focus groups. Allowing the narratives to emerge at a natural pace helped in uncovering the AG members' unique circumstances that influenced their values around technology use in parenting. Importantly, their intimate narratives were not analyzed as data to derive implications for design [9], and were instead provided in their authentic form to inspire empathy and compassion. All of these strategies helped in developing trust between the AG members, enabling the space for them to open up about the most intimate details of their experiences, such as finding love, separation from their partner, going through miscarriages, raising children with special needs, and the different shades of their relationships with their spouse, academic advisors and children.

5.1.3 **Implications for Research in Sensitive Settings**. Our unique research endeavour in forming an affinity group for describing intimate experiences has some transferable learning for similar work in a sensitive setting, such as working with vulnerable populations of incarcerated

parents [89], parents who experienced loss of pregnancy or children [6] survivors of sexual abuse [6] or sex-trafficking [42, 44], or members of the lesbian, gay, bisexual, transgender, queer (LGBTQ) population [49, 63]. We envision our work to be useful for CSCW researchers who want to engage deeply with communities, particularly in highly-personal contexts. They can encourage a greater level of involvement from members of such communities by incorporating the core principles of identifying and leveraging the unique assets of a user group, developing a safe and intimate space through researcher participation as a community member as opposed to being a "friendly outsider" [53], and discovering what that population values in research to involve them as collaborators rather than research subjects. We demonstrate that these assets can be possessed by both researchers as well as collaborators, and effectively employing them in the research is imperative in surfacing in-depth insights about their technology usage context.

Although in this particular writing effort we defined the AG as a subset of foreign graduate student mothers, their narratives gave a preview of their partners' role (or sometimes lack thereof) in their life choices, childcare, and decisions relating to technology use. The AG also played an unplanned role in communicating their partners' voice in the narratives, as the partners of two AG members read and commented on their narratives and occasionally provided input on their side of the story. Additionally, they portrayed how their young children influenced their use of technology as early adopters and users. As a possible next step encouraged by the interest shown by the partners of the members of this AG, we invite parents with different intersectional identities to utilize our approach of eliciting intimate narratives to give visibility to their stories of living with and using technology for and with their children. Future work in this research direction can explore other forms of media such as audio-visual narratives, self-designed probes by participants, or parent-facilitated elicitation of technology use from children.

It is important to consider that we formulated our work as research article for publication, and as part of that process, it has gone through rounds of revisions over the past year. With each revision, we approached our collaborators to provide their thoughts on the feedback received, and to review the manuscript before the next submission to ensure that any changes or reframing of the article arguments were consistent with their original authorial intent. While this proved to be a relatively easier task with a smaller number of collaborators, it might be difficult to engage and retain a sizable number of collaborators over a long period of time. Despite having a diverse group collaborators, we are mindful that our sample might not be representative of the whole foreign student parent population, thus we also do not claim generalizability in terms of depicting the experiences of all foreign graduate student mothers. Additionally, the narratives describe the first-person experiences of cis-gender mothers who are primary caregivers of their young children. We tried to limit the bias in the narratives through informal discussions about them in the meetings between AG members, but with stories being self-reports that could potentially free participants of socially sanctioned behaviours [71], cannot guarantee complete objectivity. We deliberately avoided scrutinizing the narratives to retain their essence and originality, and to refrain from negating the lived experiences of AG members by embracing their their own voices. While being naturally subjective, this also resulted in the narratives being rich and valuable, which we believe is no lesser than any 'objective' research [51, 52].

5.2 Technology and Foreign Student Parenting

In this section, we present a reflection on the narratives, contextualizing what is described above with our understanding of the challenges that foreign graduate mothers of young children face. In particular, we focus on the potential benefits and challenges of using technology in parenting.

5.2.1 ***Technology as a Parenting Assistant****.* These narratives present the AG's nuanced perspectives on the use of technology as a digital childcare assistant [12], where they rely on technology as a positive distraction tool, enabling the AG members to chart time and space to balance the multiple responsibilities that accompany their multiple identities. In essence, the in-depth narratives highlight various social and cultural forces that form the context for their use or rejection of technology. They further highlight the tensions and conflicts that they face in using digital technology, which can be perceived as being in conflict with "good" parenting practices. Despite the screen-time judgement faced by AG members, they had an overall positive attitude towards using technology as a parenting assistant in the absence of help. While there exists a large body of work on how parents engage with and seek help from parenting communities online [5, 83, 87], these narratives tease the intricate space where parent-child interaction is facilitated through technology in the absence of online and offline communities of assistance.

It is interesting to note that, while the general term "technology" was used to examine how it facilitated or hindered the AG's parenting, their narratives predominantly referred to a subset of technologies (digital media devices) such as television, smartphones, and tablet devices. Curious about the non-appearance of popular forms of technologies for children such as baby monitors, gaming consoles, smart speakers and conversational agents [15, 34, 66], in the last video chat session, the facilitator asked the co-authors about their experiences (if any) with these other kinds of technologies before and after coming to the US. Two AG members recounted their access to technology as being limited to laptops and smartphones in their home country, which they owned in their mid-twenties. The other two members had similar experiences, except that they did have access to broadcast television and portable cassette players and recorders in their childhood. Although there were other technologies they used after coming to the US (such as pre and postpartum technologies including fertility tracker apps [40] and breast-pumps [32]), the AG members primarily utilized digital media devices with their young children for communication, entertainment, and deliberate distraction. This was also encouraged by the availability and affordability of these devices in the US as compared to their home country of origin [97]. As a member of geographically dispersed families, mothers found screen-based technology to better aid their communication needs as compared to non-screen devices, which did not retain children's attention for a long time when talking to remote family members. Consistent with findings from [13], AG members also described them as devices which helped them get through parenting tasks by distracting, entertaining, or educating their child with little or minimal involvement on their part.

The AG members described their vision of technology for their unique parenting challenges, which we communicate here as future research directions worthy of exploration by our fellow researchers and designers of media and technology for children. We note them as speculations about what might have worked as a better parenting aid based on the intimate narratives about their circumstances. Two out of the four AG members in this research were solo parenting their children while their partners were in another state or country, so they envisioned technologies that can effectively distract their children from their mothers when they attend to house chores or academic responsibilities. This was especially longed for during the pandemic, where children were present with their mothers during their working hours. Related to that, mothers also talked about having a mechanism to notify parents when young children indulge in physically dangerous behaviour while mothers complete tasks which require their undivided attention, such as attending a meeting or a class in another room. To make up for time spent mentally away from their children while they attend to their academic responsibilities, mothers talked about making educational programs centered on inclusive learning and effective parent-child communication that can help them bond with their children. As young children only watched videos or listened to music, one mother envisioned a small AI driven app or robot which could curate videos and materials

for her child, ensuring that children consume age-appropriate content while parents are not co-watching. As members of a nuclear family with limited outside interactions due to the mother's busy schedules, AG members also desired interactive content that helps build their children's social and communication skills. In that regard, one mother mentioned the possibility of encouraging physical activities in a social setting with other children enabled through technologies.

5.2.2 *Technology as a Band-Aid Solution*.

The intimate narratives illuminate how AG members handled childcare as primary caretakers and sometimes lone parents, and their willingness – and at times, helplessness – towards using technology as a childcare proxy. The AG members talked about the early childhood screen exposure choices they made, which at times were not in line with the professional recommendations [1, 79] due to the unconventional circumstances they lived in. The narratives also highlight the opportunities for exploring the underappreciated benefits of using technology as a caregiving assistant by parents who cannot afford conventional childcare for a variety of reasons. The controversial role of technology as a childcare assistant is not commonly admitted by parents, partly due to their own guilt for their choice of early childhood media exposure and partly (and relatedly) because of the actual or perceived judgemental views of other parents, especially those with a slightly more privileged living setup (e.g., living near family or close friends who offer help for childcare, being able to afford third-party childcare services).

While technological solutions currently provide support to the AG members' parenting practices, they are band-aid solutions to systemic problems such as the lack of affordable childcare, inflexible schedules, and unsympathetic consideration of female students' living situations. Deciding to have children during graduate studies (which ought to be a private choice) often entailed personal sacrifices on the part of mothers, limiting them from extending their family while being a graduate student mother in the US. This was consistent with research findings where mothers have to pay the baby penalty [73, 100] while juggling their many identities (of a mother, wife, and student) in and outside the home. Structural changes, including departmental support and affordable childcare, can enable student mothers to make empowered decisions regarding extending their family, and/or spending more time with their children, due to this much-needed support.

6   CONCLUSION

Through a participatory assets-based approach, we engaged foreign graduate student mothers as empowered AG members to narrate their intimate biographical stories. We discovered opportunities in recognizing the AG's value as student researchers due to their distinctive positionality, as their scholarly experience as graduate students made them valuable collaborators in different aspects of research explorations, beyond just being research subjects. Rather than focusing on improving or redesigning technologies, our work centers the nuanced complexities of motherhood while juggling work responsibilities, cultural differences, and the competing pressures of child-raising and academia. The AG members' narratives contextualize the use of technology for and with their children, while surfacing their challenges and vulnerabilities as a call for action for appropriate technologies to support their unique parenting circumstances. We present our methodological innovations and intimate narratives to inspire empathy while engaging members of vulnerable communities as research participants.

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A   INVITATION FOR COLLABORATION

Dear [name], I (met)/(found you through) [source]. I wanted to invite you to write a collaborative, autobiographical paper with you for a human computer interaction conference. My research focuses on designing distraction technology, like conversational agents in TV shows, and technology that can help mothers, specifically foreign graduate student mothers who raise young children without familiar support systems. I was wondering if you would be interested in writing a first hand impression of your own life, including your experiences with technology as a parenting assistant as a foreign graduate student mother of a young child in the US. I consider it as an interdisciplinary collaboration, where you might (if relevant) count this publication towards your degree progress. We can complete this over summer, and I have funding to provide 50$ to each collaborating co-author. Only criteria for this is to be a non-US born/international student mother passionate about voicing her opinions about her young child(ren)'s use of technology. If you are interested/have time, let me know so I can hit you up with more details. That said, I understand that academic moms already have their plates full, so it's okay if you'd like to pass!

B   WRITING CUES

- **Intersection of multiple identities**: How was your life before coming to the US/becoming a graduate student mother? Why did you decide to pursue a graduate degree? Why did you decide to have/raise children during graduate studies? What's the role/perspective of your partner ? Do you plan on having more children during graduate studies (why/why not)?
- **Technology as a parenting assistant**: What is the role of technology in your parenting? What are some of the limitations of your experience with technology use by and with your children?
- **Perceptions of early childhood media exposure**: How (if at all) COVID-19 has affected your routines and behaviours about the use of technology for or with your children? Your overall needs or vision, like and dislikes about technology, something that you wished to have in past or in future?

C   SUPPLEMENTAL (BUT EQUALLY IMPORTANT)

Union of souls, separation of bodies: The pregnancy period was accompanied by lots of health challenges that made A defer her trip twice. Three months after delivery, she had to take the most difficult decision of her life. She was left with two options; to stay back and lose the admission or to leave her husband and child at home while she pursued her career. Upon careful analysis, she and her husband decided that she would accept the admission offer with her husband promising to take care of their three-month-old child back home. She wept so bitterly at this decision, but knew she had limited chances to advance her education. Their decision did not go well with some people who felt she was too heartless to have abandoned her family, especially her three months

old because of her studies abroad.

Apprehensions: She desired to get married, but her mind was crowded with the stories and news about marriages that ended in divorce. This increased her fear to the point that she doubted finding a good man. However, it was not too long that she found her soulmate who meant the whole world to her. Their love grew and the bond between them was so tight. Though she and her soulmate loved each other so passionately, things were not very smooth because they had some opposition from members of their families. They were not perturbed as they were able to overcome the hurdle. The family eventually approved their relationship, and the marriage preparation began in earnest.

Lucky Stars Shining Bright: During the uncertain times of their relationship, she had applied for a scholarship abroad to get away from what life was throwing at her at that time. Coincidentally, the approval from parents, scholarship letter, and offer letter for the government job that she had been trying to land from several years all came together. Fast forward to when they got married after what seemed like eternity, she conceived within the first month.

High Bar: She was then faced with the choice of availing the scholarship and moving abroad while being pregnant, or staying back home where she might never decide to pursue a PhD. The former involved experiencing childbirth and postpartum duties without familial support while continuing studies with a *desi* partner who had only seen everything from a glass of water to a belt in the *shalwar* (trouser) being ready for his father (and brothers), handed in a silver plate by her stay-at-home, immensely adept mother-in-law. She had only given birth to one child at the age of 30 (that too delivered with a cesarean section aka easy birth), and had no chances of having another one until completing her PhD. On the other hand it was her mother-in-law who had also given birth (naturally) to four healthy children (3 of them boys) before her mid-thirties, while perfectly juggling all the responsibilities of being a good wife, mother, and daughter-in-law in a huge joint family system.

Decisions not made lightly: While this was going on, she got some overseas full scholarship admissions she earlier applied for. It was a beautiful and joyous moment for her and her soulmate. This shortened the period of wedding preparation that they had to get married within two weeks. She did not miss her first month after the wedding, she conceived that same month while preparing for her graduate program abroad. However, she dwelled on the thought that she would be separated (physically) from her husband so soon.

Hodgepodge of decisions: As she was rocking her 17 day old baby, she made a choice that night. No matter what, she would protect her baby from the binds of patriarchy. She would raise her baby to stand up for herself and make her own choices. Mistakes help us grow and she chose growth for herself and her child. She wanted to finish her doctoral degree and help train women like her to stand up for themselves . She prayed, she cried but she knew she had to leave her heart back home to make a life for both of them. She had the support of her parents and her family, especially her mother who offered to take care of her child despite her deteriorating health. At the age of 29, she walked away with nothing material but most consequential to her life: Her self-respect.

Love, again: She was driven, focused and terrified to fail. She worked hard and familiarized herself with technology that was eons ahead from when she left her training behind. Late nights led to late discussions with a lab mate and a bench mate. Love was brewing but was she paying

attention? Sometimes you just take the plunge and that is what she did! She met and introduced families oceans apart across *Zoom*. Marriage happened but followed immediately by the sad demise of her mother, and her daughter's caretaker. What was supposed to be a slow integration of family became a forced interaction of living under the same roof. Grief and self-doubt were her new friends.

Baby Fever: She did not remember how old she was, yet vividly remembered the dream in which she was pregnant, and that craving of feeling a child inside her consumed her for the coming years. The catch was due to her religious beliefs, she did not want to have a child without being legally married. And she did not meet her soulmate until she was 26. The first thing that she told her (now) husband when he proposed was that she wanted to have a baby immediately after they get married, and it genuinely freaked him out. Of course, this is not something you expect to hear in response to a romantic proposal, as if the pressure is not already enough. But she thought her clock was ticking, so she desperately wanted to experience motherhood.

Unable to extend family without extended family: Earlier in life, A had hoped that she would complete her family size in her thirties so that as a young mother, she would grow with her kids. Life, however, said otherwise; her decision to pursue a PhD restricted this noble dream of hers. While the thought of baby demanding less attention from her if he has siblings to play with lured her occasionally, she knew it was not possible as long as she is in the USA as a graduate student. It would be too demanding academically, emotionally, financially, and physically to manage a large family alone in the USA without family support.

A bigger family: C and her partner had always wanted more children, but she always got upset when he raised the topic and felt that he was being inconsiderate of her situation as a graduate mom raising their son all by herself, haunted by trauma of the past when she found out she was pregnant again when baby was fourteen months old. While she hoped that her one of her school applications would be successful, she worried about being in a situation where she had to start graduate school in a foreign land while having to care for a baby and a toddler. She tried being optimistic, yet life took a sudden turn when the doctor reported that the fetus had stopped growing. She decided to go ahead with an evacuation procedure without contacting her partner or any family member, experiencing excruciating pain and shivers for hours after the process without pain relief medication which could not be covered by her insurance. She was later supported by friends who came by the hospital to take her home, though she cried for months, picking herself up when time to move to America approached.She now gets scared at the thought of being pregnant again without family support while coping with stress of graduate school. Perhaps when the pressures of graduate school are over, then her mind would be ready to birth a newborn.

Culture shock: Her idea of America was twelve months of bright and sunny days. The people were nice and friendly, most of them willing to help a stranger, but no one told her of the imminent darkness and a winter that would last for months. She could not afford a daycare close to her school so she would take two buses and walk fifteen minutes to a daycare that was affordable. There were days when water trickled from baby's nose as they journeyed to the bus stop waiting endlessly for a bus that usually would often run late. Luckily, they survived that winter without any illness, but this would be a defining moment for her, being without family and lacking immediate support.

Student parents D's partner decided to move to another state for his graduate studies, this had always been his dream and she was in support of it. Although it meant he would be far from the baby, they still made it work by using social media to communicate. This was the same way she

related to family back in her homeland, social media was the only way she could get baby to see and recognize grannies, aunties and uncles; the baby barely spoke to them, but he smiled when they sang to him and praised him for his artworks.

It takes a village: For several days, they yearned for an extra pair of hands who could hold the baby while they napped peacefully, or just walked outside together for 5 minutes without worrying about her. With two out of three members of the family being extremely light sleepers living in a single bedroom apartment, if she vowed to take care of baby without disturbing her husband, he would wake up immediately with hearing the baby cry, and if he volunteered, the baby would need her to be fed in less than half an hour. Plus the husband did not know how to cook, at all, so she had to cook meals at home as they ate *Halal* (denoting or relating to meat prepared as prescribed by Muslim law).

Bridging the geographical distance: Her daughter was suddenly uprooted after her fourth birthday and brought back to a new and unknown environment. Her baby was an American but raised internationally. There were struggles, tears and tantrums. But calling apps made it easier to stay in touch with family back home. Her daughter knew that family and her loved ones were one touch away.