

Writing Home From Afar: Connecting Distant Families through Sharing of Outdoor Experiences with Digital Diaries

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Maintaining emotional connections and fostering meaningful communication among distant family members has long been challenging. Existing communication technologies, such as instant messaging, video-sharing, and social media enable quick exchanges but often lack mechanisms to initiate appropriate conversation topics and support in-depth emotional interactions. This study explores the use of digital diary-sharing in addressing these limitations. We conduct thematic analyses on diaries from a three-week study (N=22) using DailyBean, a diary app, to examine frequent patterns in users' sharing of outdoor experiences with distant family members. We identify five key mechanisms to support connections between distant family members: topic initiation, memory recall, shared moments, joint activities, and future planning. We also highlight frequent conversation topics that facilitate emotional engagement and reflection for distant family members. We conclude our study with design recommendations for effective diary-based family communication.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**.

Additional Key Words and Phrases: shared experience, distant family communication, diary-sharing, relationship closeness, diary, outdoor

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1 INTRODUCTION

For distant families, preserving emotional connections and deep communion has always been a challenge [8, 56]. While technological advances have enabled families to remain connected through text, voice, or video, sustaining deep conversations across distance remains difficult.

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Many long-distance family members struggle to move beyond routine updates, often finding themselves caught in surface-level conversations that lack emotional exchanges [7, 9]. These difficulties are compounded by asynchronous schedules, time zone differences, generational gaps, and diverging communication habits [6, 46]. As a result, meaningful family communication often becomes infrequent or emotionally unsatisfactory.

Among the wide range of shareable experiences, outdoor experiences present a particularly clear case of this challenge. Although outdoor activities, such as going on a local hike or visiting a public garden, often involve rich emotional and sensory content, studies have shown that sharing these experiences digitally is frequently constrained by technical limitations, such as device portability or connectivity issues [59], a sensory gap that impedes conveying the fullness of immersion [4, 46, 59], the need to operate recording or sharing tools that can disrupt attention and authenticity [28, 49], and people may feel hesitant to share fewer "Instagrammable" moments due to concerns about audience perception and the pressure to present idealized content [3]. These factors contribute to the difficulty of translating the richness of outdoor experiences into reflective or emotionally resonant communication. Even on platforms that support interpersonal sharing, such as WeChat or WhatsApp, outdoor moments are often reduced to image-based updates or brief messages that do little to prompt deeper engagement [48, 70, 79]. Although these tools lower the barrier to staying in touch, they provide limited support for sustained and emotionally reflective interaction [2]. Outdoor experience sharing thus serves as a representative and underexplored scenario that reflects broader limitations in distant communication. By investigating how families share outdoor moments across distance, we aim to uncover design insights that can generalize to other forms of sharing personal experiences in everyday life.

To address these challenges, we found diaries offer a unique solution approach to these challenges by creating a reflective space for recording life moments and tracking personal changes in perspective. Research has demonstrated that maintaining a diary encourages self-reflection and emotional disclosure [71, 76]. Additionally, diaries provide prompts that support the recall of meaningful events and experiences, aiding participants in expressing emotions that may not be shared spontaneously. Studies have also shown that multimedia-enhanced diaries can cue users to recall activities and deepen their engagement with shared experiences [34, 37]. However, previous CSCW and HCI literature has not sufficiently explored the mechanisms by which diary-sharing enables effective relationship maintenance and emotional reflection for distant family members. This informs the two primary research questions of our investigation:

- **(RQ1)** How can diary-sharing activities trigger relationship maintenance strategies to foster connections among distant family members?
- **(RQ2)** How do diary contents drive conversations between distant family members?

To answer these research questions, we collected data on the usage of DailyBean from 22 participants in a three-week diary study. DailyBean is a diary app providing a form page with text, images, emoji inputs, and simple review interfaces for users to keep and share diaries. Participants were asked to record outdoor experiences through DailyBean and share their diaries with a distant family member in close relationships every week. In this study, we refer to participants who share diaries as "sharers," and the distant family members who receive the diaries and engage with the shared experiences and interactions as "sharees." At the end of each sharing session, participants completed a diary reflection report required by the diary study to help us collect and understand user needs and experiences. Following the diary study, we hosted a group discussion with participants to discuss the reflections and share related experiences and thoughts beyond the context of diaries. Finally, we conducted a work activity affinity diagram (WAAD) activity to analyze the usability of

digital diary-sharing activity and explore the interactive mechanisms and prompts that improve distant family everyday communications through diary-sharing during the sharing process.

The contributions of this study are as follows:

- (1) We demonstrated the value of digital diaries as a communication medium, emphasizing their role in maintaining emotional bonds and fostering deeper family relationships.
- (2) We explored how diary content serves as a conversational prompt, facilitating intimate communication and enhancing emotional engagement within families.
- (3) We examined how distant families integrate digital diary-sharing activities into their communication routines, providing insights into how these practices can be affected by diverse family communication habits and trust-building. Our research highlights how digital diaries enhance engagement, contributing to developing communication tools that facilitate more meaningful exchanges in family settings.
- (4) Our findings offer implications for communities in CSCW and HCI, particularly by informing the design of computer-mediated communication technologies that prioritize relational depth. This research provides actionable insights for developing systems that foster habitual, meaningful communication among distant family members, addressing key challenges in maintaining distant intimacy.

2 RELATED WORK

Family communication is crucial in maintaining emotional closeness among distant family members. Researchers in CSCW and HCI have explored various technologies to facilitate meaningful interactions, promote emotional connection, and address communication challenges in different contexts. This section reviews prior research on distant family communication (section 2.1), distant experience sharing technologies (section 2.2), and diary usage (section 2.3). Our study builds upon these insights to explore how sharing outdoor experiences through diaries can foster deeper connections between distant family members.

2.1 Distant Family Communication

Social science research has shown that modern families face multiple challenges in long-distance interactions, such as routine conflicts, time zone disparities, differences in interest, culture or values, or mismatched expectations regarding communication frequency and emotional openness [1, 43, 78]. These challenges frequently result in fragmented or surface-level interactions, especially when communication relies on technologically mediated formats rather than spontaneous, real-time in-person exchanges [29, 43].

Taking routine conflicts and time zone disparities for example, during the COVID-19 pandemic, Heshmat and Neustaedter found that families struggled to synchronize communication due to conflicting schedules and time zones, particularly in larger group video calls, which hindered equal participation and emotional reciprocity [29]. Researchers have also examined how differences in interests, cultural norms, and values shape distant family communication. Shin et al. found that family members often face difficulties initiating meaningful conversations when they cannot identify emotionally resonant or mutually engaging topics [64]. The lack of physical co-presence and non-verbal cues further limits opportunities for empathy and emotional depth [2, 20]. In cross-cultural or intergenerational contexts, communication preferences and pattern discrepancies may inhibit open exchanges and lead to misunderstandings [36, 52, 57, 78]. Moreover, mismatched expectations regarding communication style and frequency further complicate remote interactions. Prior research on family communication patterns demonstrates that families with low conversation orientation, those that discourage open dialogue, are more susceptible to emotional detachment [78].

In high-conformity families, where harmony and obedience are prioritized, emotional disclosure may be suppressed, leading to a lack of perceived support despite frequent contact. Even with access to communication tools such as video calls and messaging apps, many families still struggle to sustain reciprocal and emotionally meaningful engagement [50, 75].

To address these challenges, researchers have explored how relationship maintenance strategies can foster emotional connection in distant family settings. Drawing from Stafford and Canary's framework, strategies such as positivity, openness, assurances, and shared tasks have been shown to enhance relationship satisfaction and perceived closeness across both romantic and parent-child relationships [67]. For example, Dainton and Stafford identified positivity and openness as particularly effective in sustaining the commitment and emotional accessibility [12]. These strategies are especially relevant for distant families, where shared activities and verbal affirmations play a central role in maintaining intimacy without physical presence. Studies further suggest that integrating these behaviors into technology-mediated practices, such as asynchronous sharing or structured prompts, can reinforce relational stability over time [1, 30]. In line with this, Hassenzahl et al. highlights the importance of supporting shared memories and joint activities in mediated communication, underscoring how technology can meaningfully contribute to relationship maintenance [25]. While these strategies have inspired the design of computer-mediated communication tools and awareness systems to support distant relationships, commonly used applications often remain limited in their ability to facilitate rich, emotional communication [52, 57, 69]. These tools may help maintain a sense of connection, but they frequently fall short in promoting the depth and breadth of interaction necessary for meaningful family communication over distance.

2.2 Distant Experience Sharing Technologies

Although technologies for sharing outdoor experiences have become widely available, challenges such as technical constraints [59], sensory gaps [4, 46, 59], and disrupted immersion [28, 49] often reduce these moments to brief updates rather than fostering the emotional depth or reflective dialogue needed for meaningful connection. Social media platforms such as Instagram have become widely used for showcasing outdoor moments. While they offer visibility, they primarily promote identity performance and self-presentation.

Irma et al. found that users post scenic images not necessarily to connect emotionally, but to assert identity or impress others, often following aesthetic conventions that prioritize photogenic landscapes over meaningful narratives [3]. Although participants showed diversity in their outdoor activities, their imagery typically conformed to traditional standards, highlighting scenic hikes, famous landmarks, or stunning views shaped by norms of what an Instagrammable landscape should look like.

Other researchers explored technologies designed to create ambient or momentary connections during outdoor activities, but these efforts often privilege presence over dialogic exchange. Prince's study on SMS communication during outdoor adventures revealed that while brief updates allowed family members to feel connected in real-time, they lacked the capacity for deeper emotional reflection [54]. To address this, Neustaedter et al. developed Shared Bicycling and Beam Geocaching, systems that use video streaming and remote viewing to simulate co-presence during outdoor events [46]. Although these tools created immersive visual experiences, users still struggled to sustain meaningful conversations due to limited expressive control and the absence of narrative framing. These designs rarely support personal storytelling or emotional resonance. Across these systems, the main emphasis remains on awareness of presence rather than fostering mutual understanding, contributing to what Turkle describes as a "connection crisis," where people are constantly online but emotionally disengaged [2].

To address the limitations of low-context sharing, researchers in CSCW and HCI have also proposed emotionally evocative systems that incorporate narrative, memory, and shared routines into remote communication. Some of these designs overlap with the goals of awareness systems, which Markopoulos et al. define using five core dimensions: input modality, notification level, contextual richness, display visibility, and user control [40]. Many awareness systems have successfully enabled ambient forms of connection among distant family members. For instance, the Digital Family Portrait visualizes the daily activity levels of older adults, offering a sense of reassurance and peripheral presence to family members [44]. Similarly, ASTRA and InterLiving allowed users to exchange short updates, icons, or images, keeping them subtly visible to one another in low-effort ways [31, 60]. These systems demonstrate how implicit input and minimal disruption can support peripheral awareness. However, studies also highlight the limitations of such designs: while they successfully maintain ambient connection, they often lack semantic clarity, making it difficult for users to infer emotional meaning or intent [42]. As a result, they offer presence without fostering deeper mutual reflection or emotional dialogue.

Beyond awareness systems, other CMC designs have explored ways to support richer interpersonal engagement, often through more narrative-oriented interactions. Some systems use tangible or multimedia triggers to elicit shared memories and storytelling. Examples include the Living Memory Box and interactive photo frames linked to physical objects for intergenerational memory-sharing [21, 68] and FamilyStories leveraging asynchronous voice-sharing, emphasize the role of tone, pacing, and spoken word in maintaining emotional closeness, especially across time zones [30]. Structured shared routines, as studied by Yuan and others, also promote co-reflection and relational continuity without requiring real-time communication [77]. Collectively, these systems highlight promising strategies such as narrative scaffolding, multimodal expression, and asynchronous reciprocity that can be adapted to support deeper emotional connection.

These tools reflect a growing awareness of the need for “dialogic spaces” in technology design. Branham argues that emotionally supportive systems must do more than facilitate presence. They must actively support processes like reflection, reinterpretation, and relational negotiation [7]. Her 4Rs framework (Repattern, Reflect, Restory, and Reconnect) emphasizes the value of technologies that foster open-ended, evolving conversations rather than presenting a feeling of abstract presence only. From this lens, we believe diary-based sharing offers a promising direction: it enables users to narrate their experiences, reflect on emotional meaning, and invite others into a more gradual, co-constructed interaction. Our study builds on these insights by exploring how the diary, structured yet personally authored, can serve as a medium for layered emotional expression and reciprocal engagement within distant families.

2.3 Diary Usage in Experience Sharing and Communication

While prior systems have made strides in supporting emotional presence and asynchronous sharing, fewer studies have explored how experience-centered sharing formats, such as digital diaries, can serve not only for self-reflection but also as relational media that structure conversation, elicit empathy, and sustain communication. To address this gap, we turn our attention to diary-based communication tools, particularly those that enable users to share personal experiences with others in a way that prompts deeper interaction. Lin et al. explore digital account sharing among couples through a 30-day diary study, revealing that account sharing facilitates joint routines and enhances relationship satisfaction through activity awareness and discussions about shared activities [38]. Similarly, Branham’s “Designing a Diary Built for Two” investigates how co-located couples use digital diaries to foster intimate communication through reflective and supportive interactions [7]. This study considers whether diary-sharing can positively impact distant family relationships.

Diaries can take various formats, such as pictures, videos, annotations, or Likert scales [10, 55, 66], to support different purposes, including self-management, behavioral tracking, and reflective practices [39]. We consider lifelogs as a form of diaries since share the common characteristic of recording life experiences. Prior research demonstrates that diaries support self-management, reflection, and behavioral tracking, with privacy, ease of use, and comprehensive data capture as common priorities [39]. Gouveia and Karapanos' Footprint Tracker integrates automatic data capture to aid recall and reflection [22], while Mattila et al.'s Wellness Diary allows users to log wellness data, such as diet, activities, and psychological states, through mobile technology [41]. Wessel et al.'s activity diary app provides real-time logging and behavioral activation support for individuals with depression [74]. In addition to personal management, diaries promote connection by sharing experiences. Vaittinen et al. explore how mixed reality (MR) annotations function as brief diaries, providing reminders, mementos, and experience sharing [71]. Wang et al. highlight lifelogging's role in assistive living, offering memory aids, dietary monitoring, and activity tracking via mobile and wearable technologies [72]. Doherty et al. analyze SenseCam lifelogs to reveal lifestyle patterns, supporting health studies through automated classification of behaviors [15]. While most studies focus on diaries as tools for conveying personal information, our study investigates how sharing outdoor experiences through diaries can enhance communication and foster connections between distant family members.

Diaries can offer receivers information through various approaches and contexts for different purposes. However, we have found that previous research primarily focuses on using "diary-sharing" to help others understand or observe information about the sharer's situation, activities, thoughts, etc. Limited research utilizes the diary's characteristic of recording detailed information to facilitate interaction and communication between the sharer and the receiver, especially stakeholders like distant families, which motivated us to conduct this study to explore the effectiveness of how outdoor experience sharing can support distant family communication.

3 METHODOLOGY

To answer our research questions and understand how sharing outdoor experiences through diaries facilitates distant family connection, we employed the diary study methodology to deepen our knowledge on distant family members communications and interactions. A diary study is a research tool for collecting qualitative information, requiring participants to record their thoughts, experiences, and activities over a designated period [5, 32, 58]. Researchers then collect insights on user motivation, behavior, and habits through analyzing the diary entries, identifying pain points, and determining the most common usage scenarios and edge cases from user experiences. In computer science, diary studies tend to focus on the use of technology, such as web sites, social media, mobile device apps, interactive games, and wearable devices. Diary studies have been applied across multiple domains within human-computer interaction, encompassing investigations into how technology affects interpersonal relationships [23, 24, 73] and the utilization of technology in outdoor environments [18, 61, 62, 71]. In this section, we will delve into diary study core steps [17], encompassing the Preparation stage (section 3.1), Diary keeping stage (section 3.2), Group Discussion stage (section 3.3), and Data Analysis stage (section 3.4). We will elaborate on the process of each stage and augment our explanation with the key design elements within each phase, including the format design of the diary records, the selection of participants, and how to effectively analyze the collected diary entries. The research was conducted under an IRB-approved protocol.

3.1 Preparation Stage

To assist our participants' experiences in outdoor activity sharing and family communication, we selected an application called DailyBean (Figure 1). DailyBean is a digital diary and mood-tracking app that allows users to document their daily experiences using simple visual and textual inputs. Its features include mood logging through emoji-like "beans," free-text entries, weather, and companion tagging, and optional image attachments. Participants could visualize their mood trends over time, customize categories, and easily generate shareable diary screenshots.

Participants were instructed to use DailyBean twice per week during the three-week study, following three main tasks: (1) record their outdoor experience after visiting nature locations, using various recording features on DailyBean; (2) share the recorded context with a distant family member via the sharing feature on DailyBean; and (3) reflect on the sharing experience by completing a structured diary entry template provided by the research team.

We chose DailyBean instead of other tools such as Marco Polo, SMS, or simply recording voice or video messages for two main reasons. First, from the participants' perspective, one common barrier in family communication is uncertainty about what to share. Participants often reported not knowing how to initiate meaningful conversations or find relatable topics. The design of DailyBean offers lightweight but diverse input options (e.g., mood, activity, notes), which helps participants explore and express more aspects of their daily experiences, thus generating richer material for conversation. Second, from the researchers' perspective, DailyBean offers broader functionalities for participants, including emotion tracking and multimodal input templates, which helped structure participants' reflections on their outdoor experiences. DailyBean's features support consistent recording practices while enabling participants to self-author emotional and contextual content. Which then helped them reflect on the structured diary entry templates submitted to the researchers. This allowed us to indirectly gain insight into their interaction contexts, supporting a more comprehensive understanding of diary-sharing as a communication medium.

The duration of the diary study spanned three weeks, a choice that aligns with the recommended period found in the majority of the existing literature on diary studies, which ranges from two weeks to two months [11, 26, 65]. This decision ensured an adequate timeframe for observing and analyzing the user experience and its evolution. A total of 22 participants took part in the study, ranging in age from 19 to 31 (mean age = 23, 14 female & 8 male). Participants were computer science students, either in the undergraduate (n=14) or graduate (n=8) program. All participants have interests in outdoor exploration and are keen on visiting the nearby public parks or trails. Prior to the study, most participants maintained moderate communication frequency with their distant family members, reporting a frequency between once a week and once every two weeks, primarily via messaging apps or phone calls. The chosen sharing partners were individuals they personally identified as emotionally close and with whom they already maintained a relatively frequent communication pattern, such as parents, siblings, or grandparents. Despite this moderate frequency, all participants announced that they do face certain challenges and barriers during family communications, such as being unsure of the sharing topics. Thus, they were passionate about improving their family communication quality and connection and volunteered for this study.

3.2 Diary Keeping Stage

In the three-week diary study, the research team provided a catalog of 15 different outdoor natural scenes, encompassing lakes, nature parks, botanical gardens, and local trails. Participants were suggested to select at least two unvisited locations each week. However, we recognize their right

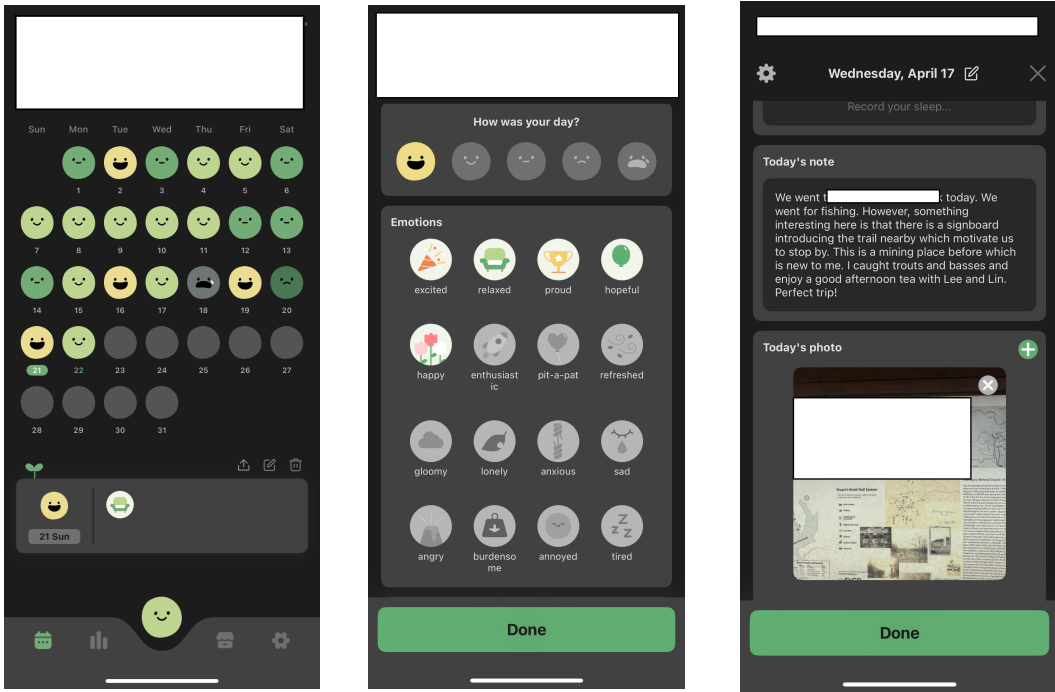


Fig. 1. Overview of diary entry features in DailyBean. (Left) the diary overview page, summarizing the user's entries. (Middle) the mood and emotion selection page for recording emotional states. (Right) the input options for adding text and images to individual diary entries.

to choose other places that were not listed based on their interests. Upon completing their explorations, participants were asked to document their experiences using the DailyBean application. Subsequently, they were asked to share their digital journals with distant family members and engage in meaningful interactions based on these shared reflections.

Following this engaged family communications session, the research team provided participants with a well-designed, structured diary recording template, incorporating guiding prompts to facilitate reflection on their experiences and thoughts. This template encompassed three key areas. (1) To capture insights into users' overall experience with the software, participants were asked to rate the DailyBean's logging features, encompassing emoji input, sentiment input, text input, photo input, and its sharing functionality using a 7-point Likert scale, accompanied by detailed user experience feedback. (e.g., Using a 7-point Likert Scale, rate the level of satisfaction of the features you used on DailyBean when recording. Please tell us why) (2) Participants were encouraged to recall and document notable elements or interactions within selected contexts, such as natural scenery, social interactions, special events, etc., to understand better the user's focal points within natural outdoor environments. At the same time, we asked participants to record three or more elements in each session. (e.g., What elements or events did you record? Why did you choose these elements?) (3) To examine how diary-sharing influenced family connection, participants were asked to describe the interaction they had with their family members, including discussion topics and personal reflections. (e.g., Please describe the experience you shared with your distant family member. Why did you talk about these topics?) The idea for this template is to help research

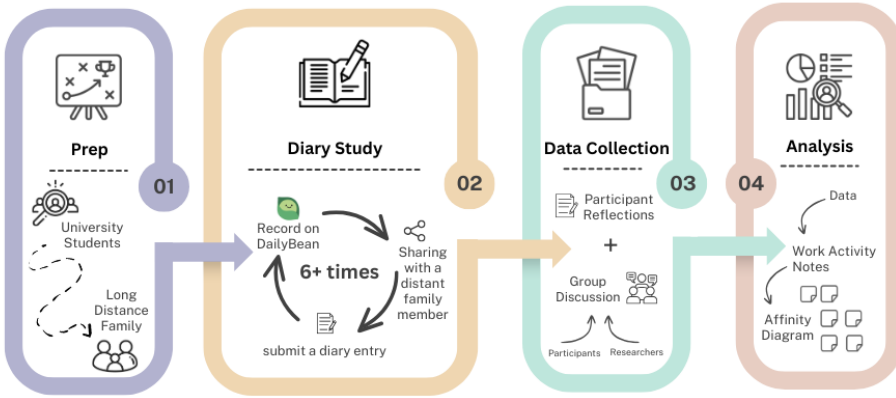


Fig. 2. An illustration of our study process. We conducted our study in four stages: (1) Preparation Stage: Participant recruitment and recording media selection (2) Diary Keeping Stage: Step1- Participants visited and recorded outdoor experiences on DailyBean. Step 2- By the end of each week, participants shared the recorded context and experiences with their family members. Step 3- Participants completed a weekly diary entry reflecting their interaction experiences. (3) Group Discussion Stage (4) Data Analysis Stage: WAAD activity

teams better understand how participants interpreted their outdoor experiences, what content they prioritized when sharing with family members, and how these sharing moments shaped their emotional connection and communication patterns. All participants completed at least six diary entries over the course of the three-week study period.

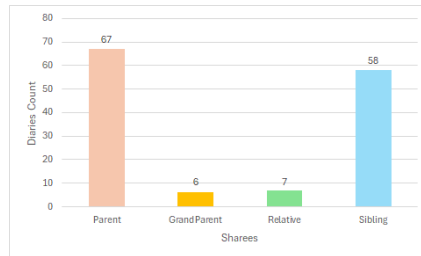


Fig. 3. Study participant demographics. Diaries shared with parents accounted for 48.6% ($n=67$), with grandparents 4.3% ($n=6$), with relatives 5% ($n=7$), and with siblings 42% ($n=58$).

3.3 Group Discussion Stage

After completing the three-week study, the research team collected all diary entry data. With a total of 138 diary entries, 57,347 total words and an average of 416 words per diary entry. Among the diary shares, 48.6% ($n=67$) were sent to parent, 4.3% ($n=6$) to grandparents, 5.0% ($n=7$) to relatives, and 42.0% ($n=58$) to siblings (Figure 3). Upon collecting the entries, the research team thoroughly read all diary entries to gain a preliminary understanding of common topics, points of discussion, and areas of controversy.

To further explore these insights, the research team organized a group discussion session [27, 53]. All participants joined this event. Prior to the session, the research team obtained informed consent from all participants to anonymously record the group discussion insights. Two researchers were responsible for producing detailed written documentation. During the focus group discussion session, participants elaborated on and supplemented the content of their diaries while also sharing and exchanging personal views and ideas, further revealing the commonalities of the study. Researchers encouraged participants to discuss more controversial areas and express their genuine opinions actively. This facilitated a deeper understanding of the underlying factors that led to debates and helped researchers gain insights into the unique needs of different groups, thereby bringing valuable perspectives to the study. The focus group discussion lasted one hour, during which the participants expressed and recorded their opinions and insights.

3.4 Data Analysis Stage

Upon completing all the aforementioned steps, the research team conducted an in-depth analysis of the data collected from diary entries and focus group discussions. We employed the Work Activity Affinity Diagram (WAAD) methodology to categorize the data. This analytical technique has been widely applied and validated in previous diary study literature [14, 16, 33]. From the participants' diary entries and group discussions, we filtered out 337 activity notes, which were derived from two primary data sources: (1) the diary entries that participants submitted after each outdoor sharing session, and (2) written notes recorded by two researchers during the group discussion session. During the WAAD activity, the first, second, third, fourth, fifth, and eighth authors participated in the analysis. We categorized the activity notes based on user feedback and themes, providing detailed classifications to help us observe from different perspectives how diary-sharing affects the sharing process between participants and their distant family members, including the interactive mechanisms, user needs, and outcomes (Figure 4).

4 FINDINGS

Our analysis reveals that diary-sharing fosters meaningful connections through interactive mechanisms and the content shared within the diaries. Drawing on findings from participants' diary entries (DE) and the follow-up group discussion (GD), we identify how these two data sources jointly illuminate the role of diary-sharing in distant family communication. Our findings include: Interactive mechanisms promote relationship maintenance strategies by keeping distant family members engaged (section 4.1). Specific diary elements serve as conversation prompts, fostering empathy and deeper emotional reflection (section 4.2). Participants adopted communication routines (section 4.3) and selective sharing habits (section 4.4) to manage emotional comfort and privacy, further shaping how diary-sharing fit into their daily lives. Together, these mechanisms and contents enhance communication quality, bridging physical distances with emotional closeness.

4.1 Mechanisms to Support Family Connection with Diary-Sharing

To address the RQ1, we analyzed and identified three five main mechanisms through the WAAD activity that significantly influence how the process of diary-sharing can foster connection: (1) creating new conversation topics, (2) sharing personal memories or reviewing shared memories, (3) shared interest and (4) moment, (5) joint activity, and (6) future plan.

4.1.1 Create New Conversation Topics. In diary-sharing, participants effectively used recorded experiences as prompts to initiate new conversation topics. Among these, two opportunities help create new conversation topics: social factors and environmental elements. Social factors, such as who the diary is intended for, influence what participants choose to record and share during

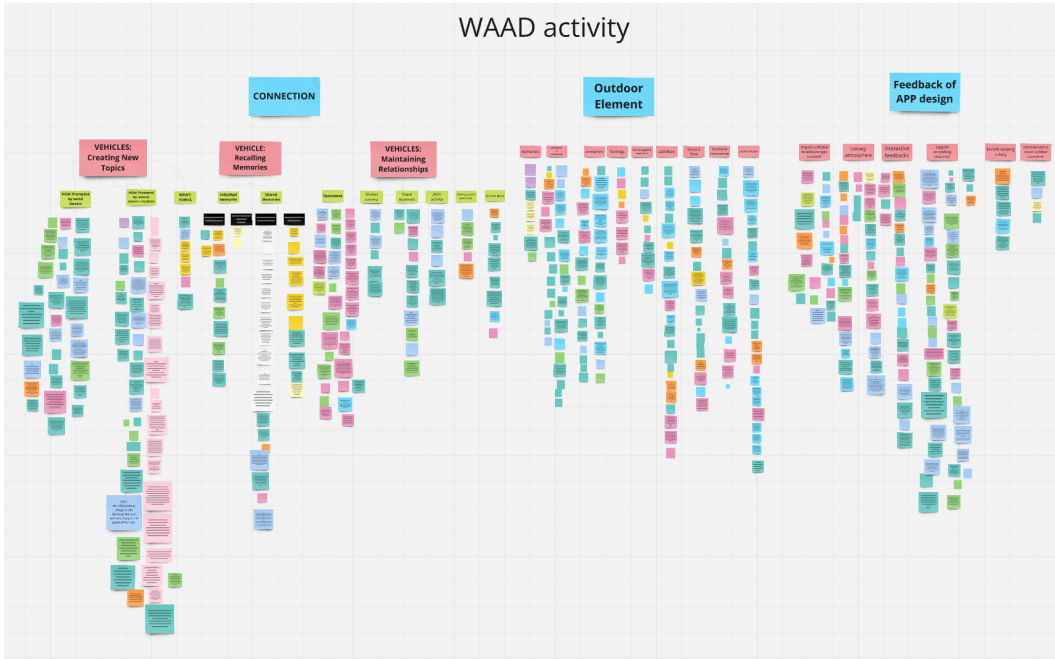


Fig. 4. Work-activity affinity diagramming (WAAD) to support our thematic analysis of diary data. Participants' diaries were broken down into multiple work activity notes (WANs). These WANs were categorized into three main groups of issues: (1) Connections: Relationship maintenance strategies used during the sharing process, (2) Outdoor Element: Outdoor elements recorded by users, and (3) Feedback of App design: User experiences related to the functionality of DailyBean.

outdoor activities. Encounters with elements of mutual or personal interest motivate participants to record details using icons, images, text, or emojis, which often lead to extended interactions around the topic.

[GD] "I would then relate it to a certain memory, experience, or interest that partner, and I shared. This was a really good way to kick start the conversation as family always appreciates the things you have in common, even if it's something really small." (U10)

Social factors also include the mental distance from distant family members. Due to the limitations of physical distance, engaging in conversation and enhancing feelings of intimacy is not a simple task. Feeling homesick or emotionally distant, participants used text input and feeling icons to express thoughts and foster deeper exchanges.

[DE] "As I was walking through the X Forest, I knew that I wanted to share this experience with my grandmother as it reminded me of her." (U3)

Besides social factors, environmental elements can serve as a catalyst for more communication. When they go outdoors, apart from commonly recorded elements like scenery, they mentioned that the format and flexibility of the diary allow them to document many additional observations in different ways, such as information about local landscape, stories with friends, history and culture written on signboards. These contents enable them to explore new topics in conversations with distant family members, adding a sense of novelty to the otherwise repetitive greetings. Comparing

with other mediums, the difference is participants noted that the format and structured design support them to better record details of their experience and thoughts.

[DE] "Writing about what I learned in my post prompted us two to talk more about the building and its history. Also, I was able to observe and record the flora and fauna more accurately and that helped drive my conversation with them." (U4)

GD] "When going through the trails, hikes, and nature, there were a lot of pieces of history. The key to prompting our conversation was I would describe my experience at each location recorded in my diary in chronological order to my mom, so whenever pieces of history came up, I described them as I stumbled upon them. If there were signs, then I read them and recited what I recorded to my mother." (U8)

4.1.2 Recall Precious Memories. Diary-sharing activities also played a key role in enhancing relationships by prompting the recall of personal and shared memories. We categorize memories into two types: personal memories and shared memories. Personal memories can be inspired by outdoor elements and were shared unilaterally during diary-sharing. For example, when sharing about a distinctive landscape or activity, participants are reminded of places they have visited in the past or similar activities they have participated in. These memories help extend conversations. Participants also felt closer as they learned previously unknown stories and gained a better understanding of one another.

[DE] "She mentioned how the trees reminded her of the place she grew up in as a child in X's countryside. From her stories, I realized I know very little about my mother. I am also grateful for the opportunity to hear her share her past experiences. This allows me to understand my family from more perspectives." (U20)

Unlike personal memories, shared memories more often bring the feeling of togetherness to both parties in the conversation. Shared memories often evoke a sense of nostalgia and emotional closeness. Outdoor landscapes or activities in the diary commonly triggered these shared memories, evoking a range of emotions and reinforcing emotional bonds. Memories can be evoked during both the recording and the diary's sharing. A participant's outdoor experience may trigger specific memories, prompting them to actively record stories involving distant family members. Recording the experience on DailyBean doesn't require participants to finish recording immediately. Instead, they are able to reminisce and elaborate in detail. Mentioning shared memories during sharing helped immerse family members in the conversation. These reflective exchanges often unfolded unexpectedly, as participants moved from sharing new experiences to reliving past moments together:

[GD] "My conversation with my father took an unexpected turn from the initial discussion about the X Forest. Instead, we found ourselves reminiscing about past family camping trips and the many lessons learned from those adventures." (U9)

[DE] "We recall the time we went hiking when I was little and how my dad shared with me his hiking experience and tips... I feel connected again since we don't have such kind of talk for a long time." (U18)

4.1.3 Shared Moments and Interests. Diary-sharing enables Sharers to create meaningful connections by documenting moments that resonate with distant family members. When recorded context aligns with personal experiences or shared interests, they foster deeper emotional engagement, making both parties feel seen and connected. Participants often tailored their recorded context to reflect mutual interests with pictures and descriptions, knowing that these shared topics would

promote meaningful conversations. Diaries about nature walks or seasonal changes often evoked emotional reflections that enhanced emotional closeness.

[DE] *"Sharing the serene winter day at the pond brought us closer, creating a shared experience that transcended the physical distance between us." (U11)*

[DE] *"My sister and I are both extremely connected with nature, and we find peace being in a quiet forest." (U4)*

Sharing content related to common interests also ensured sustained interaction. For example, participants highlighted that discussing hobbies or topics familiar to both parties, such as plants or historical sites, sparked long conversations that kept them engaged.

[GD] *"With my parents, I was able to discuss some of the history of the locations I visited, like the X Park and the history near X Pond. Sometimes, there were things I did not know, so my partner and I would research information together and talk about it over the phone." (U9)*

Participants noted that aligning recorded context with the sharees' interests made conversations feel more natural and thoughtful. This approach deepened emotional bonds by creating asynchronous yet intimate interactions. These shared topics helped participants feel emotionally connected, even across long distances.

[GD] *"My mother loves plants and studied them, so I would mention the plants I would see on my nature walk, and then we would discuss them after I shared my post" (U19)*

However, while the recording format on DailyBean allowed for thoughtful sharing, some participants noted limitations in interactivity that affected the feeling of being heard.

[GD] *"She enjoyed my post but wished that she was able to reply to the DailyBean post directly, instead of as an image on Snapchat. Because she wanted to do that, I feel that it provided a slight disconnect." (U13)*

4.1.4 Joint Activity. Diary-sharing also inspired joint activities, turning shared stories into opportunities for collaboration. Participants reflected that these activities often emerged naturally from shared topics of interest, turning simple conversations into collaborative efforts.

[GD] *"In my diary, I talked about the scary experience of driving back on a mountain road. We looked up the driving route together, and my dad taught me some tips for planning routes, which were really helpful!" (U20)*

In addition to starting collaborative projects, diary-sharing encouraged active participation from distant family members. When conversations involved hobbies or interests, this engagement often led to joint exploration and shared research or planning.

[DE] *"We both love watching autumn leaves. I shared that I only saw fallen leaves on this trip, so my mom and I looked up popular spots and the best times to see autumn foliage. We also enjoyed browsing through other people's photos shared online!" (U21)*

These joint activities helped transform one-way diary-sharing into two-way interaction, fostering mutual involvement and deeper emotional engagement. Even remotely, these collaborations created a shared purpose that enhanced emotional connection.

4.1.5 Future Plan. In addition to fostering current connections, diary-sharing also motivates participants to envision and co-plan future experiences, supporting long-term relational engagement. Planning future activities not only strengthened their emotional ties but also helped them connect past shared experiences with upcoming goals.

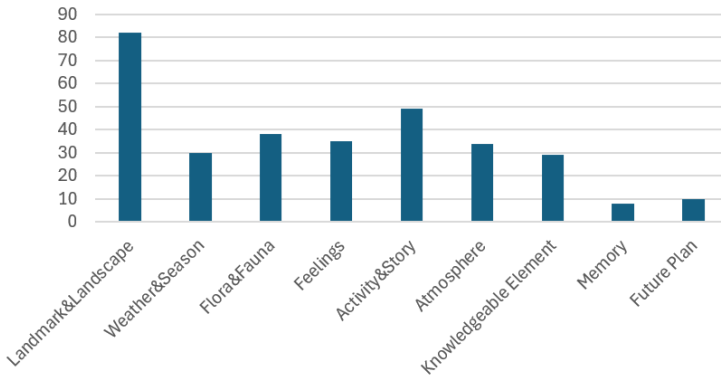


Fig. 5. Counts of Outdoor Elements Recorded in Diaries. "Atmosphere" refers to a comprehensive description of the surrounding environment, reflecting one's mood.

[DE] "After I shared, my parents mentioned that they would like to plan a similar trip and hope I can join them when I come home." (U20)

These future-oriented conversations created excitement and anticipation, helping participants stay emotionally invested in each other's lives. Planning future activities also allowed distant family members to bridge temporal and physical gaps, reinforcing their commitment to the relationship.

[DE] "I agreed with my partner about planning a picnic because I really enjoyed the small picnic I had." (U2)

Future planning not only provided opportunities for shared experiences but also ensured that the relationship remained dynamic and forward-looking, promoting emotional closeness over time.

4.2 Diary Contents to Support Distant Family Connection

To address RQ2, we collected the frequency of the diary content and classified the prompts in contents that triggered relationship maintenance strategies. The outdoor elements captured in shared diaries reveal insights into how participants engage in conversations with emotional reflection and relational depth. As shown in Figure 5, certain outdoor elements appear more frequently in diary entries, reflecting participants' preferences for recording experiences that are easy to share and initiate conversations. These elements serve different roles, including initiating conversations, fostering empathy and emotional reflection, and inspiring joint activities and future planning. Importantly, many elements function in overlapping ways, simultaneously driving both surface-level interaction and deeper emotional engagement. This section examines the frequency and multi-functionality of recorded elements, providing examples from participants' feedback to illustrate their impact on conversations.

4.2.1 Elements for Initiating Conversations. Among the most frequently recorded diary elements, landmarks or landscapes (82 mentions), activities or stories (49), and weather or seasonal changes (30) emerged as natural prompts to initiate conversations with distant family members. Their familiarity and intuitive nature made them ideal for everyday sharing. For instance, some conversations began with landscape observations, such as:

[DE] "Our conversation was driven by the comforting presence of green spaces throughout the year." (U22)

These familiar elements helped participants maintain ongoing communication across distance, often offering a comfortable way to reconnect or check in on daily routines. Outdoor stories often acted as casual conversation starters, especially when they involved familiar themes or shared hobbies. These examples illustrate how surface-level elements in the environment could lead to warm, recurring interactions among distant family members.

[DE] "Our conversation was influenced by a shared love for outdoor activities and the unique perspective that winter offers on familiar landscapes." (U17)

4.2.2 Elements Fostering Emotional Engagement. While initially used to spark conversation, these elements also became conduits for emotional expression and reflection when recording on DailyBean. Weather and season (30 mentions) or atmosphere (43 mentions) often evoke personal reflections and shared memories, encouraging empathic communication.

[GD] "When I share the atmosphere and feelings I've recorded, I can sense that my dad indirectly uses these diary topics to address my emotions and state, showing greater care for how I feel." (U20)

Participants noted that conversations often started with descriptions of the environment but gradually shifted toward emotionally reflective exchanges. This natural evolution from description to emotional exchange shows how diary-sharing supports empathy without the pressure of direct emotional confrontation. The difference is that more thoughts, stories, and details are recorded, which helps participants communicate their feelings more comfortably and meaningfully.

[GD] "During my conversation about the park visit, the topic unexpectedly shifted towards the significance of playgrounds in our youth. My distant partner and I shared fond memories of endless afternoons spent on swings and slides." (U2)

4.2.3 Elements Supporting Collaborative Engagement. Elements such as flora, fauna (38 mentions), and local knowledge (29 mentions) uniquely encouraged joint activities and future planning. These observations often aligned with participants' hobbies, creating opportunities for collaborative exploration with distant family members.

[DE] "When I shared that I saw someone camping and making a campfire, my brother suggested we check out the camping regulations for this state park. We discovered lots of interesting facts and even started planning to go on a similar camping trip next time." (U10)

Conversations about plants, animals, or cultural history were noted as details that can be easily skipped when sharing experiences through other mediums. However, such context can lead to collaborative efforts, such as researching or planning future activities. These activities foster a sense of partnership and mutual engagement, reinforcing emotional bonds through shared interests. These co-constructed interactions helped maintain dynamic engagement and strengthened emotional connection through shared plans and discoveries. However, in the absence of a process for revisiting or sharing details, it becomes difficult to cultivate such extended forms of communication.

[GD] "When we talk about the fish in this pond, my dad actively looks up ecological information and shares it with me. Our conversation naturally extends to fishing topics and activities, making me feel like we have many more shared interests." (U3)

4.2.4 Elements with Multidimensional Impact. Activities and Stories (49 mentions) and Flora and Fauna (38 mentions) demonstrate multi-dimensional impact by playing multiple roles in the conversation. A story about a hike or wildlife encounter, for example, can initiate a conversation while also inspiring emotional reflection or joint activities.

[DE] "We discussed all of the ways they care for the plants. Specifically, the trimming of some plants from winter. It was something that we would like to see later on when all of the flowers are in good bloom." (U8)

These multi-functional elements reflect the richness of diary-sharing activities, where a single entry can fulfill multiple communication goals—initiating interaction, fostering empathy, and encouraging collaboration. This overlapping functionality ensures that participants can engage in layered conversations that evolve naturally over time.

4.3 Diary-Sharing Routines to Support Sustained Family Connection

In addition to the content of the diaries themselves, participants adopted communication strategies to fit diary-sharing into their everyday routines. These strategies helped sustain meaningful contact despite time zone differences, scheduling conflicts, and varied family communication habits. Two primary patterns emerged: asynchronous sharing followed by delayed engagement, and synchronous discussion anchored around recorded context. Asynchronous diary-sharing was the most common strategy. Participants typically shared diary entries soon after creating them, often before any planned conversation, so that family members could read them at their convenience and reference them during future calls. This method enabled emotional continuity without the pressure of immediate response, allowing conversations to feel more natural and less performative.

[GD] "I definitely think I have a closer relationship with my mom after the diary study, as it gave me time to set aside for calling her and updating her on my life here at college. We now keep in touch more often, which is a good habit to keep even in the future as life goes on." (U22)

In contrast, other participants preferred synchronous engagement. They would save diary entries to review during live calls with their family, turning diary-sharing into a co-present activity. This approach supported mutual reflection and helped participants create space for more interactive, emotionally rich exchanges.

[GD] "Whenever I record a diary, I share it right away because it constantly reminds me to stay in touch with my mom. I'm more willing to schedule some time to chat with her over the weekend." (U15)

These strategies transformed diary-sharing into a rhythmic and relational practice. Whether used asynchronously to build context or synchronously to foster dialogue, participants reported that routine-based sharing helped them sustain deeper connections. Integrating diary-sharing into weekly habits allowed for communication that felt both purposeful and emotionally resonant—even beyond the duration of the study.

4.4 Privacy and Disclosure Habits to Support Comfortable Family Sharing

We found participants' sharing practices were strongly influenced by their perceptions of privacy and their habitual family communication dynamics. Many appreciated that diary-sharing felt more intimate and less performative than social media since recorded contexts were shared one-to-one or within a small circle of trusted relatives. This more controlled sharing context lowered social pressure and helped participants express themselves more freely. Over time, the private and low-stakes nature of the medium made it easier for some to move from surface-level updates to more

emotionally meaningful reflections. However, not all participants experienced this shift equally. Some hesitated to disclose personal topics due to family dynamics or a history of limited communication. Rather than abandoning the practice, they selectively filtered their content, choosing safe or observational details over emotionally vulnerable subjects. For others, diary-sharing served as a re-entry point into communication. Although not accustomed to regular updates, the diary gave them a tangible structure to initiate gentle, low-friction interaction and rebuild connection gradually.

[GD] *"To be honest, in the beginning, I felt a little bit embarrassed, but after sharing, my father told me he's glad to learn not only my academic career but also more details about daily events and mood." (U20)*

[GD] *"My mom really dislikes me riding a motorcycle, and she gets very worried whenever she sees me doing it. To avoid arguments, I choose not to share my riding experiences with her and instead have to find other topics to talk about." (U16)*

[GD] *"I don't communicate with my family much on a daily basis, so it's hard to suddenly have a lot to talk about through everyday sharing. I think some indirect guidance is needed to gradually improve the way I communicate with my family." (U1)*

Participants noted that the structure and ritual of diary-sharing helped them move beyond small talk. By having a consistent format and reason to share, they were able to discover new and meaningful conversation topics that might not have emerged in spontaneous dialogue.

5 DISCUSSION

Digital diary-sharing activities provide a valuable way to foster emotional closeness and maintain meaningful communication among distant family members. This discussion examines how diary narratives enhance contextual richness and emotional presence (section 5.1). We then discuss the frequent communication contexts and rhythms that emerge from diary-sharing (section 5.2). Additionally, we discuss how family communication patterns shape sharing strategies and emotional disclosure. (section 5.3). Finally, we analyze design implications to improve user engagement and emotional resonance across distances (section 5.4).

5.1 Exploring the Value of Digital Diary-Sharing

This subsection examines how diary-sharing enriches distant family communication. Drawing on awareness system theory [40], we discuss how diary-based communication supports key design dimensions: contextual richness, input modality, user control, and notification rhythm. We highlight how the combination of narrative structure and emotional timing in diary-sharing addresses gaps in existing computer-mediated communication (CMC) tools, especially in supporting empathic and sustained connection.

5.1.1 Enhancing Contextual Richness through Diary Narratives. Our findings reveal that diary-sharing enables distant family members to convey experiences with emotional and situational context, allowing recipients to understand not only what happened but also how it felt and why it mattered. Participants frequently documented emotional states, reflections, and environmental details, offering a richer and more personal view of their daily lives. This narrative-driven sharing style fostered empathy and made family members feel genuinely seen and understood. For example, serene landscapes or personal memories were often paired with reflections on emotional well-being or nostalgia. These elements functioned as emotional cues far beyond what is typically available in ambient or symbolic awareness systems.

Previous awareness systems primarily focused on implicit or ambient cues to maintain a sense of connection. These systems prioritize low-disruption and background awareness but often lack the contextual richness needed for emotionally resonant communication. As Markopoulos et al. explain in their foundational work on awareness systems, while ambient signals are effective for signaling activity or presence, they are typically insufficient for conveying emotional states or the nuance behind an action [40]. Similarly, the Digital Family Portrait system provided visual summaries of elders' activities but was limited to behavioral cues without narrative explanation, making it harder to engage in meaningful follow-up conversations [44].

Compared to these systems, diary-based sharing approach shifts from ambient presence to narrative presence, emphasizing explicit, user-generated content that supports empathic understanding. These findings suggest that diary-sharing tools can expand the communicative potential of awareness systems by embedding emotional and contextual depth into asynchronous updates.

5.1.2 Supporting Expression and User Control in Sharing. Our findings show that diary-sharing enabled participants to express emotions and personal reflections in a deliberate and user-controlled manner. Participants actively curated their entries by selecting what to include, how to frame their message, and when to share it. This intentional authorship allowed users to shape the emotional tone and narrative content of their communication. Many participants reported that the diary format provided a safe space to manage sensitive disclosures, particularly in situations where emotional openness was not a routine part of family interaction. The ability to reflect before sharing helped them build confidence in expressing thoughts they might not typically convey during real-time conversations.

These patterns resonate with principles from Communication Privacy Management (CPM) theory, which emphasizes that individuals regulate their emotional boundaries through selective, context-sensitive disclosure [51]. Diary-sharing offered a semi-private and self-paced medium that allowed participants to gradually open up, test emotional boundaries, and manage the timing and depth of what they shared. The asynchronous nature of the diary helped reduce the pressure of immediate feedback, giving participants more control over how they engaged in emotionally meaningful communication.

Prior research on awareness systems has often focused on implicit input modalities that require minimal user effort. For instance, the Digital Family Portrait conveyed daily activity summaries through ambient visualizations placed in family homes [44], and the ASTRA system enabled lightweight updates using sensor-based status indicators [60]. Although these systems aimed to foster connection through ambient awareness, they offered limited flexibility for users to frame or contextualize their communication. The lack of narrative control occasionally led to misunderstandings or emotional disconnect, as users could not articulate how they felt or why specific updates mattered.

In contrast, diary-sharing supported explicit, narrative-driven expression that allowed users to guide their emotional presence on their own terms. Participants were not only aware of what they shared but also why they shared it, often adapting content based on their relationship dynamics and anticipated emotional impact. These findings reinforce that communication tools designed to support emotionally resonant long-distance interaction should enable users to structure their disclosures intentionally rather than relying solely on automatic or ambient input.

5.1.3 Managing Notification Rhythm and Reciprocal Engagement through Diaries. Our findings show that diary-sharing allowed participants to communicate with emotional intention while preserving flexibility in timing and visibility. Instead of relying on real-time interaction, participants often shared diary entries asynchronously, giving recipients time to absorb the message before engaging in a response. This form of delayed dialogue helped reduce the emotional pressure of synchronous communication and fostered a more reflective rhythm of interaction. For example,

several participants described how weekday diary entries created conversational openings for deeper exchanges during weekend calls.

This dual-stage rhythm, sharing asynchronously and responding synchronously, enabled participants to maintain emotional contact without overwhelming their daily routines. Participants valued that diary entries could be read at any time and revisited, offering continuity and emotional presence without requiring immediate availability. This rhythm helped users balance autonomy and connection, especially in family contexts where time zones, emotional readiness, and privacy considerations varied.

Prior awareness systems emphasized either passive ambient awareness or real-time responsiveness. For instance, the Digital Family Portrait and ASTRA conveyed family members' activities or presence through visual indicators or short updates [44, 60]. While these systems supported awareness and low-effort communication, they lacked mechanisms for reciprocal expression or timing control. Users could observe activity but had limited ways to engage in turn-taking or emotionally reflective exchange. In contrast, diary-sharing enabled participants to control not only what was communicated but also when and how interactions unfolded. This aligns with Markopoulos et al.'s assertion that effective awareness systems should support both awareness and engagement by balancing notification level, visibility, and interactivity [40]. Our findings suggest that asynchronous diary-sharing offers a promising model for this balance, supporting both ambient presence and emotionally meaningful reciprocity.

By embedding emotional cues in reflective narratives and allowing participants to pace their engagement, diary-sharing systems bridge the gap between ambient awareness and dialogic connection. This communication rhythm, anchored in both emotional continuity and user-controlled timing, provides a design direction for future systems that aim to support nuanced family communication across distances.

5.2 Exploring the Frequent Communication Contexts of Diary-Sharing

Our findings reveal that diary contents in outdoor experience sharing serve multiple communication functions beyond mere documentation. Participants frequently used environmental elements such as landscapes, weather, local knowledge, or flora and fauna as prompts to initiate conversations, express emotions, and evoke personal or shared memories. These reflective prompts helped transform routine diary updates into emotionally resonant interactions. Rather than relying on generic life summaries, participants embedded meaning into their entries, which enabled family members to engage through empathy, co-reflection, and sustained dialogue. Participants reported that such content felt natural and open-ended, offering multiple pathways into more profound exchanges. These prompts emerged organically through reflection rather than being imposed externally, giving them personal relevance and emotional accessibility.

Prior research in computer-mediated communication (CMC) has focused on prompts as reminders or task-based triggers. For example, studies on awareness cues such as photos or audio snippets have demonstrated their value in sustaining ambient connectedness within families [45]. These designs primarily support presence awareness and are insufficient for fostering deeper emotional conversations. Similarly, prior work has highlighted how brief message formats and rapid exchanges may suppress emotionally nuanced or reflective engagement, especially in familial contexts [47]. On the other hand, the design of eKISS, a mobile photo blog for mediating parent-child intimacy, provides an illustrative case. The system allowed children to share photos and short captions with their parents, offering glimpses into their everyday lives [13]. While this asynchronous interaction supported emotional visibility and parental awareness, the study found that children often struggled to remain engaged due to the one-way nature of communication and the lack of immediate feedback. Initially, children had difficulty identifying meaningful content to share, which led to limited use

until prompting strategies, such as SMS reminders and suggested themes, were introduced later in the study. Our findings align with the emphasized opportunities for mutual interaction and guided sharing can play a crucial role in sustaining emotional connection in mediated communication systems.

The diary-sharing practice observed in our study supported a more dialogic and reflective form of prompting. We found that the format encouraged participants to produce emotionally rich entries grounded in lived experiences. These contexts frequently served as prompts for extended conversations, mutual memory recall, or collaborative planning. Participants described how their diary content was shaped not only by what they experienced, but also by how they hoped to connect with their distant family members, making the prompts both personally meaningful and socially purposeful. These prompts function simultaneously as memory cues, emotional expressions, and conversational openings. They emerge from users' own narratives and intentions, enabling deeper and more sustained interpersonal engagement. These findings point to the untapped potential of the diary format as a prompt-rich medium in family communication systems.

5.3 Exploring the Role of Family Communication Patterns in Diary-Sharing

Our findings indicate that the relational outcomes of diary-sharing can be shaped by participants' family communication patterns. Some participants found it easy to use diary-sharing to deepen conversations, while others struggled with what to share, how much to disclose, or whether their family members would be receptive. These differences were often rooted in how comfortable participants were with emotional expression or topic exploration in their family context. For instance, some participants actively avoided topics that could trigger concern or conflict, while others used the diary format to gradually introduce emotional content over time. These strategies reflect how diary-sharing is not only a matter of technology use but also a negotiation with communication patterns and relational habits.

This finding aligns with the Revised Family Communication Patterns (RFCP) theory [19], which identifies two key dimensions that shape family interaction: conversation orientation and conformity orientation. Families high in conversation orientation tend to encourage open dialogue and emotional sharing, while families high in conformity orientation emphasize harmony and obedience, often discouraging dissent or personal disclosure [35]. Prior research suggests that communication systems work differently across these family types. For example, Schrodtt et al. found that individuals from high-conformity families are more likely to avoid topics that could challenge existing values or cause worry, and instead rely on indirect or instrumental modes of communication [63]. Our participants mirrored these behaviors in their diary practices: some used neutral, observational content (e.g., landscapes, weather) as emotionally safe entries, while others expressed a need for gradual engagement, especially when emotional openness was not typical in their family dynamics.

Prior CMC design research has also addressed the need to adapt to diverse family communication patterns. For instance, Prasetya and Hidayat examined how computer-mediated communication (CMC) affects family dynamics among deaf teenagers, finding that CMC usage aligned with varying levels of conversation and conformity orientation, thereby influencing the emotional climate within families [57]. Similarly, Plaisant et al. designed a shared family calendar system that supported multigenerational access and symmetrical participation, emphasizing the need to adapt interface design to accommodate different levels of technological familiarity and engagement styles among family members [52]. These studies demonstrate that system designs benefit from aligning with the emotional rhythm and expectations of different family types. Despite this, many CMC systems still assume a one-size-fits-all approach, which may limit their effectiveness across culturally or relationally diverse families.

Our findings reinforce the importance of family communication patterns as a mediatorial factor in diary sharing and future CMC design. Although DailyBean was not customized for different family types, participants adapted their sharing strategies based on relational expectations and emotional comfort. This suggests the value of context-sensitive scaffolding, such as customizable prompts or selective disclosure options, that align with diverse communication patterns. By accounting for family communication orientation, designers can move beyond generic, one-size-fits-all tools and support more relationally and culturally attuned CMC experiences. This highlights a promising direction for future personalization grounded in family dynamics rather than just individual preferences.

5.4 Exploring Design Implications for Diary-Sharing

Our findings suggest that diary sharing enables sustained emotional communication when supported by suitable structures. Future diary tools for sharing should go beyond passive awareness or unstructured messaging to better support family connections. We outline four design implications that draw from user practices.

5.4.1 Enhancing Emotional Continuity through Replayable Narrative Entries. Diary-based communication tools should support replayable recorded context that can evolve over time through added reflections, comments, or emotional context. Rather than treating diary posts as static updates, designers could allow users or their family members to annotate or revisit entries with layered content, such as follow-up thoughts, voice messages, or reactions. This design enriches emotional presence and creates a persistent shared memory space that supports continuity and co-reflection. By enabling entries to function as evolving narrative anchors, systems can move beyond ephemeral messaging and foster sustained connection, especially in asynchronous or emotionally reserved family settings. Such features contribute to the “contextual richness” and “communication rhythm” dimensions of awareness system theory [40], offering users greater flexibility to shape and revisit meaningful experiences on their own terms.

5.4.2 Supporting Adaptive Expression through Scaffolded Prompt Design. To accommodate diverse family communication patterns, diary-sharing systems should offer prompts with adjustable emotional depth. Instead of using generic or static cues, designers can implement tiered prompts, ranging from observational (e.g., “What did you see today?”) to reflective (e.g., “What did this moment remind you of?”) to relational (e.g., “Is there someone you wanted to share this with?”). This scaffolded design allows users to choose prompts that match their comfort level and relationship context, lowering the barrier to emotional expression while avoiding forced vulnerability. It also supports gradual emotional openness, particularly in families with high conformity orientation or low conversation orientation. By incorporating adaptable prompt depth, systems can align better with users’ readiness and cultural norms, strengthening empathic communication and aligning with the expressive control and emotional reciprocity dimensions of awareness system design.

5.4.3 Managing Communication Rhythm through Flexible Sharing. Diary-sharing demonstrates the value of decoupling expression from immediate interaction. Unlike synchronous tools that require real-time availability, participants appreciated being able to share at their own pace and follow up with synchronous conversations later. This flexible rhythm, sharing asynchronously, reflecting independently, and reconnecting later, reduced emotional pressure and better fit with busy or mismatched schedules. To support this rhythm, future CMC tools should consider mechanisms that allow users to coordinate communication across different temporal modes. For instance, systems might include features for scheduling follow-up interactions based on a received entry, setting soft response reminders, or labeling diary posts as conversation-starters. Such designs can help bridge

asynchronous reflection with synchronous engagement, creating a natural rhythm for deeper, sustained communication.

5.4.4 Preserving Intimacy through Default Private Sharing. To support emotionally meaningful communication, diary-based communication tools should be designed with default privacy and intimacy in mind. Rather than offering broad sharing options or requiring users to configure visibility settings, the system should emphasize one-to-one or highly restricted sharing with only the most trusted family members. This design approach lowers social pressure and helps users feel more comfortable expressing personal thoughts without worrying about broader audience perception or unintended exposure. By maintaining a consistently private channel, users can develop sharing habits rooted in emotional security and routine, enabling them to gradually disclose more meaningful content over time. Such a design aligns with the communication needs of families where emotional openness may be limited, fostering a safe and sustained space for gradual reconnection and relationship maintenance.

6 LIMITATIONS AND FUTURE WORK

First, the feedback collected in this study primarily came from the child's role in family relationships. Therefore, the perspectives we obtain are relatively limited and may not fully reflect the dynamics of intergenerational interaction. We adopted this approach because most of the participants we recruited were in the younger age group. Future research could include members from different generations and family roles to conduct in-depth investigations, to obtain more comprehensive perspectives from various family roles, as well as the interactive needs and usage habits of diary-based sharing or related CMC design. Furthermore, although our findings indicate that family communication patterns influence diary sharing behaviors, this study did not perform a classification or analysis of each participant's self-identified family communication pattern. This study mainly investigated participants' practices and experiences of sharing outdoor experiences with family members using digital diaries, rather than classifying family communication patterns. In the future, researchers could incorporate standardized questionnaires or conduct systematic comparisons between family communication patterns to more directly examine how these patterns shape experience-sharing behaviors. At the same time, since this study used an existing diary-keeping application instead of a custom-built prototype, to ensure that participants' privacy is not violated and the technical burden is not increased, we did not directly collect detailed usage and sharing records from the application, such as content recording methods, the time of recording and sharing, or interactions during the sharing process. This choice allowed us to observe the natural behavior of the participants in real-world contexts and reduced the operational burden, but it limited the design space we could explore and our ability to quantitatively or temporally analyze usage behavior. Therefore, the research results are based solely on the self-reported experiences of the participants. Future research could consider designing a custom prototype and prompts to explore conditions such as the balance between willingness to share and privacy, or, with appropriate consent, collect detailed usage data to enable more comprehensive mixed-methods analysis and deepen understanding of how different recording modes and features affect experience sharing. Additionally, longitudinal studies can help assess the impact of sustained diary-sharing on long-term relationship quality.

7 CONCLUSION

In this study, we explored how diary-sharing activities facilitate everyday communication among distant family members and how digital diaries, as sharing tools, leverage outdoor experiences to broaden and extend the content of interactions through reflection. Our findings reveal that diaries

not only serve as effective conversational prompts that foster intimate emotional exchanges but also enhance emotional engagement and promote joint activities. We categorized the recorded outdoor elements based on their role as prompts for relationship maintenance. Furthermore, we analyzed the potential advantages of diary-sharing activities as a form of CMC design. Lastly, we examined how family communication patterns and trust influence diary-sharing behaviors and offered design recommendations for integrating diary-sharing into everyday communication routines. This study provides new perspectives for the fields of CSCW and HCI, emphasizing the importance of diary-based sharing activities in strengthening emotional connections and fostering intimacy among distant family members.

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