

Understanding Simultaneous Technology Use in Collocated One-on-One Social Interactions

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Abstract

Collocated interactions, which are central to emotional connection and social well-being, are increasingly mediated by technology. However, simultaneous technology use in one-on-one settings remains an underexplored area, despite the pervasive role of technology in everyday life. We address this gap by exploring the nuanced effects of simultaneous technology use by both interaction partners during one-on-one social interactions. We employ the critical incident technique resulting in 31 distinct stories from 26 participants. Our findings reveal varying patterns of simultaneous technology use—shared, parallel, and imbalanced—distinguishing between instrumental and ritualistic purpose of use. Whereas positive effects of simultaneous use include enhancing conversations and deepening engagement, participants report negative consequences such as disrupting conversations and hindering meaningful exchange. Based on our findings on simultaneous technology use, we propose design implications to design future technologies that enhance rather than detract from positive social experiences.

CCS Concepts

• **Human-centered computing** → **Human computer interaction (HCI)**.

Keywords

human computer interaction, social interaction, co-located interaction, smartphone use, relationship, critical incident technique, qualitative survey

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1 Introduction

The ubiquity of smartphones and other technologies has profoundly transformed the way people interact. These changes extend beyond the digital realm, significantly influencing everyday life and social relationships. While smartphones enable real-time connectivity and help individuals to maintain and strengthen social ties, they have

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also introduced complexities in preserving the quality of offline interactions.

One-on-one social interactions are crucial for one's well-being, since people enjoy spending time with close ties, such as romantic partners, friends and family or pets most. Yet, these social interactions are also most prone to disruptions of technology use. Recent research has predominantly focused on the adverse effects of technology during interpersonal exchanges, emphasizing behaviors like *phubbing*—when an individual shifts their attention away from a conversation to focus on their smartphone [20]. Such behaviors often leave the ignored partner feeling neglected, diminishing the quality of the interaction [11].

Despite this, there remains a gap in exploring how technology influences one-on-one interactions beyond negative behaviors like *phubbing*. Specifically, understanding how simultaneous technology use by both participants affects the interaction is crucial to revealing the full spectrum of its impact.

Recent HCI literature already sparked discussions to (re)focus more on human-human interactions in social settings [19, 28, 31] exploring concepts to rather support physical interactions through technology [29]. We extend this research with a specific focus on understanding instances where both participants actively engage with technology. We conducted an online survey and applied the Critical Incident Technique guided by the following research questions:

RQ1 *What patterns of simultaneous technology use emerge in one-on-one collocated interactions?*

RQ2 *How do patterns of simultaneous technology use influence the social interaction dynamics?*

In line with aspired research to create joyful social interactions [24], we found that most one-on-one interactions occur in intimate settings, such as at home or outdoors, with close ties and during meals or leisure activities. While smartphones were the most commonly used technology in these scenarios, our findings suggest a key distinction between shared, parallel, and imbalanced technology use and a further distinction between task-oriented and leisure activities. Notably, shared technology use was perceived as enriching to the conversation, presenting an opportunity for technology to meaningfully contribute to and enhance the interaction. Our results further highlight that parallel use creates opportunities for shared experiences, which can help initiate or sustain conversations. However, imbalanced use tends to be viewed negatively, and even positive technology experiences are sometimes associated with regret for hindering meaningful interactions and a desire to either avoid technology or use it together.

This study aims to lay the groundwork for designing technologies that foster more fulfilling social interactions by supporting

shared experiences and meaningful connections in collocated settings. We inform the design of future technologies that enhance, rather than detract from, meaningful social interactions.

2 Related Work

2.1 Understanding the Role of Technology in Social Interactions

Social interactions with close ties have been associated with positive mental health outcomes and enhanced social well-being [21]. However, phubbing, the phenomenon when individuals prioritize their smartphone over their conversational partners [20], increasingly disrupts face-to-face social interactions. Related HCI literature similarly introduced technofeference, referring to disruptions of interpersonal relationships or time spent together through all kinds of digital devices [26].

This holds particularly true with close relationship ties [3], be it romantic relationships [8, 27, 32, 41], friendships [1, 38], parent-child bonds [12, 43, 44] and even between supervisors and employees [33, 45]. Phubbing can signal a lack of engagement in the relationship [39], leading to lower perceived conversation quality [2, 11], decreased trust [22, 33], and reduced satisfaction in the relationship [11, 38, 41].

Several motivations drive technology use during social interactions. Technology itself can trigger notifications that prompt immediate responses, often interrupting conversations [5]. Besides, users themselves may seek mental breaks, a distraction from boredom, or a more stimulating alternative when the conversation is not engaging enough [5, 15]. Some may use their phone due to fear of missing out (FOMO) or a desire for entertainment and relaxation [5, 15, 37]. Conversely, some technofeference behaviors are linked to contribute to an ongoing social interaction, such as looking up information to enhance a meaningful conversation [5, 24]. Interruptive phone use, be it proactively picking up the phone or reactive as a response to a notification, lowers perceptions of attentiveness and politeness [25]. In contrast, integrative phone use, which seamlessly fits into the conversation, neither harmed nor improved the interaction.

2.2 Designing for Co-Located Interactions

HCI researchers started exploring concepts that redirect the focus from human-technology interaction back to human-human interaction, examining how technology interferes with social interactions and sparking discussions on ways to reshape and design technology for the physical world [19, 28, 31].

A lot of technological artifacts exist mostly for group settings or public spaces, for example, to contribute to facilitating nonverbal cues such as eye contact between strangers in public spaces, leveraging some of the beneficial qualities of collocated interactions [6], or in an educational setting where technology can help to foster collaboration [4]. For one-on-one relationships, Isbister et al. [18] explored games as a means to enhance collocated interaction and connection by improvisation and fostering synchronized movements when dancing. However, research on one-on-one collocated settings focusing on enhancing relationship quality or meaningful interactions in general is quite scarce.

To be able to build future technology that positively contributes to collocated interactions, we need to better understand the crucial parts of designing for an enjoyable and meaningful experience. Thus, Liu et al. [24] investigated the context of co-located interactions to create technology accordingly. In line with previous literature, they found that people value spending time in person with strong social ties most. Further, they found in-person interactions allow for nonverbal cues and allow for spontaneity, which is beneficial because it promotes authenticity, undivided attention, and the physicality of both the interaction partners and their environment. Similarly, Hassenzahl et al. [16] proposes Experience Design as an approach to prioritize the design for pleasurable and meaningful moments. The author identified the human needs for autonomy, competence, relatedness, popularity, stimulation, and security as potential sources of positivity and meaning. Everyday activities, they argue, hold the potential to shape experiences and create meaning. Experience design emphasizes considering and understanding users' emotional responses to a system, and what value they derive from it. This highlights the potential of technology to support intimate and close-knit relationships and allow for meaningful interactions.

2.3 Research Gap

As constant connectivity has become the norm, and increasingly integrated into social settings, we aim to understand the role of technology in collocated intimate settings, which is currently underexplored in the listed related work. The related design approaches for collocated interactions fail to fully explore technology's potential to specifically target face-to-face settings to strengthen social ties and create meaningful experiences. By examining both the burdens and benefits of technology in such social contexts, we can better inform the design of tools and systems that enhance, rather than detract from, the quality of personal interactions.

3 Methodology

We conducted an online survey to collect stories on technology use in collocated social interactions using the Critical Incident Technique (CIT) [14]. The CIT method is a qualitative method to collect specific, key events – “incidents” – in order to understand key behavioral processes and experiences. As such, it is effective for generating a detailed and comprehensive understanding of specific content domains [42]. We thus asked participants for their most recent stories of technology use within a social interaction, employing different perspectives: 1) as the person using technology during the social interaction, 2) as the counterpart of a person using technology, 3) being in a situation where both parties of the social interaction were using technology, or 4) where they observed a social situation in which other people were using technology during an interaction in the wild. We displayed the picture shown in [Figure 1](#) during the survey to display to participants potential scenarios, along with the following task description: “The image displays a variety of exemplary situations in which people use technology during a social interaction. What is the most recent one-on-one social interaction that comes to your mind where at least one person used technology? (Choose the most applicable option)” Yet, we report only the subset of stories in which both

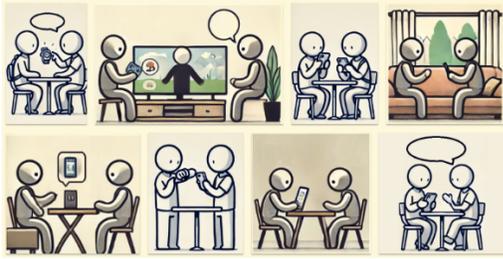


Figure 1: Survey Example of potential incidents for participants to report.

interaction partners used technology simultaneously. We recruited participants from the university mailing list.

3.1 Procedure

After giving their consent to participate voluntarily in this study and stating their demographic information, participants were presented the figure as shown in [Figure 1](#), which explained the technology use incidents in social interactions we were after for. Participants could share up to seven such incidents. For each incident, participants described the scenario in a free text field in detail and stated context information through single- and multiple-choice answers, reporting on the person using technology, social relationship, the location, the devices involved, and the emotional experience of the interaction on a grid visualization based on the circumplex model of affect [35]. Participants described an ideal behavior and situation, and finally how they envisioned technology for reaching that ideal state. At the end of the survey, participants were asked about their previous experiences with technology use in social interactions.

3.2 Dataset

We included all scenarios from the subset of data that are complete and report the specified scenario, which resulted in a total of 38 participants sharing 55 incidents. We had to exclude 24, as they were not answering the given task accordingly, e.g., describing digital interaction scenarios without face-to-face components or providing an insufficient amount of data to be analyzed.

4 Results

For this work, we report on a subset of the data collection reporting on collocated one-on-one interactions, leaving us with 31 stories describing scenarios that entailed both partners in the interaction using technology, examining the dynamics and potential implications of dual technology use.

4.1 Participants

We are reporting on the remaining $N=26$ participants. Our participants were between 19 and 61 years old ($M=27.24$, $SD=8.64$). 12 participants identified as female, 16 as male, and 1 as non-binary/third gender. Participants shared on average 1.17 incidents (1 participant shared 3 stories, 3 participants shared 2 stories, 25 participants shared 1 story with us).

4.2 Qualitative Findings on Simultaneous Technology Use

To analyze the open text fields using thematic analysis [7], two researchers did double coding, where they independently coded all scenarios and later compared their codes, discussed discrepancies, and refined the coding scheme. Through discussion, they collaboratively merged their codes, ultimately identifying six overarching themes. The first three themes distinguish between usage patterns, with (1) **SHARED USE**, where people shared one device (2) **PARALLEL USE**, where people each used at least one device on their own, and (3) **IMBALANCED USE**, where one person breaks a shared or parallel use. Further, we could distinguish between the (4) **PURPOSE OF USE**, between task-solving and leisure activity. Participants also shared their (5) **DESIRABLE SITUATIONS** describing an ideal scenario of those situations.

4.2.1 Shared Technology Use. Participants reported 6 incidents where both partners of the interaction were engaging in technology use on one joint device to enrich the ongoing interaction. Instances describe scenarios of engaging with the same device together, enriching their interaction through entertainment, such as gaming together or watching an online quiz: *[...] we were both talking about our guesses, too, while doing manicure and pedicure together. It felt nice to be thinking about a question together [...]* (P4) Participants further reported instances, where technology use was bringing new content and conversation topics to the conversation, in the form of memes, or social media content.

Moreover, participants reported more task-oriented technology use, sharing one device to jointly perform a task, where participants reported on online shopping activities or repairing a device together.

4.2.2 Parallel Technology Use. A common phenomenon described in 17 scenarios is parallel technology use, where both partners engage with individual devices. In these instances, people in the interaction used at least one device each. Reported instances of parallel use were perceived as positive when integrated into the conversation and enriching the interaction. Some participants stated that the technology opened up the consumption for the other person to join. In some instances technology was initiating or accompanying conversations: *[We were talking about computer games.] Doing this we both used the laptops to look some of those up to show and tell.* (P9) Also, when technology was used to plan offline activities together, such as "looking up possible dates for a mutual travel" (P6) or checking the weather for an activity, it contributed to a positive real-world experience. In some instances, technology use allowed the participants take time off, and the smartphone serves as a mental break that allows people to enjoy some time without communicating: *It was during a break from work, me and my colleague were on our phones to take some time off, I didn't mind the absence of conversation as I needed a break.* (P3) However, parallel use can also negatively impact the conversation when resulting in regretful use. A lot of scenarios described situations of waiting, e.g. for food or relaxation, on the couch or in bed, where the parallel engagement made participants regret to not spend the time together more meaningful: *Scrolling through social media. Feeling frustrated that we didn't do anything outside or simply communicate.* (P1) These

scenarios often describe situations of mindless phone use to kill time in unenjoyable interactions, as they were interfered with by technology: *We were having lunch, but each of us kept on looking at their phones. It made me feel awkward and uncomfortable, because there was no need for us to be meeting physically but checking our phones every time.* (P7)

4.2.3 Imbalanced Technology Use. In total 8 incidents are characterized by an imbalanced technology use in collocated one-on-one interactions, describing scenarios where one or both people engaged with an additional device, disrupting shared or parallel use and disengage with their counterpart.

Participants reported on situations where a task, such as quickly checking the phone for an important email or family matter, disrupted shared technology use, such as watching TV. While these instances, where it was only very shortly checking the phone, asking for permission, or explaining the purpose of the technology use was acceptable for participants, longer disruptions were negatively impacting the interaction. Instances of technology use where disruptions are purposeless, such as consuming content while the other person is left hanging are undesirable for participants and negatively impact the interaction. For instance, scenarios where a shared technology consumption is disrupted by driving off to individual technology use instead and shifting the attention away from the joint activity: *My girlfriend and I were watching a movie together on the TV. At one point we both started using our phones, she was in social media and I was playing a mobile game. We ended up distracted and missed almost the whole film.* (P10) Some instances of imbalanced use however shifted and turned into shared technology use.

4.2.4 Purpose of Use. Moreover, participants reported more *instrumental* technology use, to perform a task or work towards a goal together. Typical tasks involve shopping, planning an event, or simply collaborating with the help of technology: *We were planning to go shopping (groceries) and both took out our smartphones to add things to our shopping list and to look at our recipe collection.* (P4) Participants described also a lot of stories in a home setting, more specifically while sharing a meal or relaxing, on the couch or in bed. All these incidents describes technology use as a *ritualistic activity*. *I was resting with my significant other in bed and both of us were on our phones scrolling through tiktok in silence.* (P5)

4.2.5 Desirable Situations. In situations of regret, and sometimes even in situations where they enjoyed spending time on a shared or parallel device, most participants wished they had not used the technology at all, or wished that they had postponed the use of technology and focused on the physical interaction. *Ideally, I could have checked my emails at a later time.* (P3) In some instances, participants wished the technology to serve as an enabler for interactions, to open up the technology to be able to have *"some sort of environment with shared information"* (P6), use a device collaboratively, or even *"working together via shared screens"* (P12). While parallel use has the potential to enrich conversations, it can be even more beneficial when turning into shared use, as participant 5 described the ideal scenario as: *[...] both of us cuddled together swiping through videos on a single device and both of us laughing at the clips.* (P5)

4.2.6 Distinct Scenarios of Simultaneous Use. We identified three different simultaneous technology usage patterns, *shared*, *parallel*, and *imbalanced* use. The way the interactions were perceived, was also influenced by the purpose. Thus, both aspects can be used to describe distinct scenarios, as depicted in Table 1.

	Instrumental	Ritualistic
Shared use	shared task solving	shared digital content consumption
Parallel use	parallel task solving	parallel digital content consumption
Imbalanced use	disruption for task solving	disruption for digital content consumption

Table 1: Different kinds of simultaneous technology use within a one-on-one social interaction.

4.3 Context of Technology Use during Social Interactions

Participants reported their interaction partner to be their romantic partner (11), parents (6), sibling (3), close friend (8), friend (2), colleague (2), pet (1), or and others (3). 21 of the stories happened in a home setting, 6 in a restaurant, 2 at work or university, 4 outside (in a park, the streets, commuting, etc), and 1 in a store. Only 5 stories involved no smartphone as a device. These stories included a device with a screen bigger than the smartphone: notebooks (4), TV (3), and one game console attached to a TV. As such, 26% of the stories depicted a shared use of technology, 55% presented a parallel use, and the rest imbalanced use.

Valence indicates how pleasant or unpleasant a perceived affect or emotion is, ranging from positive (pleasant) to negative (unpleasant) [35]. This concept is often used to describe the emotional tone of experiences. Participants stated how the described interaction made them feel using an emotion grid. While 22 of the scenarios were perceived positively, as pleasant (12) or max pleasant (10), another 17 were perceived negatively, while 9 were perceived negatively, as unpleasant (8) or max unpleasant (1).

5 Discussion

In the following section, we answer our research questions *What patterns of dual technology use emerge in one-on-one collocated interactions, and how do these patterns influence the interaction dynamics?* We discuss the role of dual technology use within collocated one-on-one situations. A limitation of our study is the small sample size, which may affect the broader applicability of our results. Future research should further investigate dual technology use with larger, more varied populations. Despite this, we offer valuable first insights and propose design implications that can guide future work.

5.1 Patterns of Dual Technology Use and its' Dynamic in Collocated One-on-One Social Interactions

We identified three different simultaneous technology usage patterns. During shared use, people engage in one joint device, while parallel use implies that each interaction partner engages in their device next to each other. Imbalanced use is a situation, in which the number and engagement of devices is unevenly distributed. Most of the incidents described parallel smartphone use.

However, the role of technology is not only determined by the way it is used within a setting. In addition, our results suggest a distinction between the purpose of use, which can lean towards the *instrumental*, more task-solving activity, or towards the *ritualistic*, leisure-like activity, as the theory of uses and gratifications implies [34].

Our findings highlight different dynamics within social interactions. Some scenarios drew a picture of dedicated technology use as a form of entertainment, e.g. gaming together or watching movies or content on the internet together. In those cases, when contributing to a common activity, the scenarios were mostly positive. Other forms of use resulted from boredom or happened while waiting, e.g. for food. In a lot of these incidents, one or both parties used their individual devices, to kill time and scroll through social media. In such cases, even though reported to be an overall positive experience, people still wished to spend time more meaningfully, ideally without technology, or at least sharing it. Other scenarios, however, rather reported on technology as a disruption of meaningful conversations, leaving at least one partner in the interaction feeling rather frustrated. Especially our findings on the desired social interaction revealed that a lot of scenarios were accepted but still left an unfulfilling feeling with the participants. Similarly, some interactions, even though perceived more positively, still left participants regretful.

5.2 Design Implications for Collocated One-on-One Social Interactions

5.2.1 Shape technologies that enhance conversations and shared use. Our findings reveal that dual technology use was not perceived as negatively as initially anticipated. Unsurprisingly, the smartphone emerged as the most commonly used technology in these interactions [10, 26]. Sharing of devices is a desirable practice, yet smartphones often fail to facilitate shared use in an effective manner. This limitation indicates a potential opportunity for enhancing shared experiences through the development of technologies that support shared use, such as a shared mode or projection option, or at the very least, a collaboration mode that could enable users to engage in joint activities with greater ease.

Shared technology use offers several benefits, including enhancing relaxation, entertainment, and conversation between partners. It allows spending time together not only physically but also by focusing on joint activity, fostering deeper connections and intimacy [17], introducing new opportunities and challenges for technology to cater to the physical experience [13].

Our research highlights that shared technology use is particularly present in interactions with strong ties. While existing literature often focuses on technology's role in maintaining intimacy across

distances, such as for couples, family, or close ties who are physically separated [40], there is significant potential for technology to support and enhance collocated experiences as well. Enabling more effective shared use of technology could transform how people interact in the same physical space, making these interactions more meaningful and connected [16].

Although primarily reported positive experiences of shared use, there was a frequent sentiment that this time could have been used for more meaningful conversations. This suggests either that technology sometimes fall short of its potential to enhance the depth of these interactions [16] or that technology non-use remains the ultimate ideal. As such, these participants envisioned technology solutions that encourage non-use.

5.2.2 Reduce Technology Use in Social Interactions. Our findings indicate that imbalanced use of technology, particularly when it disrupts or diminishes the quality of interactions, was consistently perceived negatively. Participants expressed a strong preference for scenarios where technology was not involved. This was an expressed desire even for some scenarios of parallel or shared use, where technology fails to contribute positively to the interaction, sometimes even when interaction was perceived positively. This suggests that technology use can detract from the value of face-to-face interactions, prompting a desire to minimize or avoid such use in favor of more meaningful engagement.

The literature already explored interventions, that aim to limit technology use during social interactions. Some have proposed technological solutions aimed at reducing smartphone use during group activities, by alerting group members when someone is using their phone by monitoring movement and ambient light [9] manage phone use by locking phones together or through permission-based controls [23], or through a context-aware notification system that delays notifications when the user is engaged in social interactions [30]. Further, Reiter et al. [31] sparked discussions to design more for phubbing-aware technology for social settings, which means the automated detection of users shifting their attention away from an ongoing face-to-face interaction in favor of their smartphone. This can be beneficial for smart and context-adaptive technologies while the distinction from shared use is still an open challenge. Reflecting on social interactions helps foster awareness about their impact on social wellbeing [36]. Reflective practices and self-awareness regarding technology use could further enhance the quality of social interactions.

6 Conclusion

This work sheds light on the role and dynamics of simultaneous technology use in collocated one-on-one social interactions, as currently unexplored in HCI research. There are varying patterns of shared, parallel, and imbalanced technology use distinguishing between instrumental and ritualistic purpose of use. Whereas simultaneous use is beneficial when it contributes to the conversations and deepens engagement, it can be detrimental when disrupting conversations and hindering meaningful exchange. Users want to reduce their technology use during interactions to spend their time more meaningful, even for most of those interactions that are generally positive. We further found opportunities for technology to enrich conversations, when it proposes shared use and offers

collaboration. Based on our findings on simultaneous technology use, we propose design implications to design future technologies that emphasize creating socially beneficial experiences.

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