Focusing on Shared Experiences: Moving Beyond the Camera in Video Communication

Jed R. Brubaker[1,2], Gina Venolia[1], John C. Tang[1]

[1]Microsoft Research
One Microsoft Way
Redmond, WA 98008 USA
{ ginav | johntang } @microsoft.com

[2]Bren School of Information & Computer Sciences
University of California, Irvine
Irvine, CA 92697 USA
jed.brubaker@uci.edu

ABSTRACT

Even with the investment of significant resources, video communication in professional settings has not gained mass appeal. This contrasts with the consumer space where, despite limited resources and low quality solutions, services such as Skype have seen widespread adoption. In this paper, we explore the behavior and attitudes of individuals who actively use video communication in both their personal and professional lives. We highlight similarities and differences across these two domains, with particular focus on the interpersonal relationships, spaces, and activities that each domain supports and enables. We conclude by discussing how our study leads to a new perspective that focuses on the shared experiences enabled by video communication.

Author Keywords

video communication, video chat, video conference, shared experiences, personal communication, professional communication, mixed methods study

ACM Classification Keywords

H.4.3 Information Systems Applications: Communications Applications – Computer conferencing, teleconferencing, and videoconferencing.

TWO EXPERIENCES OF VIDEO COMMUNICATION

Adam[1], a young software engineer living on the West Coast of the U.S., admitted that he had only recently started "Skyping." *"My girlfriend is taking a two month sabbatical and teaching in Thailand,"* he explained, *"so we bought her one of the new iPod Touches with the front-facing camera. We knew we would need some way to communicate… [and] if we could video chat, that just seemed one step better… On some primitive level [video communication] feels more 'real.'"*

Adam readily acknowledged the challenges involved with a long-distance relationship, so it was surprising to learn that the two had only been dating for one month prior to her move to Thailand. Without the sense of connectedness he gets via Skype, he confessed, their relationship would have ended, or at least been put on hiatus.

At the office, Adam's scenario was quite different. He was collaborating with a partner-team in Vancouver at the time, including video-based meetings at least once a week. Here, however, Adam described the experience of video communication as *"surreal."* Between network latency and the inevitable office multi-tasking, his experience has been one of both figurative and literal "disconnects."

It would be hard to overstate the impact of video communication on how Adam conducts his life. Between meetings with remote teams and chats with his girlfriend in Thailand, video communication is integrally bound up with both his personal and professional relationships. However, depending on the context, Adam exhibits very different reactions to essentially the same video technology – differences that cannot be attributed to technology alone.

Despite investments in professional settings, video communication has not gained mass appeal [16]. When examining the personal domain, however, we see a strikingly different picture. Individuals, communicate in any way they can, enduring slow connections and frustrating software to get a glimpse of their loved ones. Even grandparents, not known to be early adopters, have mastered video chatting to connect with their grandchildren.

The technologist perspective holds that infrastructure is the primary barrier to mass adoption of video communication. While infrastructure certainly plays a role, when comparing personal and professional use, infrastructure alone cannot be held accountable. How else could one explain the lack of adoption in the resource-rich professional environment in contrast to the phenomenal growth of Skype in the self-administrated consumer space? Meanwhile, the recent surge of video tools launched in the consumer space prompts a reexamination of their suitability for actual user needs.

In this paper, we present a study of individuals who actively use video communication in both their personal and professional lives. While previous work has investigated the use of video communication in each of these domains separately, here we report on them together to understand the nuances in how individuals experience and use video communication and to expose assumptions embedded in current designs.

[1] All names are pseudonyms.

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Our findings show how a technology that is virtually the same, used in different contexts, results in striking differences in users' attitudes and practices. These findings support previous work [8] that demonstrates that video communication technologies are based on misunderstandings of work practices, rendering them inadequate for use in real professional environments, much less personal contexts. Based on our results, we demonstrate the potential of situating "shared experiences" at the center of the design process instead of focusing on the communication technology alone.

METHODS

We conducted semi-structured interviews with individuals who use video communication in both their personal and professional lives. We recruited 24 interview participants from a global enterprise in the computer software industry (16 male; ages 24-50, M=34.6). Participants were recruited using a short survey screener emailed to individuals randomly selected from the global address book that asked questions about usage and importance of video communication in both their personal and professional lives. Respondents indicating use in both domains during the last 30 days and its importance as at least 3 on a 5-point Likert scale were contacted for follow-up interviews. With two exceptions, interviewees were located throughout the United States (India (1); Russia (1)) but our participants represent a diverse set of countries of origin (USA (14), India (3), China (3), France, Russia, Germany, Singapore). 75% reported being in a relationship and 62% had children.

Interviews lasted between 45 and 90 minutes, and were conducted in person (5), over the phone (7), and via video chat (12). Interviews were semi-structured, and participants were encouraged to direct the conversation towards topics they found most salient. Topically, interviews covered adoption and use of video communication in personal and professional domains. Participants were encouraged to provide specific narrative examples throughout. Finally, participants were asked to summarize their thoughts about video communication, contrasting personal and professional use, and what they wished was possible with video communication that currently is not.

We performed a thematic analysis of the interviews [2] using grounded methodologies (notably the open coding and memoing practices as described in [5]). We first identified emergent labels and grouped them into preliminary themes such as "negotiating distance." A series of discussions involving all researchers were conducted throughout this process in order to review interview data and discuss initial codes and themes (collapsing and reframing as necessary). The primary author then produced a set of descriptive memos that outlined each theme relative to the interview data. Utilizing these memos, the three authors conducted a series of discussions in which we returned to the larger dataset in order to evaluate our themes, resulting in further clarification of the scope of each theme, their relationships to each other, and creation of the key insights.

Finally, we used a 3rd party recruiting service to deploy a survey to confirm interview findings on a population sample outside of the original company. Survey questions were 5-point Likert scales designed to determine agreement with the key insights from the qualitative data. Of the 314 survey respondents, 147 participants (46.8%) were selected for analysis based on the same participation criterion used for interviews. Respondents were predominantly based in the United States (81%). 74% of respondents were men and ages 36-45 represented the largest age block (42%). 74% were married or partnered and 67% were parents with an average of 2.2 children (SD=.94). Likert responses are reported below as the percent of respondents who *agreed* or *strongly agreed* with the statement.

RESULTS

Our study resulted in a set of five themes, each producing a series of key insights. We present each of these themes in turn, including examples from our interviews and results from our survey data, and highlight insights throughout.

Mediated Representations

Ashley was quick to explain the benefits of video communication: *"Oh! Body language just says so much!"* A single mother who works in client relations, Ashley frequently uses video at work for one-on-one calls, conferences, and online meetings. When relying on audio alone, she explained, it is hard to get *"the whole message."*

These benefits, however, do come with some overhead:

> *So, if I'm receiving a call from someone, I want to make a positive first impression, and doing that takes a little bit of effort on my part. I want to look professional… I want to appear as though I have all my ducks in a row. I don't want them to see me flipping through files and notebooks and trying to find whatever it was that we talked about a week ago, even if I have no idea, I don't want them to see that… So if it's a surprise call – maybe I can fake it if it's just a voice call, but if it's a video call that takes a little more effort.*

At home, many of these concerns fade away. For Ashley, video communication is first-and-foremost about *"grandma time."* In addition to catching up, video communication allows Ashley to share experiences such as her nephew's first steps and her daughter's new tricks (*e.g., "blowing kisses"*), important moments that she would otherwise be left to recount during a phone call. If anything, Ashley laments the limits of the video communication with her mother. *"She can't change diapers!"*

Overwhelmingly, participants described video communication as a profoundly "*intimate*" and "*immersive*" medium. Participants spoke of being able to "*see*" and talk in a way that is "*real*." And like Ashley, every participant

talked about how seeing a conversation partner over video provides unquantifiable additional information. Our survey data confirms this: participants find video communication more intimate than a phone call (Personal: 88%, Professional: 72%), but the majority disagrees or strongly disagrees that video communication is more intimate than in-person interactions (Personal: 70%, Professional: 57 %).

Interviewees described a tension between being self-conscious about their appearance and surroundings when using video communication and the benefits of seeing the appearance and surroundings of others. Previous work has indicated that self-consciousness may hinder the effectiveness of communication [3] and has explored solutions to reduce or eliminate this [6]. However, in our data, participants described *"getting over"* their self-consciousness and *"getting used"* to video's *"quirks."*

Some participants said they were less self-conscious in personal settings where they interacted with frequent contacts. Others claimed they saw no contextual difference, and focused on their comfort with the technology instead. For example, Anya, a 38 year old woman who works in human resources, explained that professional experiences had acclimated her to video, easing adoption in her personal life. In her words, getting comfortable with video takes *"practice"* and *"dedication."*

Insight: People experience less self-consciousness when using video communication as they become more accustomed to the medium.

Video communication is more challenging than either phone calls or in-person interactions, in part because of the ways in which video communication constrains physical behavior and exaggerates displays of attention and inattention. In person, we are very fluid about moving between tasks, and where and how we direct our focus. Video communication, however, makes these behaviors distinct and the focus of one's attention explicit.

The limited field of vision with webcams was particularly salient in individuals' personal lives, where much of the activity lies beyond the desk. Jason, for example, explained that when he walks away from the camera he is *"literally walking away from them, I look like I am leaving them",* where in collocated scenarios a partner could simply follow him. 72% of survey respondents confirmed that they would like to move around while using video in their personal life, with 48% indicating the same in their professional lives.

Work tasks are often more centralized to the desk and the monitor, and thus within the field of view provided by the camera, but this presents a set of problems around gaze and attention. Participants like Phil, a remote worker, described how video exaggerates their presence (*"They project me up on the wall… sort of a larger than life thing.")* while many like Anya talked being able to visibly see *"how your eyes are moving left to right",* a tell-tale sign of reading text or scanning the taskbar while switching between applications.

Previous work in HCI has discussed the problems presented by the distance between the camera and the display for more closely approximating face-to-face interactions [4] and maintaining focus on a shared task or activity [17]. However, this finding highlights issues of exposure when inattention is made more visible by the technology.

Insight: Video communication constrains physical behavior while exaggerating displays of attention and inattention.

Exaggerated displays of attention create some additional challenges for the professional environment. In Anya's words, *"Offices are such multi-tasking spaces."* Kathleen agreed, and admitted to discreetly working through her email during status meetings. *"Office-life requires some agility across a variety of mediums,"* she explained, "*I have to respond to quick IMs and emails that pop up."* On the whole, Kathleen claims she is less likely to multi-task while using video communication (*"When people see you, you are more attentive"*), but also expressed frustration at having to *"cheat"* during meetings.

Aware that their attention is visible, participants described actively performing for the camera, including Adam who described a meeting with a remote team:

> *I'm just looking at the screen… look down, look back at my laptop, make it look like I'm doing something [with exaggerated tone]* very important – *have a stern look on my face, but really, I'm just kind of checked out until we get to the next topic.*

When asked if he thought others could see through his guise, Adam was uncertain, but did claim that he can tell when others are not paying attention: *"Oh, yeah, that guy is totally on YouTube."*

Stories involving multi-tasking in personal settings were less common (although several participants did mention getting distracted by "*the internet*"). This may be the result of the kinds of interactions participants experience in their personal lives. Our participants described dedicating focused time for their personal calls, as well as situations in which partners were more tolerant of distractions.

Survey data on attention and multi-tasking confirm these stories, with respondents indicating slightly stronger agreement for professional settings. 46% responded that video communication makes it difficult for them to multi-task in their professional life (43% in personal), while 45% responded that they worry that others might be able to tell when they are not paying attention (37% personal).

Insight: Video communication presents difficulties for multi-tasking behavior in professional environments as it makes inattention highly visible.

Maintaining Connections at a Distance

Rick, a member of the consulting division of his corporation, described an intense travel schedule that has him constantly away from home. Video communication is essential to his life – for coordinating with the central office, *"goofing off"* with other road warriors from their respective hotels, and evening video calls to his wife and child. As important as these practices are, however, Rick repeatedly stated that his most profound experiences were with his in-laws living in Hong Kong. His family relocated to the East Coast of the United States several years ago, and while everyone agreed it was a good decision, he had felt some guilt about living away from family and relatives in Hong Kong.

"It was really profound to see them on Skype for the first time," Rick said smiling, *"We are so much closer to each other."* Spanning the Pacific, his wife and mother-in-law often play the piano for each other. The video connection even lets Rick's family check in on their cat that stayed back in Hong Kong.

Many interviewees discussed having early experiences with video communication with friends or colleagues, simply to "*try it out*." In a personal context, however, adoption of video communication was most often the result of relocation. Mahesh, for example, had experimented with video on MSN Messenger – *"just messing around"* – but it was not until his brother moved to Germany on a military assignment that he returned to video communication and suggested they give it a try. *"When it worked, it was great. It lets you have a 'real experience' with your family."*

The narratives of adoption at work, meanwhile, were more varied. While participants like Shrini spoke of adopting video communication for a specific purpose (in this case, an interview), others explained that their initial experiences were prompted by organizational dynamics such as joining a new team that was already using video communication or when starting a new project with remote collaborators.

It is clear in our data that communication over large, often international distances was one of the most common reasons that prompted people to adopt video communication. 51% of survey respondents said they adopted video communication as a result of them or someone they knew moving, and 53% indicated that their use increased following an intimate's relocation. These findings are in line with earlier research showing that individuals turn to other communication modalities following relocation [12].

Insight: Individuals typically choose to adopt video communication in their personal life as a result of relocations. Professional adoption is typically imposed as a result of work on projects with distant collaborators.

The potential challenges of distance can also be latent. Children, for example, provide a potent scenario in which individuals turn to video communication to include those at a distance. However, the desire to establish and maintain a relationship with a growing child can exacerbate the challenge felt by interpersonal distance. Kathleen described the increased importance of video communication following the birth of her niece back home in Germany:

> *Obviously if you live in the US and your family is abroad, you don't get to share all the moments, and it's almost starting from scratch every time you see that little one because she's already forgotten... So I just went home 4 weeks ago, and so my niece goes to day care… and people that are family can pick her up, and… I thought 'Well, what if I show up and she doesn't even recognize me?'… Then I literally showed up, and it was normal to her. Like she doesn't understand where I live… so for her it was completely normal.*

As we see in Kathleen's explanation, the addition of a child can bring about a new sensitivity to already existing distance. *"Without video",* she summarized, *"I would be the aunt that no one knows."*

Anxieties around maintaining social presence in others' lives were echoed in the professional setting as well. This was particularly true for participants who telecommute or work with remote colleagues. Sean, for example, maintains an office at work even though he telecommutes from his home in a different state. He has gone to extensive lengths to develop a custom telepresence solution that integrates the two environments. Video conferencing into his office, Sean justified the multiple HD cameras, various audio equipment, and conspicuously large flat-screen TV displaying his face, rather bluntly:

> *I know lots of remote people who are forgotten and then move on… Video conferencing is about presence, it is about being 'here.' [points to the company office]*

Evident in these stories are new experiences of, and relationships with, distance. Video communication is supporting and, in many cases, enabling new socio-spatial configurations in both personal and professional settings.

Our survey data was particularly telling on this front. When asked if, as a result of video communication, respondents were more open to a variety of interpersonal scenarios, 66% said that they were more open to traveling for work, and 65% for living apart from a close friend. Roughly half of participants indicated they were more open to a close friend (53%) or close family member (57%) relocating for work. And while respondents predominantly disagreed when asked if video communication would make them more open to living apart from a spouse or romantic partner (48%), a small subset stood apart from the majority, indicating strong agreement (22%). Professionally, respondents agreed that they are more open to working with remote teams (78%), remote individuals (83%), and working remotely from their team (72%) and manager (65%).

While individuals evaluate the impact of video communication on distance differently, the stories we heard indicate that it can mitigate the painful aspects of distance. Indeed, survey participants indicated that video communication helps them cope with distance in their personal (74%) and professional (55%) lives. These findings also support research efforts to bridge distance [e.g., 8, 14, 16], but renew questions about the ultimate impact of these communication technologies in terms of how people organize their social lives. Although contrary to evidence [11], it was clear that at least some of our participants felt that video communication altogether eliminates the negative impacts of distance. Kathleen, for example, claimed that *"location is not an issue anymore."*

Insight: With video communication, people are more willing to accommodate distance in their personal and professional relationships.

Group Identity & Shared Values

*"*W*e took a picture of my daughter, you know, next to the computer screen,"* Amanda explained. The photo in question was taken in a hospital recovery room, shortly after the birth of her child. In it, a smiling family gathers around while an exhausted Amanda holds her newborn daughter to a laptop to introduce her to her great-grandmother.

"She never got to physically meet my daughter," Amanda lamented, explaining that her grandmother passed away several months later.

> *[But] she got to meet her over video, she really got a sense that it was two-way communication and she could see her one and only great-grandchild. That picture ended up getting framed and shown at her funeral… That was such a powerful moment for our family.*

When sharing their stories, participants described video communication's role in every aspect of life, from the mundane to the momentous. In a personal context, participants described individuals with whom they used video communication regularly, as well as significant events, such as the birth of Amanda's daughter, in which special effort was made to include others.

While not carrying the same emotional significance, in a professional setting, product launches are also important social events during which special effort is made to include remote individuals. Matt, for example, described including the Shanghai-based members of his product team:

> *We have a little bit of a party… Usually the head of a division will stand up and talk, and we'll kind of cheer and pop champagne and whatever… They'll do some sort of… like a rubber-stamping of things, like… 'Are all the bugs fixed?' And somebody will say [making stamping gesture] 'Yes they are!', 'Have we finished all the work?', 'Yes…!' And that's kind of a traditional thing we do, and so they [the remote team] feel like they are a part of that…*

But teleconferencing into a social event is far from ideal:

> *[Remote participation has] mostly been passive, mostly because of the difficulty with the microphones… It looks to them and us like just a bunch of people milling around and talking, right?*

Despite the technical challenges, Matt explained that *"[they] appreciate it when we set up those kind of video conferences so they feel like they were there when the big celebration happened... to feel a part of the team, not as some sort of forgotten stepchild or something."*

The use of video to include distant relatives and colleagues highlights the symbolic power of video to demonstrate group inclusion [15]. Examining whom individuals choose to include for major or significant events highlights a byproduct of video communication use: including remote group members demonstrates their membership in the group. Moreover, it is striking that in our data, the experience of being included via video communication can sometimes be more important than the ability to communicate itself.

Insight: Individuals utilize video communication to include remote people in group activities and events to demonstrate their membership in the group.

Bringing a group together over video communication, however, is far from effortless [1]. The social and technology overheads can be burdensome, or downright prohibitive. When participants expressed their frustration with technological barriers, we asked them to explain the benefits of video communication, and what "made it worth it." Speaking about his personal life, Adam explained that while technical barriers exist, they are eclipsed by the experience of seeing the other person:

> *I think it's just back to being able to see a person's expressions and kind of look them in the eye, and get the whole experience of how they are reacting and how they are behaving when they are communicating things to you.*

While seeing close friends and family can certainly be its own reward, statements such as Adam's remind us that the act of video communicating reinforces the relationship between those involved:

> *And so I think that's important to the relationship – that we're both kind of both trying to do these things to make it a little bit easier… I think the fact that we're both making the effort is very important.*

Stories like Adam's contrast with those from a professional setting. While the ability to see each other remains powerful, and individuals do think making an effort is

important, individuals were quick to enumerate frustrations – particularly with the overheads of initiating a call.

In our data, the overriding value for personal video communication was the ability to connect, what Shrini called *"the personal connection."* Conversely, the professional domain is largely evaluated in terms of productivity. Our data suggest that one reason video has not seen much success in professional settings is that one-on-one video calls are often seen as inefficient and intrusive. In a professional context, Adam summarized, video is only used to *"solve important problems involving multiple people where you need a high degree of focus."*

These results extend Ames *et al.*'s [1] finding that video communication reinforces family identity, and indicate that video communication as an effort – one that includes negotiating bad connections, changing software clients, and even downgrading to audio-only calls – reinforces the relationship between, and shared identity of, the participants. Moreover, where Ames *et al.* demonstrated how video communication was used to promote family values, we see the same effect in professional settings and suggest that video spreads any group's values, but is also evaluated in relationship to them.

Insight: Video communication use demonstrates and is often evaluated in relationship to shared group values.

Establishing New Relationships with Place

"So my daughter lived in Italy for a year," Karen started, "*[and] could not make the trip [home]...*" Karen comes from a large family that is scattered around the world, *"but we try to make a point of getting together at Thanksgiving time."*

> *In the house was probably twenty of us that were at my sister's house in Reno at the same time that she's [her daughter] online, you know, in Italy. And so it was just, you know, we walked around with the laptop, so she was getting the feel of going into the kitchen, to the living room… We had her setup in a corner for a while where her cousins could sit down and have an individual conversation and meet her roommates. And at one point, the phone rings, and we have a niece – her cousin – that lives in Hawaii. So, not on video, but we literally had the phone on speaker next to the computer that's Skyping, with people in the room, all sharing a Thanksgiving experience where we'd normally all be in the room.*

Karen admits that it was hard when her oldest daughter moved abroad. However, she talked about experiencing Italy vicariously through her daughter and using video to get a better sense of what it meant for her to be there. Video enables access to places in a way that other mediums do not. Given the visual component, video communication is particularly adept at sharing, exposing, and blending places.

Harrison and Dourish's distinction between "space" and "place" is useful here [7]. "Space," they argue, is the structure of an environment and includes features such as orientation, proximity, and presence. Meanwhile, "place" is the result of a shared cultural understanding. Video provides various spaces (*e.g.,* video chat vs. multi-party conferencing), however, it is the norms and mores used across these spaces that establish shared notions of place.

Work, school, or travel may introduce distance, but video communication allows individuals to share their locations as a way of building relationships as they establish "place." Following conversations, sharing locations was the most common use for video. Adam, for example, described being able to see Thailand through the eyes of his girlfriend:

> *It's obviously a very foreign place, so it's, you know, my only way to ever see and experience what she is seeing and experiencing, and get an idea of where she is, and that kind of stuff...*

Sharing a location often involved highlighting its distinctiveness and served to reaffirm the reasons for the distance. In fact, sharing a location was often the primary objective of the video communication sessions described to us. In addition to the scenarios like Adam's above, sharing offices and the latest hotel room were also common.

While comparatively mundane, sharing new domestic spaces after a move proved to be an almost universal experience. Jason, who just moved to another state, described an episode with his mother and sister:

> *So it was the first time that they had seen the apartment… it was a mess because I was just moving still, and then when I got it cleaned up, like a few days later, I got on and showed her [mother]…*

Likewise, Shika described sharing her new apartment with her grandparents after moving across the country for a job, showing them *"how I had arranged everything."* Where some stories spoke of the pleasure at sharing a novel location, these "house tours" were more often associated with providing comfort to family members by showing them how participants were settling into their new living situation, often in a location that family would otherwise not be able to visit.

In contrast to these largely personal stories, we heard relatively little from people's professional lives about space or place. Instead, stories focused on gaining access to professional expertise regardless of location. Indeed, many participants joked about teasing co-workers who chose to videoconference into a meeting rather than walk to the adjacent building and attend in person. The flexibility video communication provides has also irrefutably opened up the possibility of working remotely (at least part of the time), allowing participants like Frank to negotiate personal and professional responsibility by, in this case, picking his

daughter up from school in the afternoon and finishing his workday from home.

Professional stories also focused on the appropriate decorum. Shika, for example, reinforced the importance of those remoting in from home to *"show proper respect"* for presenters by maintaining a professional environment regardless of your location. For the duration of any professional video conference, it seems, the home space is expected to be an office.

Where location in personal communication enables interpersonal opportunities to create meaning and understanding around those spaces, the shared understanding of the place of professional video communication was almost always the same: it was the office. For this reason, some participants described their unease with professional video communication in their personal environments. Shrini, for example, described video communication from his house as the equivalent of *"inviting someone into your home."* The one partial exception we saw to this was reported by Parker, the manager of a fully-distributed team. *"Video communication is a window into someone's house,"* he explained, claiming that he always IMs colleagues before initiating a video call: *"It's the equivalent of walking by their office…"*

Insight: The spaces accessed and created by video communication are influenced by and have value due to shared cultural understandings.

Shared Activities & Co-presence

"So, prior to my wife moving here, we used to use video almost on a daily basis." It was only two weeks earlier, Victor explained with a broad smile, that he and his wife finally found a place to live together in Seattle. Victor moved across town. His wife moved from Ohio.

Victor described a period of 4.5 years during which he and his now-wife used video communication for a range of what would otherwise be considered conventional dates. This included the classic movie night:

> *We would just… you know, saying, 'Hey, let's have a movie date on Skype.' So it is possible… But we kind of make sure we are in the plus [or] minus five second gap in the movies… I think it mimics actual dates and whatnot, where you're able to see the other person up-front and whatnot, right? Of course it's not a perfect substitute, but it's… a decent substitute.*

In personal video communication, we repeatedly saw creative behavior that extended the reach of webcams into kitchens, gardens, and into users' lives. Without question, the most common activity was sharing one's location (as discussed in the previous section), but the variety of shared activities from across our interviews was striking.

Jack, a single man in his mid-thirties, talked about clipping his webcam to the hood over his range so that his mother could give him instructions on how to cook one of his favorite childhood dishes in the pot below:

> *I grab my mom, get her online, and say, okay, 'Am I doing this right?' So it's inclusive… and she could see what I was working on, and you know, give me some advice directly on it.*

Jack shared interactions with his father as well:

> *And I've done the same thing where I was working on my plane, you know, my dad, who's fixed this one issue before, I basically crawled under the plane with the camera, and I showing him the part where we could talk about it...*

In fact, 57% of survey respondents indicated that they use video communication to share activities with others in their personal lives, 62% in their professional lives. In a personal domain this included attending parties (22%), family events (32%), and watching TV or a movie (26%). In a professional domain, respondents reported giving and attending presentations (65% and 84%, respectively), as well as participating in remote interviews (42%) and team social events (29%).

This, however, is often despite support from technology that is designed for desk use only or built into laptops. What we are seeing, particularly in the personal domain, is a swell of new practices and shared activities in which individuals are utilizing video communication beyond the desk, often including laptops and mobile devices balanced in precarious places.

Insight: Individuals are moving beyond conversation-only video communication and repurposing video to engage in shared activities.

The current support for shared activities, however, is quite limited, and may explain the dearth of personal experiences involving friends.

> Adam: *I think it's because it [video communication] feels a little more personal… with someone you don't have kinda a strong connection to it can be more awkward… Friends that you hang out with, I feel like, it's usually like you're hanging out, and then you're focused on some other activity, right? Like, I'll go drink beers and watch a football game or something, right? [Slowly] You're not like staring at each other face-to-face and communicating very deeply and looking into each other's eyes.*
>
> Interviewer: *That audio recorder can't capture the terror on your face. [Both laugh.]*

In his early twenties, Adam explained that typically he wants his interactions with friends to have *"less emotional weight."* Friends are the people you do things with, and for the time being, few systems take advantage of video for the purpose of enabling compelling shared activities.

Insight: The limited number of activities that video communication supports discourages broader adoption.

When discussing video communication in professional contexts, several participants also included activities such as screen sharing, collaborative document editing, or even broadcasting a presentation's slide deck. Chad explained that in his job he often finds himself coordinating with multiple remote people on PowerPoint decks under tight deadlines. Where they used to break up the presentation and regroup later, consolidating the content was burdensome. These days, he explained, they just *"get together"* online:

> *So generally what we do is, we'll bring up a [screen sharing] meeting… I make some people presenters, we do an application share, and then we talk through what we're doing…. With PowerPoint, we'll go through and we'll discuss, 'Okay, we need to talk about X, Y, Z to this general, so what of these points would look good?'*

While participants were unable to see each other during these meetings, the application sharing let them coordinate on a single document on a shared desktop – contributing content from their individual machines, and then coordinating their additions.

Initially surprising, the inclusion of collaboration scenarios that do not include any video makes sense when we consider their properties. Much like video communication, these digitally shared spaces provide a dedicated and synchronous environment among a set of participants (often just one other person or team).

Screen sharing and collaboration scenarios were not limited to the professional environment either. For example, when Chad is traveling for work, he and his son frequently play an online game together. During these sessions they use screen sharing to coordinate their actions and enhance their gaming experience:

> *So we coordinate starting new servers, attacking people… We're looking at the same things, we're working on the same things, we're chatting about the same things. It's real time interaction.*

During time sensitive activities, such as online games, Chad and others explained that video communication can actually be distracting, and that screen sharing provides a better sense of connectivity.

Activities such as screen sharing do not eliminate the benefits of the camera. Rather, they redirect it to a shared point of reference – a virtual desk of sorts – and in so doing, create a sense of co-presence. Survey respondents agreed that sharing or engaging in an activity with someone over video communication makes them feel like they are together in both personal (71%) and professional (64%) domains. Notably, not a single individual strongly disagreed with this statement.

Research on immersive environments has previously discussed this phenomenon [*e.g.*, 13], however, we find the similarities between video communication and collaborative environments compelling. This highlights both the potential for video as a collaborative activity space as well interactions that more seamlessly integrate activity partners and workspaces – virtual or real.

Insight: Shared visual context creates a sense of co-presence.

FOCUSING ON "SHARED EXPERIENCES"

When analyzing the range of stories in each of our themes, we were struck that the technology was often secondary to the social experiences it enabled. Individuals are using video communication to create shared social experiences in both personal and professional contexts, provided the technological overheads do not impede the desired experience. These stories, and the insights they provided, have drawn our focus to the potential of explicitly designing from the perspective of "shared experiences."

A design focus on shared experiences can appropriately account for social context and include more types of interaction partners (e.g., casual friends) by explicitly considering the experiences video can enable and enhance. We contrast this focus with two prevalent approaches coined by Nardi *et al.* [9] as "talking heads" and "video as data." Talking heads describes the prototypical scenario in which two individuals use video communication to simulate a face-to-face conversation. In contrast, video-as-data describes scenarios in which some "data" is more important than an individual's face, such as a patient during a surgical operation or a whiteboard during a brainstorming session.

Importantly, shared experiences are not necessarily task-specific (be the task a "conversation" or "surgery"). Instead, many of the scenarios in our data involved a series of tasks or events that were secondary to the overall experience and highlight the potential for a video communication infrastructure to better enable, accommodate, and enhance such experiences. Rather than considering the ways video communication can be improved as a channel, focusing on shared experiences gives priority to the social scenarios and environments in which a constellation of technologies could be used to enable the end-user experience.

Design Foci

Considering the intersections among our themes, we present three foci that a shared experiences perspective offers.

The appropriateness and adequacy of the technology for the types of dynamic behavior that might occur – Shared experiences often include dynamics that video communication cannot accommodate. Impromptu brainstorming on a white board during a conference call or a child running around the room are both examples of activities that can be central to shared experiences, but that video communication may not adequately support.

The objectives and shared group values of those participating – In personal settings the primary objective might simply be to connect with another person, regardless of the technical overhead. However, in more task-oriented professional settings, such as an office meeting, technical problems can be an intolerable overhead especially if participants begrudge the meeting in the first place.

The spaces and places used and/or created by the experience – Shared experiences prompt varied notions of space and place. Explicitly focusing on the place envisioned by the technology allows us to consider the role of place, and its varying influence on, for example, conference-room-like experiences vs. one-on-one calls. It also draws attention to the symbolic meaning of place as well as what it means to be "local" or "remote."

Designing for Shared Experiences

When using these foci, our primary motivation is not in the design of technology for specific experiences, although many scenarios would benefit from such attention. Rather, we find shared experiences particularly instructive in highlighting opportunities to create a video communication infrastructure and platform that better enables and supports emergent shared experiences. In this final section, we present three sets of design opportunities generated out of the shared experiences perspective.

Ambient and non-primary uses of video

Shared experiences often utilize video communication to support other primary activities. Talking heads and video-as-data assume that the video stream is the primary focus of attention. Even in conventional settings, this is not always the case. A focus on shared experiences accommodates "ambient" uses of video – such as open connections with only occasional interactions. In a PC-based environment this suggests that the view of the video stream might end up buried behind other windows and that users could benefit from IM-like notifications of video activity.

Likewise, video communication often plays a secondary role. Recall Victor's movie nights with his now-wife. The simultaneous use of Skype and Netflix nicely demonstrates the ways in which users add video communication into a constellation of technologies to create their shared experiences. Shared media consumption suggests a range of adaptations, notable the ability for video communication channels to more easily support metadata that software like a Netflix movie client could use for syncing independent streams between remote viewers. We can also imagine designs that would more closely approximate a collocated experience. Notably, movie nights are typically spent sitting next to your partner on the couch, and not looking at them straight on. Placing a vide communication on a separate screen to the side of the user might be more suitable and reminds us that the amalgamation of technologies in shared experiences may often cross divisions of hardware as well as software.

Camera(s) & subject matter

Shared experiences often demand mobile and/or multiple video views. Talking heads and video-as-data assume that the camera and person are stationary, however, the shared experiences we saw showed examples where neither was true. Jack's story of snaking a camera into a plane compartment while working on the engine with his father, or the desires of any parent to follow the action of their children prompts some re-evaluation of the assumptions that govern the design of video communication hardware and software clients. Consider the video compression algorithms: The assumption that most of the captured content does not change frame-to-frame no longer remains true. Instead, algorithms that track groups of pixels moving along vectors could better support non-stationary content and the future of mobile video communication.

Likewise, shared experiences challenge the talking heads presumption that one camera is adequate. Even the ability to switch between front- and back-facing cameras on mobile devices demonstrates the value of multiple perspectives. Experiences like cooking may require multiple camera views (e.g., one for face-to-face conversation and one placed above the stove) or a camera-view that can follow someone as they walk around the kitchen. And stories like Jason's about "*walking away*" from his conversation partners resulted in a number of participants imagining a series of cameras mounted throughout their house and the ability for a video feed to follow them as they move about.

Designing for everyone and everyday

Video communication is more readily used with close friends, family, and coworkers and for special occasions such as Thanksgiving dinner and product launches. The lack of everyday experiences involving friends identifies an opportunity for future exploration – particularly given the recent launch of new services such as Google+ Hangouts that target these relationships. The success of these services remains to be seen, but our experience suggests that they need to go beyond just supporting a group of talking heads in video windows to support shared experiences.

One option may be to reframe video communication as a system-level service. This would allow developers to video-enable their applications, incorporating the medium in ways best suited for the experiences their software provides. As a comparison, consider the plethora of applications that have emerged for mobile devices that make creative use of GPS information as an OS level service. Currently, the most widespread equivalent is video-based screen sharing, which in most clients actually replaces (rather than supplements) the camera-feed.

The desire for interactions with casual friends to have *"less emotional weight"* (Adam) highlights the enormous potential of video communication to augment shared experiences rather than rely on video communication to be the experience itself. A shared experiences perspective

naturally asks "What do people want to do?", and in turn, "What does video need to enable?" If the adage "friends are who you do things with" is true, then explicitly designing systems that incorporate video to share activities with friends will broaden adoption.

CONCLUSION

Using video communication, Adam peers through a camera to connect with his girlfriend halfway around the world. Shika is demoing a new release to colleagues in the home office, and Amanda introduces her family to its newest member. While the camera is often seen as a vehicle for video technology, we see the potential of reframing video as a vehicle for sharing experiences such as these.

In this paper, we explored the differences and similarities of video communication across personal and professional domains. We provided insights regarding mediated representations, use of video communication in response to distance, and the role of group identities and values in use and evaluation. We also highlighted video communication as a vehicle for access to and creation of place, and the co-presence supported by shared activities.

Building on our insights, we argued for a design focus on shared experiences. Shared social experiences are central to individuals' understanding and evaluation of video technology, but have remained under-addressed. To this end, we enumerated a number of demands that the shared experiences from our data place on existing designs of video communication. Shared experiences often involve integrating video with other tools to create shared social experiences such as screen sharing for collaborative tasks, and video as a communication back channel when playing online games. Likewise, shared experiences can benefit from mobile cameras, multiple video streams, and the use of video as an ambient signal. We also highlighted potential opportunities for design based on current social practices. For example, many of our participants' most profound experiences were special events such as the introduction of newborns or using Skype to join the family for Thanksgiving dinner. Finally, the absence of everyday shared activities among friends and activity partners presents an opportunity for future exploration.

Focusing on shared experiences, we aspire to move beyond the camera to the activities and shared experiences that we want video technology to enable. By focusing first on the social experiences, we hope to diversify the uses for video technology and enable new ways for us to connect.

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