

Testing the technology: Playing Games with Video Conferencing

Archer L. Batcheller, Brian Hilligoss, Kevin Nam,
Emilee Rader, Marta Rey-Babarro, Xiaomu Zhou

School of Information, University of Michigan
1075 Beal Avenue, Ann Arbor, MI 48109-2112

[archerb, bhilligo, ksnam, ejrader, martarey, xmzhou]@umich.edu

ABSTRACT

Video connections can establish a media space in which games may be played, just as people play games while collocated. Experiments with participants playing the game ‘Mafia’ indicate that people in a video condition have similar levels of satisfaction, fun, and frustration, to those that play while collocated. This finding holds for both those with prior experience using video systems and those without, suggesting it is not merely a “novelty effect.” Results differ about whether there exist differences in focus of attention, suspicion/trust, and pointing for people playing the game while using a video system. Implications for both fun and work uses of video are suggested.

Author Keywords

Video mediated communication, social interaction, games.

ACM Classification Keywords

H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces --- synchronous interaction; H.4.3 [Information Systems Applications]: Communications Applications --- teleconferencing, and videoconferencing

INTRODUCTION

Research on video conferencing systems and video media spaces has focused on video as a tool to augment work processes. Yet video has been used to connect remote spaces for fun and casual communication for more than two decades and may play an increasingly important role in non-work uses as it becomes more affordable and accessible. In the early 1980s, Galloway and Rabinowitz streamed video between city streets across the United States, observing the spontaneous interaction of people confronted with others located 3000 miles away [6]. Since their early experiments with video as art, most research

about video systems and media spaces has focused on the work environment. Cutting-edge video systems were deployed in a variety of corporate research laboratories. Gaver et al. explored the use of the RAVE system at EuroPARC as an enhancement to work interactions [7]. Their study focused on video’s ability to deliver awareness information, and the related issues of privacy. Similarly, Bly et al. described video systems set up between offices and public spaces at Xerox PARC in Palo Alto, California and Portland, Oregon [1]. They documented a variety of functions for which people employed the video, including awareness, chance encounters, and social activities. Fish et al. focused on the informal interactions observed on Bellcore’s Cruiser video system, noting that it facilitated spontaneous encounters which often led to task-focused work [5]. However, they found that face-to-face contact was still more frequently used for maintaining relationships.

Many of the classic studies of video media spaces have been documented in Finn et al. [4]. These studies have focused on the use of video technology in the work setting and primarily apply to an environment that seeks productivity. Instead, this study focuses on *non-work* settings as we investigate the potential for having fun over video in a way that has been underaddressed to date.

Karahalios and Donath have explored residential video use in the dormitories at MIT [9]. Having connected two public locations in dormitories, they experimented with visual effects that help the technology serve as a social catalyst that promotes spontaneous interactions. Residential uses of video may also be more planned than spontaneous. For instance, video may be used to play games between groups of friends at two different dormitories. Or social games could be used as an icebreaker to introduce new groups of students to each other. This study focuses on planned interaction in such activities as organized social games.

Recent work by Mueller et al. on “exertion interfaces” has examined video links as a space for social games, finding that competition and physical exertion can help draw participants into an enjoyable experience [10]. Such games involve specialized technology that measures ball movements and overlays a video stream with game information. Their findings highlight the potential for fun games that use video streams to connect people.

Prior studies have flagged several phenomena of interest for games played in a video media space. Bos et al. studied a social dilemma game played over video and found that people negotiating via video achieved the same level of trust as those that were face to face, but took longer to do so [2]. Thus it is important and interesting to watch for ways that trust and suspicion play out over video. In experiments about distributed work, Bos et al. found that groups tend to form alliances based on whether they are collocated with other players, instead of making economically optimal game decisions [3]. Similar alliance forming effects may appear in games played over a video system that has players split between two sites. Veinott et al. found that video is better than an audio-only channel when native English speakers are communicating with non-native English speakers [11]. They note that video provides a richer communication channel that permits grounding and helps to negotiate understanding. Similarly, social games often require subtle cues that help to negotiate understandings and make game decisions. The ability of video to display such cues should have interesting effects on game play.

By studying a social game played over video, this study has two aims: 1) to address “fun” interactions over video, both for casual groups who are gaining access to video systems and for work groups that may participate in fun, social activities over video; and 2) to inform work-based video interactions with respect to trust formation, forming alliances based on location, and negotiating decisions. Two hypotheses focus these aims into concrete questions:

1. Participants have equal amounts of “satisfaction,” “fun,” and “frustration” in collocated and video conditions.
2. Participants in the video condition will perceive an “us vs. them” effect absent in the collocated condition. They will tend to trust people on their own side, and be suspicious of those who are not.

METHODOLOGY

The party game ‘Mafia’ was selected for its interesting set of social interactions without a need to exchange physical artifacts. Game play in Mafia requires extensive conversation and negotiated decisions. Since the game also involves deceiving others and determining trustworthiness, observing subtle cues such as body language and facial expressions is important. These features produce a rich and interesting set of interactions, both in observing a fun activity, and in simulating potential real-life activities.

There are many varieties of Mafia, but we used a simple version of the rules. In our games, the moderator (a member of the research team) passes out cards that assign participants as either ‘mafia’ or innocent ‘civilian.’ The game proceeds in rounds, with each round including a time when the two mafia agree upon a civilian to kill, and a time when the civilians vote to remove one person on suspicion of being mafia. The game continues until the civilians have

voted to remove both of the mafia, or the mafia have killed enough civilians so that the civilians could never muster enough votes to remove the mafia. For more details of the game, see the Mafia Brotherhood’s webpage [8].

Eight groups were recruited to play Mafia, with each group consisting of eight participants. Of the eight groups, four participated in *collocated* sessions with all participants in one room. The other participants joined four *video* sessions which were split between different sites, connected by a video conferencing system. The rooms were set up in an identical fashion, with rows of four participants facing either a row in the same room, or facing a row of participants viewed through the video system.

A Polycom VSX 7000 video conferencing system connected the two locations, using H.263 compression with a transmission rate of 1920 kbps. The video was displayed on 50 inch plasma screens. Although participants wore nametags, video quality was not sufficient to read the names through the display. One-way latency was about 250 milliseconds. Two Polycom Digital Tabletop microphones were positioned to the side of the participants. The audio processing included echo cancellation.

Three to six games of Mafia were played by each group, according to the time available and the length of each game. After the games, participants were given a written questionnaire, followed by a brief discussion with all the participants. Quantitative data were collected from the questionnaire. Qualitative data were gathered from several open-ended questions on the questionnaire, the discussion with participants and direct observations of the games.

Participants were recruited through posters on a university campus and an online subject pool. Most participants were undergraduates. Of the 32 participants playing in the collocated condition, 18 were male and 14 female; 16 had played Mafia previously. Of the 32 participants in the video condition, 13 were male and 19 female; 19 had played Mafia previously. From the video groups, 12 participants said that they had used video conferencing before.

RESULTS

The primary statistics of interest are based on a comparison of answers given by the participants in collocated and video conditions. Answers were measured with a 7-point Likert scale, with 7 being “very easy” or “strongly agree.” These results are summarized in the ANOVAs shown in Table 1. The variables included are “inthere” for ease of interaction on your side, “intother” for ease of interaction with the other side, “signal” for ease of signaling (e.g., pointing), “satisfied” for satisfied with the game, “fun” for had fun with the game, and “frustrated” for was frustrated with the game. The following six variables indicate “suspicion,” “trust,” and “focus.” Participants were asked whether they “were more suspicious of my side than the other side” and whether they “were more suspicious of the other side than my side.” Similar questions were asked for trust and focus.

	collocated		video		ANOVA
	mean	sd	mean	sd	p
inthere	5.19	1.33	6.13	1.01	0.002
intother	5.63	1.58	5	1.24	0.086
signal	5.33	1.40	4.88	1.48	0.215
satisfied	5.84	1.39	6.13	1.1	0.374
fun	6.16	1.02	6.41	0.71	0.26
frustrated	2.5	1.72	2.31	1.36	0.63
suspmv	3.25	1.57	2.78	1.56	0.232
suspoth	3.34	1.70	3.16	1.83	0.673
trustmv	3.5	1.44	4.44	1.76	0.023
trustoth	5.16	1.11	5.13	1.34	0.919
focusmv	2.88	1.39	3.34	1.48	0.208
focusoth	3.59	1.90	3.56	1.9	0.948

Table 1: ANOVAs for collocated vs. video condition.

These data indicate that participants in the video condition found it easier to interact with those on their side than those in the collocated condition did. Also, those in the video condition found people on their side more trustworthy than the collocated people found those on their own side. This later difference is likely caused by an anomalous session in the video condition. Running an ANOVA by session for the video condition indicated inter-session variance significant at the $p=0.049$ level. Removing the most extreme session eliminated the significance for the ANOVA comparing collocated and video conditions ($p=0.252$).

Levels of fun, satisfaction, and frustration remained constant between collocated and video conditions. This lends support to the 1st hypothesis, that participants would not experience significant differences between collocated and video conditions for the aforementioned variables.

The questionnaire also inquired about prior use of video systems. ANOVAs showed no significant effect of video familiarity on satisfaction, fun, or frustration ($p=0.171$, $p=0.218$, and $p=0.984$, respectively).

DISCUSSION

The most significant finding is that the data support hypothesis 1. Variables indicating satisfaction, fun, and frustration did not change, suggesting that these participants found the game equivalent in collocated and video conditions. The means are even slightly in favor of the video condition and are without a large variance, demonstrating a trend unlikely to be easily reversed with a larger sample size. One concern of this conclusion is that many of the participants may simply be reacting to a new technology, creating a “novelty effect” – subsequent use could see increasing frustration with the video system. However, the data also show no systematic differences in satisfaction, fun, or frustration according to video experience. This suggests that even those who had used

video previously still did not have a negative reaction to seeing video in use again, this time to play Mafia.

The quantitative data reject hypothesis 2, yet the qualitative data strongly suggest differences in levels of trust and suspicion. This disparity demands a careful look at the data. Qualitatively the video screen seemed to represent a divide. As one participant expressed it in the questionnaire, “It felt like two different sides, rather than one community.” In all four video-mediated sessions, we observed evidence that participants adopted an “us versus them” approach to the game using the video screen as the divide between groups. Only one collocated session mentioned “sides.”

Since, theoretically, any player has the potential of being mafia in any given round, it is not strategically advantageous to accuse players of being Mafia simply because they are physically located in a different room. Nevertheless, this occurred frequently, and participants were aware of it. In three of the video condition focus groups, participants commented on this. For example, one said, “I tended to accuse the other side more.” Other participants nodded or otherwise agreed with this statement. In a questionnaire from a different session, another participant wrote of the video set-up, “It definitely made people trust those in their own room more than those in the other.” Others spoke about feeling as though they were on separate teams, that it was a case of “one room vs. the other”, and “Us versus them.” Clearly the physical separation did affect how participants perceived and approached the game.

One possible explanation for the tendency to accuse non-collocated players more than collocated ones pertains to the sense of social distance between non-collocated individuals. In one of the focus groups, one participant said, “It’s easier to accuse them in the other room because they’re not here.” A different participant agreed and added, “Yeah, so you’re not so uncomfortable.” In most of the sessions, participants did not know one another. The need to confront strangers and accuse them may be a difficult thing for some people. While the video conferencing brought participants close enough to be able to engage in the game, it still maintained enough social distance to make a difficult social task somewhat easier.

The qualitative data also reveal that the use of video conferencing appears to have had three complicating effects on the game: it drew participants’ attention, made signaling more difficult, and made interaction more difficult.

The large, high-quality video displays were attention magnets. We observed participants’ focusing most of their attention on the screen, often failing to look at others seated next to them, even when those individuals were speaking. Several participants in the video condition mentioned this. As one put it, “I couldn’t see what was happening here, because I was looking at the screen.” In contrast, in the collocated condition, there was evidence of most players looking around at all of the other players during

conversations, making direct eye contact, and talking to others in the same row and in the opposite row. While a few individuals noted that they found it easier to see the other side, and easier to hear their own side, the trend was a more balanced focus of attention among collocated participants.

Although there was no statistically significant difference between the two conditions with regards to signaling (e.g., pointing, nodding, gesturing, etc.), there are qualitative observations and comments that would indicate participants did experience frequent problems making themselves understood when signaling across the video connection. This happened when the civilians had their eyes closed and the mafia were selecting their victim. When the two mafia were not collocated, the two collocated mafia were choosing a non-collocated victim, or the moderator was not collocated with the mafia, signaling was difficult. One participant's comment summed up what several others in multiple sessions said: "It's a lot tougher if you want to point to someone on the other side." However, mafia in the collocated treatment never had trouble making themselves known to each other or to the narrator when pointing.

Finally, a number of participants said they felt limitations in the video conferencing technology made interacting with non-collocated participants challenging at times. Several mentioned having trouble seeing facial expressions or hearing participants at the other location. Others said it did not feel "personal". Still others noted a "slight delay" in the image. Feelings about these issues were common but not universal. However, what is particularly interesting about these findings is that in spite of challenges created by the technology, participants in the video condition still had as much fun as and no more frustration than (based on the quantitative data) participants in the collocated condition.

FUTURE WORK

Better measures for trust and suspicion, signaling, and attention focus may result in quantitative support for the qualitative observations above. This work could also be extended to other games, such as Charades, that have different forms of interaction and teamwork. This would allow greater applicability to games in general. Further experiments could consider people who are "experts" in playing the game, as opposed to "novices."

CONCLUSION

Finding that games can be as fun over video as in person opens a new array of uses for video conferencing. As video systems become less expensive, groups of families, friends, and even strangers may enjoy planned games spanning multiple locations. Playing games also may be a useful exercise for firms to positively orient users to a new technology to be used for work tasks. However, while differences such as heightened suspicion of the other side may make a game more fun and challenging, these effects of video would be undesired in most work contexts.

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REFERENCES

1. Bly, S.A., Harrison, S.R., and Irwin, S., Media spaces: bringing people together in a video, audio, and computing environment. *Communications of the ACM* 36, 1 (1993), 28-46.
2. Bos, N., Gergle, D., Olson, J.S., Olson, G.M. Being there versus seeing there: Trust via video, in *Conference on Human Factors in Computing Systems*, ACM Press (2001), 291-292.
3. Bos, N., et al., In-group/out-group effects in distributed teams: an experimental simulation, in *Proceedings of the 2004 ACM conference on Computer supported cooperative work* (2004), ACM Press, 429-436.
4. Finn, K.E., Sellen, A.J., and Wilbur, S.B., *Video-Mediated Communication*. Lawrence Erlbaum Associates, Inc., Mahwah, NJ, USA, 1997.
5. Fish, R.S., Kraut, R.S., Root, R.W., Rice, R.E. Evaluating video as a technology for informal communication, in *Proceedings of the SIGCHI conference on Human factors in computing systems* (1992), ACM Press.
6. Galloway, K. and Rabinowitz, S.. *Hole-In-Space*. <http://www.ecafe.com/getty/HIS/>.
7. Gaver, W.W., et al. Realizing a video environment: EuroPARC's RAVE system, in *Proceedings of the SIGCHI conference on Human factors in computing systems* (1992), ACM Press.
8. Graduate Mafia Brotherhood of Princeton University. <http://www.princeton.edu/~mafia/>.
9. Karahalios, K. and Donath, J. Telemurals: linking remote spaces with social catalysts, in *Proceedings of the SIGCHI conference on Human factors in computing systems* (2004), ACM Press.
10. Mueller, F., Agamanolis, S., and Picard, R. Exertion Interfaces: Sports over a Distance for Social Bonding and Fun, in *Proceedings of the SIGCHI conference on Human factors in computing systems* (2003), ACM Press.
11. Veinott, E.S., Olson, J.S., Olson, G.M., Fu, X. Video helps remote work: speakers who need to negotiate common ground benefit from seeing each other, in *Proceedings of the SIGCHI conference on Human factors in computing systems* (1999), ACM Press.