

Taking and Sharing Pictures with Phonecams: An Ethnographic Study

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ABSTRACT

In this paper, we describe the results of a pilot ethnographic study of the behavior patterns of early adopter, college-age users of camera-enabled mobile phones (phonecams) in the United States. The study examines picture-taking motivations and surrounding contexts, phonecam picture sharing, and the use of other cameras in comparison. We define a loose taxonomy of picture-taking activities to create a framework for categorizing consumer camera usage for both phonecam and other devices, and identify interesting usage trends.

Author Keywords

Digital cameras, ethnography, field studies, contextual inquiry, phonecams, mobile phones, cell phones.

ACM Classification Keywords

H.5.2 [User Interfaces] (D.2.2, H.1.2, I.3.6), K.4.1 [Public Policy Issues], K.8.m [Personal Computing Miscellaneous].

INTRODUCTION

A phonecam revolution has begun: camera-enabled cell phones (“phonecams”) were first introduced into the U.S. as optional camera attachments in Fall 2002. Popularity of phonecams surged in U.S. markets around Spring 2003, spurred by an increase in advertising and the offering of multiple handset models with integrated cameras. Analysts predict that 65 million phonecams will be sold worldwide in 2003, and that the phonecam market will be worth 49 billion U.S. dollars by 2008 [10]. It is anticipated that two million phonecams will be sold in 2003 in the U.S. alone [8]. Additionally, a study found that nearly 50 percent of surveyed cell-phone users said they wanted an integrated phonecam as their next cell-phone purchase [1]. Camera

phone annual sales have already outsold digital cameras [10]. The burgeoning phonecam audience will demand new products and services; however, those designing for phonecam users need to be informed by the ways people use the devices.

Ethnographic methods “provide ways to elicit user requirements that would be hard for typical users to articulate” [11]. We hope such a deeper understanding of phonecam usage will subsequently improve design of products and services, in line with the goals of other ethnographic work [2, 7, 13].

METHODOLOGY

Recruitment and Screening

Subjects were recruited by posting flyers to campus bulletin boards, sending emails to various university lists and newsgroups, and posting to phonecam web site forums. Potential subjects were screened for suitability. Participants who had not owned their phonecams for at least a month, or had not taken at least 10 photos were eliminated due to lack of experience with their phonecams.

Participants

The subjects of the pilot study included eight university students between the ages of 18 and 25, with an average age of 21.25 years. Three of the subjects were female and five were male. Length of ownership of a phonecam varied from one to three months, with an average ownership of 1.8 months. Three participants used phones where the camera was an external attachment. None of our users had the same phonecam model.

The participants were all students at a suburban university located in the San Francisco Bay Area in the United States. Six of the students were undergraduates, while two were graduate students. Seven of the eight participants reported a conscious decision to purchase a phone, while one had received the phonecam as a gift. Although none of the students claimed to be “gadget” or technology-savvy, all were familiar with cellular phones and regarded them as ordinary, everyday devices, consistent with findings regarding digital cameras [12].



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Interviews

Two two-person teams were formed to interview the subjects in one-hour sessions. Data from each session was captured through videotaping, note taking, and digital photographs. In addition to the individual sessions, one subject was interviewed for another hour in a follow-up session, and another subject was interviewed with a group of friends for one additional hour to collect data on group interactions with phonecam users.

Our primary observation technique was contextual inquiry. Shadowing users was not practical because phonecam usage is not confined to a specific place or time. We instead opted to interview participants in their living environments, allowing us to relate phonecam usage to personal computers, other photography, and people who shared the same living space.

Interviews were conducted in a conversational, semi-structured fashion using a predefined protocol outline. The sessions began with questions about the device itself, the participant's service plan, and motivation for purchasing a phonecam. Next, questions addressing phonecam picture-taking habits were heavily emphasized, including comparisons to other cameras. Then, we asked about the storing and sharing of photographs from all types of cameras including phonecam, digital, and film.

RESULTS AND DISCUSSION

After the interview process, the resulting videotape footage was examined and transcribed. Important facts and quotes were extracted from the transcriptions. Affinity diagrams were constructed to examine interesting behaviors among users. Charts were also created to examine usage trends.

The findings are organized into two key aspects of phonecam photography:

- content and purpose of photos taken with phonecams, in comparison to other cameras;
- methods of sharing phonecam photos.

Content and Purpose of Photos

We began data analysis by understanding trends in photo content and motivations for capturing photos. We found a significant divide between “traditional” photography and phonecam photography. In this sense, traditional photography is used to describe picture-taking activity with film and digital (non-phonecam) cameras. In our study, we found that traditional pictures were mostly intended for archival purposes. Participants documented special events, trips, holidays, portraits, landscapes, and more. These findings are consistent with anthropological research of photography [6], and research surrounding content of personal digital photo libraries and filing systems [4, 9, 12].

All participants viewed the quality of phonecam images as inferior to those of traditional cameras, and hence less suitable for the purposes of preservation. Image inferiority can be attributed to lower image resolution, lack of flash,

absence of manual focus, and lack of optical zoom. Perceived inferiority was also due to the hybrid nature of the device, where phone functionality overshadows camera functionality. We predict that even with improvements in phonecam image quality, film and digital (non-phonecam) cameras will not be replaced in traditional photography.

We did, however, find instances where phonecams were used in traditional photography. Participants used phonecams at important events where other cameras malfunctioned or were left behind. In these cases, the phonecam was used as a backup camera with the mentality that a poor image was better than no image at all. The phonecam was also used to take traditional photos intended for storage on the device itself, such as portraits used for photo caller-ID, or to be used as the device's wallpaper. In these instances, the image quality was not an issue because it exceeded the display quality.

Outside of traditional photos, however, we discovered new areas of photography more conducive to phonecams. We created a loose taxonomy of phonecam photography by examining the motivating circumstances around these pictures and categorizing phonecam photos into four categories: traditional, communication, spontaneous, and covert. Figure 1 summarizes examples of the content and purpose of various phonecam photos in these categories.

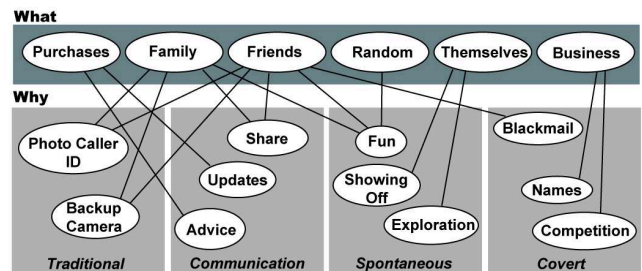


Figure 1. Categorization of phonecam pictures.

We present details and discussion around the communication-, spontaneous-, and covert-based phonecam picture-taking in the subsections below. Quotes from participants are *italicized* and prefaced with an ID. The ID represents the gender of the participant (M=male, F=female), along with a numeric ID or “G” for participants from the group interview.

Communication-Based Phonecam Photos

This category of phonecam photographs is best described by the age-old cliché quoted by many study participants:

A picture is worth a thousand words.

The picture is often the most efficient method to convey an idea. Many of the “communication” pictures were taken in a shopping context. Participants sent photos to friends and family to update them on a purchase or to ask for advice on potential purchases, such as a new car or piece of clothing.

M1: When I buy something, I want to send [it] home... just [to] let my parents take a look at it.... I don't need a high quality picture ... to get an idea...

F1: I was at the mall; I decided I wanted to [use the phone to] show a dress to one of my friends to see if I should get it.

Other pictures in this category included pictures sent as a part of a nightly ritual from one of the study participants to a long-distance significant other. In this case, the picture exchange was similar to gift-giving phenomenon identified in previous research with phone-based text messaging [14].

Spontaneous-Based Phonecam Photos

Spontaneous pictures are enabled by the “always-available” nature of integrated phonecams. This phenomenon was best characterized by our study participants:

M2: It's my phone, so I just carry it around. I usually remember that it has a camera, and I can take pictures of anything that might be worthwhile later.

M1: This is just basically for ... spontaneous, fun stuff....

F1: You always miss great ... potential pictures because you don't have a camera with you, and that's why I love my phone so much.

Participants took photos of “random” and “funny” occurrences that we also categorized as spontaneous photos. Such photos usually took place in everyday settings, where users were relaxing with groups of friends and were not planning to take pictures. Examples of spontaneous photos include those of infants making faces, people in unexpected circumstances, and practical jokes.

M2: This was this man we made out of tin foil one day... We put it where our chef usually cooks and he got [angry].

FG: In case you haven't noticed around campus, there is a couple of two ducks and they just waddle around together all over campus, [but] nobody believed me that there were ducks. We were coming home at 2 o'clock in the morning and [there they were].... So we got a picture of [them], and people believed me.

Spontaneous pictures revealed an interesting split between participants using phones with camera attachments and those using integrated phonecams. Camera-attachment users reported recognizing picture-taking opportunities, even when they did not have the camera attachments with them.

M2: Two friends and I went to the mall,[and] we bought these ridiculous matching polka-dot dresses. We walked around the mall for hours wearing them. I really wanted to take a picture, but ... I had forgotten my camera attachment.

Camera attachment users were much more likely to remember to bring their camera attachment to planned special events like birthdays or trips, but were generally unsatisfied with the resulting pictures.

Covert-Based Phonecam Photos

We found some unexpected uses for phonecams in the area of covertly taken- photos. Participants reported taking a

number of embarrassing or incriminating photographs that they jokingly referred to as “blackmail” photographs, such as friends sunbathing topless or looking unattractive. Such pictures were valued highly by participants, and were viewed as tokens of trust and intimacy between friends. Others used their phonecams to cultivate a sort of business edge—e.g., to help remember customers' names, or to capture images of a competitor's product.

FG: I've definitely taken some pictures of people that didn't know I was taking a picture.

M3: I went to meetings where it wouldn't be appropriate for you to take pictures... But I did manage to take some pictures. It was very helpful because then you could recognize [people]

Covert photography is enabled by the form factor of phonecams, and the discreet manner in which pictures can be taken. From a bystander's perspective, it is ambiguous whether the user is typing a text message, looking at her calendar, or taking a picture. These pictures are also partly enabled in the short-term by low public awareness of integrated phonecams. Since our study, however, several news articles have been published alerting readers to the potential malicious uses of phonecams [5, 10]. Therefore, an ethical quandary for designers exists: although covert photography appears to be a highly valued aspect of phonecam use, it also enables some illicit uses, such as the “up-skirt” cases in Japan [1].

Covert pictures also widen the differences between attachment cameras and integrated cameras. In the case of camera attachments, the user must physically attach the camera to the phone, a process that signals to others a transition into picture-taking mode. The altered form of the device also makes it more difficult for the users to take pictures unnoticed. Manufacturers can design integrated phonecams that do not afford covert picture taking.

New Picture Space

Our findings on the content and purpose of phonecam photos suggest that phonecams are *not replacing* cameras for traditional photography. Instead, integrated phonecams are *enabling* a new set of picture-taking opportunities, and *supplementing* the usage of other cameras. This new expanded picture space is represented in Figure 2.

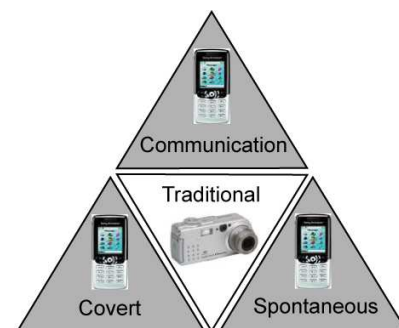


Figure 2. New picture space: traditional photography is complemented and not replaced by phonecam use.

Sharing Photographs

The most common ways that users shared their phonecam photos were by emailing them from the phonecam or by showing them in person, directly on the phonecam. Although fewer people currently own phonecams in the United States, many have readily available internet access. Thus, emailing a photo from a phonecam can often provide nearly instant method of “sharing the moment.” We expected email to be a common way of sharing phonecam photos, but were surprised, however, at the popularity of what we have termed the “photo-wallet” phenomenon.

M4: If I was going to print [a photo], it would be to show someone, and ... I might as well show [the photo to] them on the phone.

The “photo-wallet” phenomenon involves sharing phonecam photos in person, using the phone itself as the display device. 50% of our users reported this type of activity, including all of the users with the high memory capacity phones (>50 pictures).

In addition, we were also surprised that none of the study participants shared their pictures via personal web sites, even though many participants expressed a mild interest in photoblogging, a term used to describe the incremental posting of images to a public web site in a serial fashion. We anticipate that as posting images to a photoblog becomes more intuitive and awareness increases, photoblogging, especially mobile photoblogging (“moblogging”) [3], will become a more popular photo communication medium.

CONCLUSION

Although phonecams are beginning to outsell digital cameras, they are not replacing them for traditional photography. Phonecam pictures are primarily being used for communication-centered or opportunistic photography, rather than documenting events for archival. Designers of phonecam products and services should not assume that phonecams are being used like other cameras, and instead should focus their attention on areas of the new picture space. Additionally, phonecam designers should keep in mind both the desirable and undesirable aspects of covert photography from this paper, even as external social and legal forces begin to limit phonecam use and promising new trends in picture usage. While this pilot study only provides a glimpse of early phonecam adoption by college-age users in the United States, it does reveal some interesting insights that could lead to a more detailed study in the future.

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REFERENCES

1. Batista, E. Nokia snapshot of the future. *Wired News*, September 29, 2003.
2. Blomberg, J., Burrell, M., and Guest, G. An ethnographic approach to design. *The Human-Computer Interaction Handbook*. (J. Jacko and A. Sears, Eds.) NJ: Erlbaum & Assoc. (2003), 964-986.
3. Camera Phone Moblog (mobile web log) Community <http://www.textamerica.com/>
4. Graham, A., Garcia-Molina, H., Paepcke, A., and Winograd, T. Time as essence for photo browsing through personal digital libraries. *JCDL 2002*. 326-335.
5. Harmon, A. Smile, You're on candid cellphone camera. *New York Times*. October 13, 2003.
6. Holland, P. 'Sweet it is to scan': Personal photographs and popular photography. *Photography: A Critical Introduction* (L. Wells, Ed.) London: Routledge (1997), 103-150.
7. Hughes, J., King, V., Rodden, T. and Andersen, H. Moving out from the control room: ethnography in system design. *Proceedings of CSCW'94*. ACM Press (1994), 429-439.
8. Jardin, X. Phonecam Nation. *Wired 11*(07), July 2003.
9. Lansdale, M. and Edmonds, E. Using memory for events in the design of personal filing systems. *Int'l Journal of Man-Machine Studies*, 36, 1 (1992), 97-126.
10. Mawston, N. *Camera Phones Outsell Digital Still Cameras in H1 2003 and Beyond*. Strategy Analytics, September 2003.
11. Millen, D.R. Rapid ethnography: Time deepening strategies for HCI field research. *Proceedings of DIS 2000*. ACM Press (2000), 280-286.
12. Rodden, K. and Wood, K. How do people manage their digital photographs? *Proceedings of CHI 2003*, ACM Press (2003), 409-416.
13. Suchman, L. and Trigg, R. Understanding practice: video as a medium for reflection and design. *Design at Work Cooperative Design of Computer Systems* (J. Greenbaum & M. Kyng, Eds.) NJ: Lawrence Erlbaum Associates (1991), 65-89.
14. Taylor, A. and Harper, R. Age-old practices in the “New World”: A study of gift-giving between teenage mobile phone users. *Proceedings of CHI 2002*, ACM Press (2002), 439-446.