# Six Themes of the Communicative Appropriation of Photographic Images

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## ABSTRACT

In this paper, we explore the use of digital photographs in computer-mediated communication. We present Lascaux, an instant messaging client that serves as a research platform for studying visual communication with digital photographs. Through a combined analysis of the uses of images in Lascaux as well as the uses of images in other communicative contexts, we arrived at six themes of appropriation: the image as amplification, the image as narrative, the image as awareness, the image as local expression, the image as invitation, and the image as object/instrument. For each theme, we explore the ways in which a medium may be designed to support that class of appropriation. Finally, we reflect on the relationship between literacy, mastery, and appropriation.

## Author Keywords

Visual communication, computer-mediated communication, image-mediated communication, instant messaging, networked digital photography

## ACM Classification Keywords

H.4.3 [Information Systems Applications]: Communications Applications; H.5.1 [Information Interfaces and Presentation]: Multimedia Information Systems; H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces — *Collaborative Computing*

## INTRODUCTION

The cultural history of visual communication provides rich evidence for the significance of the image in communication. Before the written word, in fact, was the image — evidence of communication found in the cave paintings of Lascaux predates evidence of early writing by as much as 10,000 years [21]. Since then, visual communication has flourished across time and culture, from the cave paintings of Lascaux to instruction booklets found in airline seat-back pockets and from coffin vignettes found on Egyptian tombs to last Sunday's comics [21, 22].

Recent technologies ("recent" always being relative, but particularly on this scale) such as webcams, networked digital cameras and cameraphones allow users to overcome
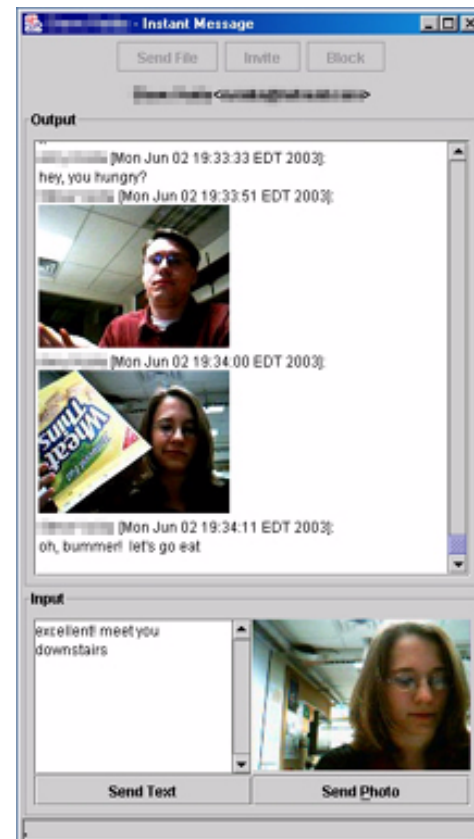
**Figure 1. Lascaux, an instant messaging client that serves as a platform for studying visual communication**

the traditional constraints of time and space in visual communication. Initial studies of networked digital camera use demonstrate that new technologies such as these can change the way individuals think about photos, from images as memory support to images as expression [20].

Using these recent technologies, our research aims to further explore the use and impact of networked digital photography for visual communication. As with other new forms of communication (e.g., text messaging), the lower the cost of communication, the more freely the new communicative conventions and practices are explored and adopted [12]. To explore the potential of the photograph as visual communication, we have initially turned to a communicative medium in which the use of photos will incur little to no additional cost and that is already viewed as a flexible medium [24] and a medium of mixed modes and conventions [28] — instant messaging.

In this paper, we describe the Lascaux instant messaging client, our platform for studying visual communication with digital photographs. Then, we give an overview of our methods and present the primary contribution of this paper — six themes of the communicative appropriation of photographic images. We describe each theme through examples from both external contexts as well as from the context of the Lascaux data. For each theme, we explore the ways a medium might be designed to better support each of these categories of communicative appropriation. Finally, we draw some broader implications about the relationship between literacy, mastery and appropriation for the design of computer-mediated communication media.

## LASCAUX

We have developed and deployed an instant messaging (IM) client, Lascaux, in which users are able to take still photos from a live webcam feed and insert them inline into an instant message as easily as they are able to insert text (Figure 1)[1]. Lascaux users see their own live webcam feed at the bottom of the chat window and can click a "Send Photo" button at any time to capture and send the image.

Lascaux is written in Java and implements a custom version of the MSN Messenger Service Protocol that allows Lascaux users to instant message with other MSN Messenger users. This design choice lessened critical mass-related adoption hurdles, both by allowing users to maintain the same number of IM contacts as previously and by enabling the additional functionality of Lascaux to be seen as compelling even if the other instant messaging user was not using Lascaux — photos are automatically sent from a Lascaux client to a MSN Messenger client as attachments.

Lascaux implements two kinds of data logging: statistical logging and IM content logging. The statistical logs report the participants' anonymized user IDs and client-types as well as whether each line of the message was text or image. IM content logs preserve all text and images of the instant message, as seen by the coparticipants. When the Lascaux user closes an IM window, she is asked whether she would be willing to share the instant message with the researchers. If she says "yes," then both statistical logs and content logs are emailed to a researcher. If she says "no," then only a statistical log is sent.

Lascaux has thus far been used by 8 self-selected participants over the course of 4 months, with 22 total individuals represented in the log data (as Lascaux users also instant messaged with MSN Messenger users). 202 logs of Lascaux-to-Lascaux or Lascaux-to-MSN Messenger use were collected. A log of Lascaux use was defined based on when the participants opted to close a session window. Of those 202 Lascaux logs, 120 utilized images in their communication[2]. A total of 806 images were shared.

In general, a Lascaux encounter emphasized the image as a first-class communicative object. In the context of instant messaging, we observed an experimental, fluid, coparticipatory interleaving of text and image where, in some cases, the image carried the communicative weight of the instant message. In a representative excerpt[3] (Figure 2), one can see how text and image interleave, with images occasionally catalyzing conversational threads. One can see how images from one conversant interleave with images from the other conversant. Some images appear highly posed while others appear more natural. Images convey reactions. Images illustrate textually-conveyed expressions. Images replace traditionally textually-conveyed expressions. One can see experimentation with perspective in the pointing image and experimentation with movement in the waving image. One can see visual "goodbye" rituals taking hold. The use of Lascaux spanned work and home environments; a single Lascaux interaction often included both work-related and social communicative functions.

## METHOD OF ANALYSIS

We began by analyzing our data using inductive or open coding [3], allowing themes of use to emerge from the data. It became clear that there were many ways images were being used to communicate, but we found that: (1) the level of abstraction of our initial analysis was too low for developing what we felt would be useful and generalizable design implications and (2) there were uses for images that were not as prevalent in our data as they were in other related work and we wanted to better understand why. In parallel with continued analysis of the Lascaux data, we began analyzing the communicative use of images in other contexts — from other contexts within HCI, such as media spaces, to contexts more traditionally associated with disciplines like visual studies or the history of graphic design. In general, our analysis emphasized the construction and authorship of images, in contrast to an emphasis on the interpretation of images that is more typical of the visual studies discipline.

By examining the communicative appropriation of images in other contexts and in our data, we found that:

- attempting to bridge the sometimes large conceptual gap between the Lascaux data and the use of images in other contexts helped us focus on themes at a higher level of abstraction, resulting in what seem to be more generalizable design implications;

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1. After data was collected for this research, Apple released a new version of its iChat instant messaging client (http://www.apple.com/ichat) that supports similar live photo sharing functionality. The logging features of Lascaux allow us to study emergent communicative practices that are only likely to become more commonplace with a commercially available client.

2. These numbers reflect the number of logs received, not the number of unique instant messages that occurred, since in Lascaux-to-Lascaux instant messages, both parties submitted logs. There is not, however, a one-to-one correspondence that would make for a simple quantitative characterization, as Lascaux coparticipants would often close their instant messaging window and send the log at multiple and differing points over the course of an instant message. If we had to estimate, we would speculate the number of unique messages to be about 75% of the number of logs received.

3. In all excerpts, identifying information in the text has been anonymized but idiosyncrasies of language and typographic errors have been preserved. All images are presented unaltered, with the participants' consent.
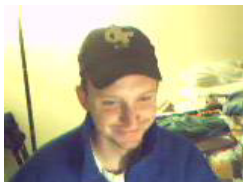
Jimpy:
　hey boss
Jimpy:
　new changes?
Scott:
　Hiya
[...]
Scott:
　I'm gonna check the email logging stuff in momentarily...just popped back on to test it out
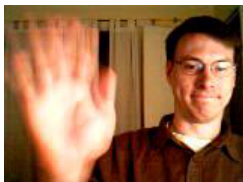Jimpy:



Scott:
　Dude, you've got the best cheezy response pics
Scott:
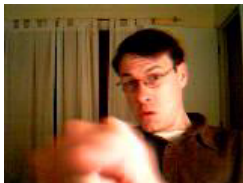


[...]
Scott:
　you da man
Jimpy:
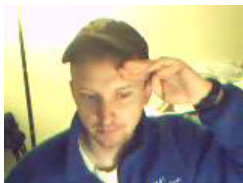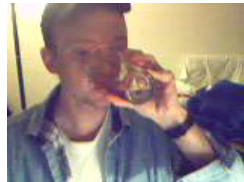


Scott:
　k
Scott:
　see ya
Scott:



Jimpy:



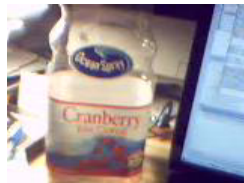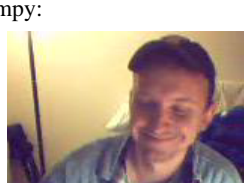**Figure 2. A typical Lascaux encounter**

Jimpy:



Mara:
　now that is the way to do it
Mara:
　i have to get up and go to the kitchen to get my refills
Jimpy:



Jimpy:



Mara:
　all i have to say to that is
Mara:
　when you bolt for the bathroom in the next two minutes, don't take your camera with you
Jimpy:
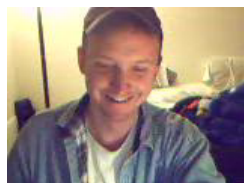


Jimpy:



Mara:
　special effects
Jimpy:



**Figure 3. Narrative, humor, and sleight of hand**

- reflecting on instances of themes in visual communication outside the context of the Lascaux data enabled us to better distinguish general themes in communication from more specific influences of the IM medium or the Lascaux deployment on these themes; and
- observing evidence of themes in visual communication in other contexts but absent in the Lascaux data allowed us to question what about the Lascaux medium or its deployment might have precluded such appropriation, allowing us to generate additional design implications.

Emergent themes from the Lascaux data were refined based on emergent themes from image use in contexts outside of the Lascaux data and vice versa until the themes converged. The six themes presented here are the result of this combined method of analysis.

### SIX THEMES OF THE COMMUNICATIVE APPROPRIATION OF PHOTOGRAPHIC IMAGES

Six themes of the communicative appropriation of photographic images emerged from our analysis[4]:

- the image as amplification,
- the image as narrative,
- the image as awareness,
- the image as local expression,
- the image as invitation, and
- the image as object/instrument.

These themes do not constitute a framework in the traditional sense of the word; they are neither mutually exclusive nor at quite the same level of abstraction. They are, however, themes that we encountered repeatedly in our analysis and found most useful in understanding the breadth of our own data. We present the themes here in generally increasing order of their degree of sociality. We consider the themes to be predictive (although subject to the influence of particular media), due to their constancy across contexts, as well as provocative, due to their perspective that extends beyond the traditional bounds of computer-mediated communication. The purpose of the themes is equally to inspire and to forecast the emerging space of computer-mediated visual communication.

Likewise, the goal of our design implications is not to provide a set of specifications for the next version of an instant messaging client. Indeed, many of the design implications will be mutually exclusive and enacting all of them would overburden many if not all communication media. Rather, we consider the design implications to be grounded speculations to help connect the reader to the data and the themes and to inspire new forms of computer-mediated communication.

In the end, we hope the reader will come to appreciate what we found to be a surprising breadth of ways that users appropriate photographs in computer-mediated communication and to appreciate the often nuanced design decisions that support one use over another.

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4. Because our analysis was tightly coupled with the use data of American participants, the themes may reflect a Western bias.

**The Image as Amplification**

Images are commonly appropriated for the purpose of amplifying some communicative intent. Emoticons are one example of this — simplified visual representations that imbue their surrounding communicative context with a particular affective state.

Another example of the image as amplification may be seen in the visual representations of comics:

> ...a form of amplification through simplification. When we abstract an image through cartooning, we're not so much eliminating details as we are focusing on specific details. By stripping down an image to its essential "meaning," an artist can amplify that meaning in a way that realistic art can't [22].

Within the comic visual language lies an alphabet based on human gesture, expression, and posture; an alphabet that amplifies through simplification and allows the artist to "convey nuances, support the dialogue, carry the thrust of the story, and deliver the message" [2].

One interesting class of the image as amplification in our data was the participants' use of shrugging (Figure 4). Used in much the same way that one might use an emoticon or the comic visual language to amplify emotional intent, the shrug emerged surprisingly from our data, as we were aware of no existing IM client that offered an emoticon for shrugging.

The images focus solely on the details of the shrug and, through this focused simplification, arrive at an amplification of the communicative intent. The image conveys more about the shrug and its communicative context, however, than simplification in the manner that an emoticon simplifies and generalizes. There is evidence of immense nuance in these shrugs. No two shrugs are the same — an empathetic shrug, a frustrated shrug, a helpless shrug, an annoyed shrug, etc... — and it is this emotional nuance that the photographic image amplifies.

In retrospect, the shrug seems to be a natural choice for amplification in Lascaux due to general camera placement and the cameras' typical field of view. Amplification of shrugs may have been seen by users as compelling because it combines a facial expression and gesture which, together, took up the entire field of view. Other forms of amplification may have been less prevalent because they required a different field of view. An amplified wink, for example, may have required closer camera placement or the ability to zoom in on just the eyes.

This observation has implications for supporting amplification in technologies of visual communication. Achieving diversity in what is amplified appears to be related to the amount and ease of mobility of the camera and/or the potential to change its field of view or zoom.

Other techniques for fostering amplification might involve providing additional capabilities of focus and simplification for amplification. One might provide the user with a software implementation of a fisheye lens, for example, to simplify the boundaries and focus attention towards the center of the image. Similarly, one might provide a visual mode that employs techniques of background extraction and automatically blurs the background to exaggerate the depth of field and make the subject of the image stand out.

**The Image as Narrative**

Use of images as narrative is strongly influenced by the control the author holds in crafting those images; that control is as much about what is included in the narrative as what is left out.

The Bayeux Tapestry is one example of the image as narrative, created within a generation of the 1066 Battle of Hastings to visually depict the story leading up to and including the Norman Conquest. There is an irony, however, embedded in its design. The Bayeux Tapestry was commissioned by a Norman, a victor of the conquests, of an



**Figure 4. Variations of a shrug**

Anglo-Saxon artisan, one of the conquered. That the conquered retold the story of their own defeat affected the point of view of the narrative. That authorial control impacted how the story was retold as well as the iconography of the retelling [4].

Taking similar advantage of authorial control with dramatically different content, one Lascaux participant employed the image as narrative with a particularly humorous bent (Figure 3). This user composed his images to selectively include only one of his two juice bottles at any given time, a sleight of hand that lured his coparticipant into thinking he had consumed an impressive amount of liquid in a very short period of time. He presented the punch line to his narrative by revealing that his joke used two props instead of one.

What, then, were the specific characteristics of this medium that fostered a narrative form of visual communication? And more generally, what would a technology need to do to support narrative visual expression? In this example, the control afforded by the medium in the composition and timing of shared images enabled the user to carefully craft this narrative for his particular intent[5]. In lieu of post-production editing, it seems that technologies that support intentional omission and "behind the scenes" control are useful in fostering narrative.

Most of the narrative we saw in the Lascaux data was of the serial comic type, primarily a sequence of authored images. While Lascaux allows for the flexible interleaving of text and image, it does not support the coupled relationships between text and image that are often found in narrative, for example, image captioning or the use of text within a photo. One might further explore the image as narrative by providing various options for the coupling of text and image (e.g., Comic Chat [17] or fotoTXT[6]).

In addition, most of the narrative we saw in the Lascaux data was conveyed through character and props; very little context or setting contributed to the narrative. One might consider features that would allow for better utilization of setting — a real-time green screen, for example, and the ability to use any image as the backdrop to a narrative.

In examples of the image as narrative like the Bayeux Tapestry, the boundaries of narrative are strongly delineated. In Lascaux, there are no technological provisions to indicate when a narrative begins and when it ends. What is the role of boundary in narrative? Does it serve a social function, perhaps with the audience? If so, one might consider ways of demarcating the boundaries of narrative. In Lascaux, however, much narrative appeared to begin spontaneously, catalyzed by an interesting or unexpected image. The relationship between images and the boundaries of narrative is an open question and an interesting one, we believe, to explore within the design space of image-mediated communication.

If boundaries serve a more important role after the fact, it may be because many narratives are enjoyed repeatedly. One might better support the image as narrative by better enabling narratives to be re-enjoyed or re-experienced, for example by allowing users to create personal "diaries" of their narratives. One might also better support the image as narrative by supporting the retelling of Lascaux narratives. The potential for enabling informal publishing through reuse may be an interesting match for a medium based on peer-to-peer communication, as it incurs fewer of the costs associated with more public and/or persistent publishing, such as a webpage or a blog.

In our Lascaux data, we saw the joint authorship of visual pastiches — a visual pastiche of favorite desk toys or a visual pastiche of body parts that made the conversants feel old or tired. Not narrative in the traditional sense, these collaborative pastiches do suggest that Lascaux is a medium in which collaborative authorship is being explored and perhaps even fostered by the use of images. The role of the image in fostering collaborative authorship would be an interesting question to explore through design. In addition, one might explore means of supporting the joint creation of other forms of narrative, perhaps by relaxing the traditionally tight coupling of user name and text or image, for example, by allowing the narrative to flow uninterrupted and unencumbered by intermittent changes in authorship.

**The Image as Awareness**

One of the more common research foci in the computer-mediated visual communication literature is the use of images to provide awareness. In the late 1980's and early 1990's, widespread computer networking and the availability of multimedia capture and playback devices engendered the development of media spaces (e.g., [5, 8]). In a common instantiation of media spaces, users had an always-on array of thumbnail-sized webcam images providing nearly live video feed of coworkers' offices or shared lounges and workspaces:

> Although seemingly the most invisible, the use of the media space for peripheral awareness was perhaps its most powerful use. The view, at first glance, appeared to be nothing more than a view of an empty public space. On closer examination, however, there was rarely more than a minute or two in which there were not at least sounds from the other location giving clues about the ongoing activities there....Being aware of such activities required no response; it provided an overview of who was around and what was happening (and afforded the possibility of joining in) [5].

The image as awareness provides an overview of activity that need not be high-bandwidth or photorealistic. Babble, a threaded and persistent computer-mediated communication system, includes a social proxy as visual communication to depict users' presence and activity. In Babble, the conversation is depicted as a circle and the conversants as dots, within the circle to varying degrees of activity or outside of the circle when participating in other conversations [9]:

> The idea was that users could be *aware* of the activities of other participants with respect to the conversation, so that a gathering crowd might entice others to join. Similarly, since this awareness would be shared by all participants and thus enhance accountability, phenomena such as a dispersing

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5. See [15], p. 52, for another example of the image as narrative supported by control in crafting images.

6. http://www.fototxt.com

Jimpy:
    hey, does he want to
    exchange IM ID's?
Mara:
    He isn't using any external
    IM clients this summer
Mara:
    oh, i see
Jimpy:
    very well then
Mara:



Jimpy:
    i'll have to continue using
    an owl to send him
    messages

**Figure 5.  An awareness of
leave-taking**

crowd might provide a way of shaping a conversation's content, style, or etiquette [9].

In one example of awareness appropriation from our Lascaux data (Figure 5), a mutual friend of the coparticipants is taking leave after arriving and having become the subject of the conversation. Given that much recent research in synchronous, remote visual communication has addressed issues of awareness or shared context, we had expected to see a more predominant use of the image as awareness.

One difference between Lascaux and media that seem to better foster awareness is the distinction between Lascaux's explicit, click-to-send mechanism and an always-on, polling mechanism. One might wonder about the possibility of fostering awareness through a polling mechanism in Lascaux. One of our users, in fact, altered his Lascaux code for a period of time to experiment with having an image automatically sent about twice a minute. Instead of allowing the images to provide a more passive awareness, this user felt compelled to perform for the camera, providing a visual counterpoint to the other content of the instant message. Without this, he explained, "the images started to lose meaning because they weren't posed."

One might also better foster awareness with visual communication through aggregation techniques. One might consider macros to visually aggregate certain classes of contextual or awareness information. For example, if a locally-stored photograph were triggered every time someone walked past the camera, the user might have at her fingertips a representation of the "busyness" of the area that she could choose to send to a conversant at any time during an instant message.

It may also be that in future research, we will come to understand the extent to which critical aspects of awareness are conveyed implicitly through photographs with other primary intents, rather than explicitly through awareness-intended images.

**The Image as Local Expression**

Some images are appropriated as a way to create and maintain identity within a subculture. These images are often stylized expressions of local conventions or experiences. Often, this localized form of expression is inaccessible to those outside a subculture. Graffiti is one such example of this appropriation of the visual image.

Sometimes images evolve from being direct and accessible reflections of experiences to stylized and inaccessible forms of local expression. This evolution can be seen in the use of images dating back to the earliest known examples of visual communication. The African and European cave paintings of 35,000 to 4,000 B.C. were direct and accessible reflections of experiences, likely used in hunting rituals or as an instructional tool for the young on the cooperative hunting process [21]. Subsequently, however, language was extended to express the communicative needs that arose within local subcultures:

> As pictures became highly stylized and conventionalized according to local usage, they became more and more removed from experience and therefore less accessible to both people within the culture and to other cultures as well [2].

Four months of Lascaux use may still not be long enough to witness the development of stylized images; eight Lascaux users may not be a large enough population to discern which images are accessible to some subpopulations and not others. We do, however, see examples of users experimenting with the medium, experimenting with images that could well evolve into local conventions. In one particular example, a user was trying to convey admiration to her coparticipant. She sent three images in quick succession in which her hands waved about her head. Her coparticipant sent an image of himself looking confused. The experimenter then translated the intention of her images: "tipping my hat to you." This particular series of images was not seen again in the data, but seems the type of experimentation with visual language that bears a certain degree of esoteric-ness but within local usage could come to be well-understood and commonly-utilized.

The image as local expression may be viewed as a grassroots phenomena in which members of a subculture socially negotiate the emergent layers of meaning of their images. That said, the more flexible the input medium, the greater the expressive potential. In text messaging, for example, text input that was constrained by dictionaries (e.g., T9), would have impeded the appropriation of text messaging shorthand within subcultures. The lack of constraints on the photographic input in Lascaux, then, is more likely to enable the flexible, grassroots appropriation of the image as local expression.

It may be that it would have taken longer for the image to emerge as local expression because instant messaging is typically a dyadic medium and there are fewer opportunities for conventions to propagate [28]. There are two additional issues at stake here, designing for the image as local expression — the ability for local expression to be learned within a subculture and the ability for local expression to be reused within a subculture.

mokona:
   pan is hiding under the bed
mokona:
   it's her new favorite hide
   and seek place
mokona:
   she's pouncing on my head
Umi-chan:
   hehe
mokona:
   i'm lying on the floor
   eating strawberries
   listening to the game
mokona:
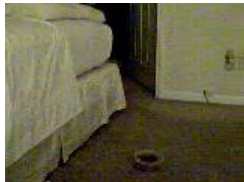


mokona:
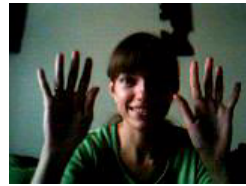   oops.. she went under the
   bed again
mokona:



mokona:
   she's trying to find spiders
   again
[...]
Umi-chan:
   puu?
mokona:
   strawberries so good
Umi-chan:
   me want strawberries
mokona:



**Figure 6. Sharing
strawberries**

Anna:



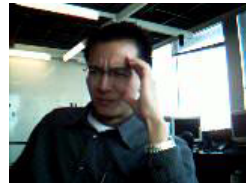[...]
Paul:
   I can't do it!
[...]
Anna:
   try to concentrate on it
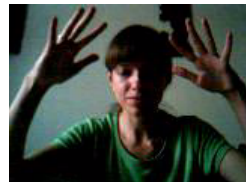Anna:
   really really hard
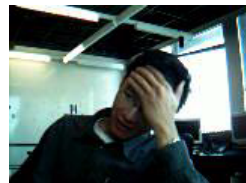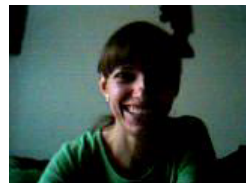Paul:



[...]
Anna:



Paul:



Anna:



Anna:
   not working yet?
[...]
Paul:



Anna:
   see!!!!

**Figure 7. Two-handed
self portrait**

To support the learning of local expression within a subculture, one might allow images or series of images to be tagged with their intended meaning. One might create shared "scrapbooks" of favorite images. One might better support the forwarding of instant messages, instant messaging excerpts, or individual images through other communication media, such as email.

To support the reuse of local expression within a subculture, one might allow images or series of images, either from a shared or individual repository, to be pulled into the current instant message. For example, a social group might share an image of a favorite pair of shoes that they all understand to mean "I'm running late."

### The Image as Invitation

Anthropological studies have foregrounded the social role of the image — the image as an artifact that invites others to sociality. Kodak's innovation of the "You press the button, we do the rest" camera in 1888 [19] enabled amateurs to access the medium and appropriate the resultant domestic photography into an activity of social meaning-making. As anthropologist Richard Chalfen articulates, "[domestic photographs] are meant to be shared, and they are meant to prompt interaction" [6]. The social invitation of the domestic photograph is to join in an "intertext of discourses that shift between past and represent, spectator and image, and between all of these and cultural contexts, historical moments" [16].

That photos are viewed socially is echoed by researchers in the Computer Supported Cooperative Work community, both by those conducting their own field studies [7, 10] and by those designing and developing technologies to support photo sharing [1, 25].

Studies of the use of digital cameras in conjunction with mobile email devices (to email the photos) liken this new photographic activity to that of sending multimedia postcards [15, 18]. The existence of the postcard, it is argued, "depends upon [it] being sent to another person." Likewise, the significance of the multimedia postcard is "in the way it can form a basis for sociability....The connection to other people and the capability to entertain them are ends in themselves; the 'utility' of the message is of secondary importance" [18]. The social invitation of the multimedia postcard carries an implied response:

> To receive a message forms a binding relationship in a sense that some kind of reply is expected. This way it actually calls for a reaction, at least an expression of gratitude, if not an outright return of gift [18].

It is likely the case that images used within a communicative medium are inherently social, but some communication functions as an invitation to enriched sociality. In Figure 6, the images provide an invitation for the user's coparticipant to share in her experiences, to share virtually in the amusing exploits of her cat and to push the boundaries of virtuality by sharing what she is eating as well.

Given an expectation that images are used as invitation, however, what was missing from our data were images used at the very outset of an instant message. We saw instances of one line greetings (e.g., "Hi!" or "Hey Scott") followed

by a photograph (often a wave) but none in which a photograph was used to begin an exchange. One limitation of our protocol was that an instant messaging session had to be established in text before images could be sent. A medium that would better foster the image as invitation would allow images to initiate an exchange.

In the context of instant messaging, it is often common to provide an indication of status (e.g., "Busy" or "Out to Lunch"). Previous research [13] has documented user customization of this status field to provide detailed and sometimes humorous status information. Such customized status, in many cases, may also be viewed as an invitation (e.g., read as: "Distract me! I'm tired of writing"). A medium that better supported the image as invitation might allow users to set visual status as an invitation (or dis-invitation) to enriched sociality.

Previous research on teen use of cell phones has noted that meaningful social exchange may take on the additional form of gift-giving [27]. In the context of cell phones, teens saved text messages that held particular significance for them. In the context of visual communication, one might better support enriched sociality by providing a way for particularly significant photos, instant messages, or excerpts to be saved in a way that would help validate and foreground their significance as gifts.

**The Image as Object/Instrument**

Our final theme of the appropriation of visual images reflects more of a continuum between viewing the image as an object and the image as an instrument. This distinction has also been explained as the difference between communication in which the focus is *on* the image (image as object) versus communication in which the focus is *through* the image (image as instrument).

A more concrete example of this distinction may be seen in the history of the use of images in the Catholic church. In Europe, prior to the seventh century, the use and, in some cases, worship of the religious image was firmly in place:

> Under the successors of Constantine, in the peace and luxury of the triumphant church, the more prudent bishops condescended to indulge a visible superstition for the benefit of the multitude....By a slow though inevitable progression the honours of the original were transferred to the copy: the devout Christian prayed before the image of a saint; and the Pagan rites of genuflexion, luminaries, and incense again stole into the Catholic church [11].

During the reign of Leo the Iconoclast, however, the use of images was abolished as being a return to paganism and idolatry. It was not until the ninth century that the legitimacy and veneration of images was re-established [14]. The emergent theological justification for the use of religious images emphasized the distinction between the image as an object *on* which one is focused and the image as an instrument *through* which one is focused [14]. The image as instrument transcends that which is the image as object.

This same distinction has also been made in reference to the images of the nineteenth-century art world. Marshall McLuhan speculated that the greatest revolution caused by the photograph was in the visual arts. Because a painter could no longer compete with the realism of the photograph, he turned to impressionism:

> ...in the pointillisme of Seurat, the world suddenly appeared *through* the painting. The direction of a syntactical point of view from outside *onto* the painting ended as literary form dwindled into the headlines with the telegraph (author's original emphasis) [23].

In our Lascaux data, there appeared to be a continuum between images that functioned more as objects and images that functioned more as instruments. In Figure 8, for example, while the communicative intent is to share the discovery of a book, the image of a book is primarily just that, a book — an object. In Figure 3, the image of a juice bottle is situated somewhere between an object and an instrument. The juice bottle functions somewhat as an object, as it is being used a prop in the communication. But the juice bottle is also being used as an instrument through which the communicant is being clever; here, the image is also a joke. In Figure 6, the image of a strawberry is very little about the strawberry. The significance of the image is not its object-ness. The significance of the image is as an instrument through which an invitation to sociality is proffered. Finally, we might anticipate a class of image as instrument that requires such artistic mastery of the medium that we have not seen it after only four months of use.

It seems that the flexible interplay of text and image in Lascaux is sufficient for supporting the image at many points on the continuum between object and instrument. If we hypothesize that there is a class of image as instrument that will eventually parallel the artistic paradigm shift of pointillisme, what may foster that use of the image may not be any one particular feature or affordance of the technology, itself. The emergence of the image as artistic instrument may result from a unique configuration of the technical flexibility of this medium, other communicative or artistic technologies, and the social context in which they all play out.

If the image as artistic instrument emerges as a new way of seeing in a medium, it also implies that an existing or

Scott:
   I was at the library
Scott:
   The librarians are so nice
   here
Scott:
   I got myself a book to per-
   oose
Mara:
   cool
Scott:



Mara:
   hahah
Mara:
   excellent

**Figure 8.  A book to "per-oose"**

conventional way of seeing in a medium has been established, a matter of long-term adoption and appropriation.

## LITERACY, MASTERY & APPROPRIATION

There is a strong relationship between literacy, mastery, and the appropriation of classes of communication. The initial design of Lascaux anticipated less nuanced understandings of literacy and media access. We chose to study visual communication in the context of instant messaging because of its accessibility compared to other communicative media. This design decision reflected our understanding of the role of gatekeepers, a role that can be seen throughout history.

The first example of the illustrated manuscript (as early as 16th Century B.C.) were funerary papyri, more commonly referred to as *The Book of the Dead*. They were commissioned of Scribes to foretell the deceased's journey into the afterlife [21]. *The Book of the Dead* were written in a hieroglyphic sacred language that only the Scribes used and understood [2]. Most Egyptians, then, were not able to leverage this form of visual communication for their own expressiveness; only the Scribal gatekeepers, in this case, could be considered literate.

That visual communication was controlled by cultural gatekeepers was not uniquely endemic of the ancient Egyptians. Contemporary visual gatekeepers congregate around certain areas of California and New York:

> Most film and television, consequently, has been controlled by a caste: the high priests of Hollywood and Sixth Avenue — a caste almost as closed and as narrow as that of the scribes of ancient Egypt....Except for some primitive home movies, in moving images most of the rest of us have been, to use a formulation of Alan Kay's, only half "literate."...We have been living with the frustration of a one-way form of communication, the frustrations of the mute [26].

In general, Lascaux serves to promote visual communication literacy, placing an authoring and expressive potential in the hands of non-gatekeepers. Lascaux is not a one-way, controlled and disseminated medium; the user has personal control of the medium and modality as well as control of what and when to convey, enabling expressiveness, creativity and even a little sleight of hand (Figure 3).

Within Lascaux, however, we came to understand that the literacy Alan Kay talks about is as much about individual technical affordances as it is about cultural gatekeepers. Literacy is about access to the expressive potential of a medium. To the extent that any technical capabilities of a system are out of reach, any classes of communication that rely on that specific technical capability are also out of reach. It is even then that one's literacy is compromised.

In the current version of Lascaux, a mouse click is required to send an image. In general, this meant that when a user was in the photo, only one hand could ever be seen; the second hand was on the mouse. Certain users, however, found work-arounds to this "limitation," creating subpopulations of users who were and were not able to access the expressive potential of two-handed images. Imagine, for example, not being able to tell a "fish tale" because you do not have two hands available to show how

big the fish really was. In the Lascaux data, users often used two hands extended as far as the boundaries of the camera to convey just how wonderful someone was, as the answer to the typically rhetorical question "How awesome are you?" Those whose two-handed literacy was not compromised flaunted their ability to generate a "two-handed photo," often to the great frustration of their coparticipant (Figure 7).

The broader implication of the two-handed photo observation is that the appropriation of visual communication for a particular communicative intent is directly related to literacy. Whether one's intent is to compliment someone, to tell fish tales, or to use the image as amplification, narrative, awareness, local expression, invitation, or object/instrument, the accessibility of a technology or even certain features of that technology for mastery will be a significant factor in determining whether the image is appropriated within a medium.

Our research highlights the potential impact of relatively subtle design decisions on the appropriation of visual communication. Even a decision such as having users click a button to send a photo can have dramatic impact on the ability of users to access entire classes of visual communication.

## CONCLUSION

Although this research does not completely "close the loop" between observations of human activity and the implementation of new forms of computer-mediated communication, we believe that our efforts at identifying design implications based on our analyses of image use across multiple contexts validates the usefulness of our themes of appropriation as a lens for examining a breadth of communicative roles of the image in instant messaging.

This research constitutes an initial snapshot of visual communication in instant messaging. This exploration began with the design and use of an instant messaging client, Lascaux, that enables users to send both webcam photos and text in instant messages. Our analysis of the Lascaux data and of other accounts of the use of images in communication have led us to outline six themes of the communicative appropriation of the visual image. Considering the themes as provocative predictors of future visual communication practices, we then built upon our analysis to suggest potential design techniques for supporting each thematic appropriation of the visual image.

Taken together, our three perspectives amplify each other — the Lascaux data analysis, the analysis of image use in other contexts, and the grounded speculation of design implications. In the end, we have offered six themes of the appropriation of the image and numerous potential research and design trajectories for the integration of visual communication with computer-mediated communication technologies.

## ACKNOWLEDGEMENTS

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