pixSmix: Visual Ambiguity as a Means of Designing Interpersonal Connection

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CHI 2010, April 10 - 15, 2010, Atlanta, Georgia, USA
ACM 978-1-60558-930-5/10/04.

Abstract
Strategies for meeting people online are often based on appearance or demographics, criteria that do not guarantee quality connections or long-lasting relationships. Drawing from prior work in ambiguity and affective interaction, *pixSmix* is a conceptual design to facilitate human connection through visual expression and interpretation. Participants create mosaics formed from a dozen public images, co-creating meaning with those who view and interact with the social artifact. To explore the validity and dynamics of this process, we gathered feedback using a paper prototype and a task-oriented focus group. The early outcomes support the notion of ambiguous design as an engaging creative activity and, through sharing of new social artifacts, as rewarding reflective experience.

Author Keywords
Ambiguous design, visual expression, connection, images, focus group, paper prototype.

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Our goal for this design project is to facilitate interpersonal connections based on the artistic expressions of another person rather than evaluation of external factors (appearance or demographics). We believe this is accomplished by encouraging expression through visual imagery.

Our core design assumptions are that people will react positively to the creation of these visual works—*it has to be fun to do*—and also that they will be willing to interpret the work of others. The pixSmix concept calls for individuals to aggregate around new social artifacts, comprised of a dozen pictures selected from a library of 36 random public images. Other people respond to these ambiguous artifacts, annotating them with narrative and a perceived understanding of its creator.

As a multi-user interaction dependent on people to co-create the meaning of the artifacts, traditional testing of individuals using prototypes would provide only a limited view of the potential community dynamics. To address this shortcoming, we decided to facilitate a task-driven focus group on expression and connection. This abstract explains the context and early results supporting our ambiguous design.

Ambiguous Design

Ambiguity can be considered an asset to the design of interactive systems. One notable example of *ambiguous design* is the Home Health Horoscope—a sensor-based system that collects information about activity in a home and turns that data into over-interpreted statements, modeled after horoscopes [5].

One perhaps intractable problem when designing for wellbeing is to have computers generate accurate interpretations. With precision as a goal, accuracy is dependent on the computer understanding the context of a broad range of data. Rather than use sensor data to report and process *precise* measurements, with HHH the responsibility for interpretation shifts to the occupants of the home. The horoscope becomes a social artifact that prompts discussion, often about how that day's statement is wrong.

AuralScapes—a project to bring arrhythmic sounds and overhead images into an enclosed internal room—attempts to change the ambiance of a physical space. The information presented is *ludic*, or playful—it is purposely blurred and incoherent until the observer gives it aesthetic meaning. With AuralScapes, the same hum of nearby machinery that was initially annoying to occupants of the interior space will, over time, became familiar and even comfortable [8]. Interpretation evolves with experience.

Ambiguity can also lead to *appropriation of use*. In a field test conducted with networked cameras, participants attempted to capture images revealing the context of their own lives. Through the device, they were encouraged to share these artifacts between family and friends. In practice, the device was used as a broadcast tool for storytelling, to express spirituality and affection, to strengthen group bonds, and in supporting conversation [7].

Ambiguity sometimes produces adverse reactions. Pangmangi is a flat-panel display installed on office doors to create awareness of the occupant's availability. During testing, the installation generated

frustrations with the lack of precision and incorrect interpretations [6]. This reaction can also be *provoked*. Digital deviance addresses the needs of the darker aspects of humanity through application design [3]. Sinister prompts can engender positive outcomes: the technology assumes a negative role, and humans in the group counter with noble behavior.

As introduced to HCI in 2003 by Gaver et al, ambiguity falls into three broad classes: *information* (in the artifact), *context* (surrounding the artifact), and *relationship* (in the participant's experiences) [4]. The authors suggested several actions the designer might consider when enhancing the ambiguous design of an experience, including:

- *Over-interpret data* to encourage speculation. (Information)
- *Cast doubt on sources* to provoke independent assessment. (Information)
- *Implicate incompatible contexts* to disrupt preconceptions. (Context)
- *Offer unaccustomed roles* to encourage imagination. (Relationship)

The main interaction in pixSmix is the manipulation, selection, and arrangement of random photos into a grid. Drawn from an ample supply of interesting pictures available through the Flickr API[1], none of the photos shown to a pixSmix member originate from that person's own gallery. Through making choices from unrelated content, members actively construct a meaningful experience around the technology [9].

[1] http://www.flickr.com/services/api

Individuals build social artifacts from this creative material based on the sense they make of the images they see. In turn, that artifact will be assigned different meaning by others who see it. This is a key characteristic of ambiguous design.

Methodology

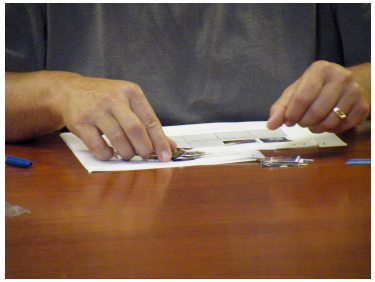
For pixSmix, all four of these qualities of ambiguous systems—imprecision, playfulness, re-appropriation, and provocation—are potentially integral to the user experience we want to create. Prior to implementing a full system, however, we explored our concepts and assumptions through a task-driven focus group.

Paper Prototype

Initially, a paper prototype—comprised of 36 pictures cut from magazines—was created to simulate the kinds of images we might expect to provide through Flickr. Three people were recruited through local online social networks to participate in a small user study.

The goals for this inquiry were to: (1) evaluate the perceived individual value of the proposed interactions; (2) observe the process of sorting through images to select a dozen for the composition; and, (3) to better understand the strengths and weaknesses of the suggested GUI navigation.

Outcomes of the paper prototype study created expectations for the focus group. The three subjects each found the concept enjoyable and indicated they were intrigued about seeing it as a real site. They all explored the images thoroughly before selecting their first picture to place in the grid, spreading them out to see them all at once (everyone used space off of the paper "screen"). Even with just 36 pictures, few images



Figures 1-2. Paper prototypes yielded insights about how people sort, select and explore images.

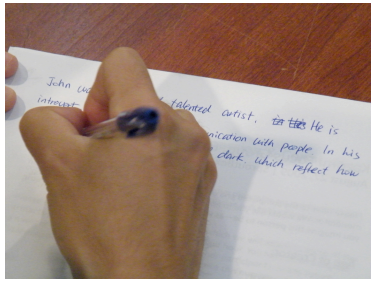


Figure 3. After first composing their own mosaics, participants in the focus group were asked to write stories inspired by another mosaic.

overlapped between mosaics; only one of the 25 images used appeared in all three compositions. These findings became areas of interest in the group session.

Focus Group

Ten local people were recruited to participate in the focus group and discuss topics related to expression and connection. At the start of the session, each person completed a short survey about her demographics and use of technology. They then undertook a number of tasks related to ambiguous design and the visual expression interaction planned for pixSmix.

The participants in the focus group were split evenly along gender lines (5 women, 5 men) with ages ranging from 24 to 52 years old. Only one participant was not an active member of any online social or media community of interest (Twitter, Facebook, YouTube, and Flickr), and just two self-reported spending fewer than 6 hours a day online. Most participants (7) considered themselves "artistic," but those who did not also had the least amount of active exposure to online social networks and daily time spent online.

To assist with the tasks, three packets containing 36 small pictures each were distributed to all of the participants: *Interesting* (Flickr's most interesting pictures), *Contacts* (interesting pictures from friends of the facilitator), and *Creative Commons* (interesting photos licensed for public use). Every person selected the 12 pictures they liked the best and arranged them to fill a 4x3 paper grid (Figure 1). As each composition was completed, a photo was taken (Figure 2), generating 30 such images for later analysis.

The final task involved making sense of an existing composition, previously created from the third packet of pictures. This mosaic of photos was displayed on a screen for everyone to see, and each participant was asked to guess some basic demographics of its creator and compose a short story inspired by these pictures (Figure 3). Group discussion followed.

Gauging Engagement

These activities uncovered new insights about the composition and interpretation strategies for making meaning of these ambiguous artifacts, as well as the impact of shared experiences on connection.

Composition

As with the prototype tests, participants in the focus group initially examined all of the images in a packet prior to making decisions. In many cases[2], this involved first spreading all of the pictures out onto the table, off of the paper workspace. A common strategy involved separating candidate from non-candidate images before selecting and arranging the twelve finalists.

Some distinctions emerged between how the three packets of photos were used. While the distribution of images was similar across packets (Figure 4), the "Contacts" set—containing multiple images of clay book boxes, the President, and Indian faces—represented a different organizing strategy. Due to a limited number of photo contributors, and the narrowed diversity of subject matter that resulted, participants tended to form thematic piles as part of their sorting process.

[2] One participant went through the entire stack one at a time without using the table. He explained his strategy as not wanting to intrude on the shared space of his neighbors.

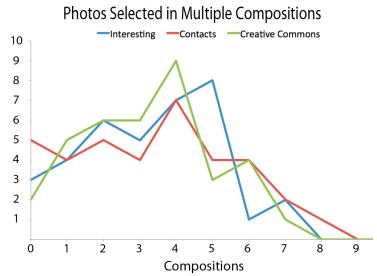


Figure 4. Distribution of images used in compositions

One of the other open questions was whether a pool of 36 images would create a large number of rejected photos. In all three exercises, however, the majority of images appeared in no more than 4 arrangements. Only one image (from the most homogenous packet) appeared is as many as 8 of 10 compositions. Of the 108 photos in the three packages, only ten failed to be included in at least one of the 30 mosaics.

Awareness of a prior meaning was influential in decision-making. In the "Contacts" packet, five images of Barack Obama were not used, and of the three that were only one appeared in more than one composition. The most popular images were often distinctive, uncomplicated and unattached to well-defined meaning (As one participant said: *"I gravitate toward pictures with neutral emotion"*).

Everyone had to resolve the constraint of the 4x3 grid offered as the composition space. All twelve spaces in the grid were landscape orientation, but a number of the pictures were portraits. Compositions from the first two sets showed modest use of portrait images, but by the third set participants felt less constrained (30 portraits were selected)[3].

Interpretation

Participants appeared to project an ideal self onto the creator of the sample composition. While they described the creator's mood in contradictory ways—artistic, quiet, ambivalent, engaged, out-of-sorts, playful, and reflective—only one person went against his own gender when guessing the creator's gender. Also, everyone gravitated toward a median age of 30 years old—younger participants guessed the creator was older, and older participants guessed younger.

Revelation of the creator was not entirely welcome. Upon discovering who composed this work—a 5-year-old boy, who had grouped his images into dark and bright—one participant appeared sad among the many smiles (*"I feel really dumb."*). Many indicated they now saw the composition in a different light (*"Finding out a 5-year-old did this explains a lot about the choices."*).

Several people stated they wrote a story about the composition only because of the facilitator's instructions and would not likely do so of their own volition. Most agreed that listening to stories was fun, suggesting a greater interest in consuming than sharing meaning.

[3] One person experimented with the grid itself, turning it into a 3x4 orientation.

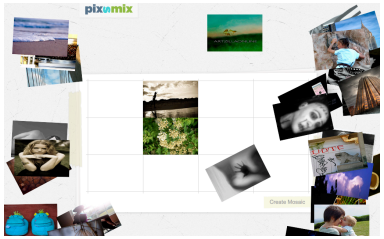
Some basic text analysis[4] was applied to the stories authored by participants about the composition. The stories varied in length (149-592 non-space characters), generating 399 unique words and 3513 non-space characters. The men in this focus group wrote a little more and had a slightly higher readability index (7.16 to 6.94), suggesting the possibility that genders approach this interaction differently. Age, degree of online activity, or self-disclosed sense of artistic ability may be equally culpable for any differences, however, as these qualities overlapped in the participant group.

Shared Experiences

At the start of the focus group, no introductions were offered to the ten participants. In the absence of that formality, people were uncomfortable. However, some noted that not knowing others made it was easier to focus on the initial tasks (*"With all my friends around we'd be talking"*). That shared experience—both the uncomfortable social situation and the required tasks—ultimately allowed the participants to engage with the artifacts and each other (*"I would not have been interested [in the pictures] if I hadn't done this first"*).

Common tasks and shared experiences also proved a recurring theme when participants described how each met his or her "best friend." Six people indicated the ultimate attraction was because the best friend played a complementary role, rather than birds-of-a-feather. However, everyone had some common context in which the friendships grew.

[4] Textalyzer, http://textalyser.net



pixSmix Alpha

Ongoing development of pixSmix will lead to a Beta launch in February 2010. Having confirmed that the interaction concept is interesting to people through early inquiry, this iteration strives to address the question of sustained engagement with the site.

Our early inquiries highlight two relevant areas of exploration. First, people are more likely to consume than share interpretations, suggesting a need for symbiotic user groups to power interaction dynamics. Second, the same social artifact may spark grouped responses based on demographics or behavioral patterns. If true, this will greatly inform future plans for recommendation systems.

We are currently targeting four specific user groups: Photographers, Creative Writers, Self-Help and New Age Disciples, and Mommy Bloggers. An extended user test will help us better understand how these groups might incorporate pixSmix mosaics into their routines.

Implications

Ambiguity is not a fixed target. Over time, interpretations can become convention, lessening the ambiguity and thus need to interpret [2]. Different meanings arise out of different contexts, and therefore, ambiguity must be designed as an interpretive *space* [1], rather than a discrete object that remains eternally ambiguous. For that reason, pixSmix must continually adapt certain elements (images, responses, creative controls) to continually recreate the experiences encountered by our focus group.

The early inquiry revealed promising signs that pixSmix may be a well-received and engaging activity. The constraints presented to participants afforded creative challenges for expression. Diversity made thematic grouping difficult and created a wider range of individual choices. Most importantly, these constraints were not fixed: people adapted.

Our interaction concept masks the context of creation of each social artifact, forcing observers to make meaning from their own experiences. Viewer feedback is not meant to be precise, but rather provoke self-reflection as a byproduct. pixSmix intentionally makes it difficult to import existing social graphs or construct new ones based on member profiles. The point of connection is the mosaic, forcing individuals to employ new strategies of engagement. No conclusions can yet be drawn about the effectiveness of such artifacts to drive social connection.

Absent the author's context, people appear to project themselves onto the work of others. In fact, knowing the intent of the creator changes the interpretation of the observer. The shared act of creating mosaics is what gave participants an interpretive foothold. Just as lasting friendships are founded on common experiences, the shared cyclical experience of artifact creation and interpretation, as witnessed in the focus group, lends credence to the goal for the pixSmix—connect people in a new and meaningful way.

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