Inspiring Design: Exploring online sources of user-generated information

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ABSTRACT
This paper describes an exploratory study examining different online sources of photographs to inform and inspire designers in the conceptual phase of user-centered design. While ethnographic techniques are available to access rich user information, these techniques are often expensive in terms of time, money, and effort. Increased online participation and online contributions through Web 2.0 and crowdsourcing applications provide growing opportunities to access and solicit a wide variety of user-generated content. These activities and the generated content may provide economical access to information from and about users, to inform and inspire designers. This paper examines five sets of images harvested from four online sources. Results address the use of these sources for gathering images, highlight differences between sources, and discuss designers' interpretations of the images. We conclude with a plan for continued research to better understand how crowdsourced content can benefit user-centered design.

Keywords
Crowdsourcing, Mechanical Turk, Images, Inspiration, User-Generated Information, User-centered Design (UCD), Sustainable Living

INTRODUCTION

The continued emphasis on user involvement demonstrates their value in the development of usable systems [5,11]. Early user involvement is especially beneficial for understanding user requirements and context of use [5,8]. In addition, image collections [4,10] and examples [3,6] play a critical role in ideation and rational during the creative design process. Personal and shared collections are common sources of inspiration and information for designers. Techniques aimed at early user involvement, such as, cultural probes [2] and generative techniques [8,9], engage users to elicit rich contextual information that is both personal and highly visual. This rich information is appreciated as a source of inspiration as well as information about intended users and their context. Unfortunately user involvement and engagement often require considerable time, money, and expertise, especially to coordinate and conduct the fieldwork.

In contrast, the Internet continues to provide new opportunities for people to easily create and share information. Increasing participation in Web 2.0 applications including various forms of crowdsourcing provide a venue for people to contribute to and access a wide variety of user-generated content. These activities provide a variety of new opportunities to access user generated information.

The current study elaborates upon four of these online applications as a source of insight into the everyday lives of people, analogous to cultural probes [2], by gathering rich visual information (personal photographs). From the plethora of online sources, Google Images, iStockPhoto, Flickr, and Amazon's Mechanical Turk (MTurk) were selected to gather images for this study. These four well-known sources were selected because they access and accumulate content in different ways.

- Google Images searches out any images on the Internet based on algorithmic relevance, to the search terms.
- iStockPhoto, familiar to designers and populated by photographers, is a repository and storefront to buy and sell stock imagery.
- Flickr is an online repository, specifically designed to "Share your photos. Watch the world" [1]. Populated by people interested in sharing photographs. A second image set was collected from Flickr using the 'interesting' filter.
- MTurk, rather than searching out existing content, uses crowdsourcing to collect inputs from an on demand workforce capable of completing a wide variety of tasks, including uploading photos.

This study explores the differences between these sources in supporting online image collection, for informing and inspiring the early stages of a user-centered design process. What are the qualities of images? How do designers react and interpret the images? Do these sources provide designers with inspiration and insights about users?

METHOD

This study was conducted in two segments. First, images sets were harvested from the four sources, and then designers were asked to explore and discuss the image sets. Theses activities were conducted based on the following scenario, which was selected to fit within a current research program in the department.

A designer is presented with a task to "Design a product to help families live more sustainably." Seeking insights into how "families live sustainably" he turns to the Internet as an initial source of information and inspiration.

Data Collection

The aim was to gather 40 images from each of the 4 sources (Google Images, iStockPhoto, Flickr, and MTurk). To begin, an assignment was created on MTurk to gather responses while image sets were collected from the other sources. To create the assignment on MTurk a Human Intelligence Task (HIT) was created using the standard "file upload template." The HIT asked people to "Please submit a picture of something your family does to live sustainably." The HIT offered $0.05 per upload and allowed only one upload per participant, with no other filters or qualifications. In 3.5 days the HIT was completed and the 40 requested pictures were retrieved (see Figure 5).

Images from the other sources were collected using the default search function on each homepage with the search terms "family sustainable living." The first 40 images were saved from each source (see Figures 1-3).

While gathering images, Flickr offered three filter options (relevant, recent, and interesting). The default was "relevant" (see Figure 3). As this was an explorative study, a second set of images was gathered from Flickr using the "interesting" filter (see Figure 4). 'Interestingness' is determined from a variety of data including number of views, comments, and tags a photo receives [Flickr].

Figure 1. Images from Google Images (n=40)

Figure 2. Images from iStockPhoto (n=7)

Figure 3. Images from Flickr (n=40)

Figure 4. Images from Flickr using the 'Interesting' filter (n=40)

Figure 5. Images submitted by workers on Mechanical Turk (n=40)

Data Analysis

For the second part of the study, six designers individually examined each of the five image sets in random order. The designers all had academic training and professional experience in industrial design, 3 had specific expertise in sustainable design, and 3 were female.

The designers were given the design brief and asked to conduct a card-sorting exercise [7] with printed copies of the images for each set. The sorting task allowed the designers to freely explore the images, while the act of organizing stimulated them to evaluate meanings and set relationships between images [4]. During the card-sorting task the designers freely commented on what they saw, how they interpreted individual images, relationships and contrasts between images, as well as qualities that made images more or less interesting or appealing.

After the sorting tasks were completed they were asked to reflect on their preferences and perceived value of the

image sets for providing information and inspiration related to the design brief. They were not informed of where or how the images had been collected until they had completed the sorting and value judgments for all five sets.

The designers' comments were captured throughout the process, and then sorted and organized by the researchers, into emerging themes and ideas. The selected comments shown in tables 2 and 3, are quotes that represent the most common comments and reactions to the image sets.

RESULTS

The results capture both the researchers' experiences harvesting images from the different online sources, and designers' perceptions of the images sets, as a source of inspiration and contextual user insights.

Harvesting Images Online

The process of searching images on Google, iStock and Flickr was no different then any other online search, though saving each image for later use required 10-15 minutes per set. MTurk required additional steps to create an account, write, fund, and post the HIT. This process was similar to making an online purchase, assuming you used an existing template to create your HIT, this required about 15 minutes.

The primary difference in using MTurk was the time lapse between posting the task and receiving the results (waiting for people to complete the HIT). Downloading the resulting images from MTurk was not notably different then saving the search images (10 minutes). An unexpected difference, experienced by the researchers, was a sense of commitment and attention to the results from MTurk. The act of waiting for responses combined with the inability to immediately scroll down or enter new search terms, contrasted the fleeting attention typically given to search results, especially those that do not match our expectations.

During the collection process the authors noted some initial observations of how the image sets differ (see Table 1).

Source	Researchers' Initial Observations
Google Images (see Figure 1)	Corporate stock photography of architecture, furniture, and event advertising. A modern western perspective. Some duplicate images.
iStockPhoto (see Figure 2)	Stock photography, posed and idyllic. Green color. Very limited quantity.
Flickr (see Figure 3)	Personal and authentic snapshots of people and activities. A western view of rural places. Several duplicate images.
Flickr 'Interesting' (see Figure 4)	More composed personal photos, a western view of interesting people and activities from other places. Increased variety.
MTurk (see Figure 5)	Personal snapshots of people and families in India. An emphasis on religion (icons and events). Some images with questionable relation to sustainability.

Table 1. Researchers initial observations, noted during the collection process.

The second phase of this study took a closer look at these image sets by presenting them to designers, to explore and discuss their impressions of value and content.

Designers' Reactions

The designers had many comments as they explored the images. The comments captured during the card-sorting tasks (see sample in Table 2) show that each set of images (to varying degrees) was capable of expanding their thinking on the topic.

Source	Designers' Comments
Google Images	Pros: "some nice links between groups" "nature, industry, technology" "community projects" "eco can be modern and sexy"
	Cons: "lacks people" "overview, limited details" "big gaps" "fluff" "I don't want other's solutions" "not homogenic [sic.]" "sustainable is more than architecture"
iStockPhoto	Pros: "well composed pictures"
	Cons: "lack quantity" "how does this relate" "obviously stock photos… not personal"
Flickr	Pros: "idealized, but helps make a vision" "interesting contrasts (recycling vs. nature, research vs. life, the good vs. the bad)" "shows all aspects, success and failure" "if only nice pictures you can miss a dimension" "lots of people… doing something is interesting"
	Cons: "industrial… lacks depth" "they feel forced" "missing tedious photos"
Flickr 'Interesting'	Pros: "interesting clusters with good links" "not what first comes to mind" "nice to see people doing stuff" "Homogeneous set" "makes a nice info-graphic" "not redundant" "more inspirational"
	Cons: "no city stuff, are we all living rural?" "all happy brown people" "far from subject, but interesting"
Mechanical Turk	Pros: "developing vs. the west… reconsider who is consuming" "shows relationship of sustainability to social practice and tradition… a part of life"
	Cons: "some obvious crap" "lacks 1st world contrast" "lots of people, but not doing things" "too easy to categorize" "no connections [between categories]"

Table 2. Designers' comments related to each set of images.

Many of the comments described what the designers like and dislike about individual images as they relate to the topic of sustainable living, with additional attention given to how the images in a set relate to each other and a wider view of sustainability. Their comments show a preference for images that were personal and showed people 'doing things' (see Table 3). They also preferred sets of images that showed contrast, diversity and links or relationships between images. As a result the sets from Flickr were preferred, Google and iStock were not highly regarded, and MTurk received mixed comments.

The designers' comments on the perceived value of each set (for informing and inspiring) reflected their preference for pictures of real people doing things and sets that showed contrast or tension among images. In contrast the researchers observed that the set from MTurk, although not

the preferred set, generated numerous questions and garnered additional attention as the designers worked to fit the divergent images of religious events and iconography into their broader view of "family sustainable living."

	Designers' Comments
Positive	"People doing things is nice" "Real snapshots of life" "Doing something is interesting" "Unexpected" "contrast is nice…western vs. developing cultures" Interesting tension… the good and bad of [post industrialization]"
Negative	"Questionable relationship to sustainability" "I don't want to see typical solutions" "I see people, but they are not doing anything" "stock photos"

Table 3. Designers' comments on what makes a good or poor image or set of images, for inspiration and contextual insights.

CONCLUSIONS

The results from the current study support the use of online applications for gathering user-generated information for user-centered design. The images provided both information and inspiration for the designers by broadening their perspective on "family sustainable living" and challenging their assumptions. Additionally their comments illuminated characteristics of images that affect their perceived value for conveying rich contextual information about users. Specifically the designers preferred photos that are personal and showed people 'doing things'. They also preferred photo sets that showed contrast, diversity, and links or relationships between subsets. They did not appreciate posed or stock photos that show what they perceive to be someone else's solution or are not representative of 'real' people.

The image sets from Flickr were the preferred, while the divergence of the images from MTurk triggered more questions for further consideration. MTurk is obviously slower than search options, but faster and more affordable than methods requiring fieldwork. The images from MTurk may not produce the richness and personal connection gained though fieldwork, it does offer an affordable option to access first hand responses from 'real' people, without leaving your desk.

For this study, images from Google and iStock were perceived to be less valuable because they were not personal and showed a limited, commercial, or cliché perspective. In contrast these comments about preference the designers still identified elements in each set that triggered design considerations and exposed unique information on the topic of sustainable living. After completing the sorting task designers wanted more information about the images leading discussions about the additional information that is available from each source, by looking at the website, comments, or descriptions associated with each image. These insights indicate that online sources contain additional information that designers can use to gain rich insight into users' lives.

Additional value in gathering user-generated information from online images sources may reside in using the diversity derived from multiple sources and explicit (not passing) consideration for the results, by taking the time to critically examine what we find before moving on. To better understand these opportunities, the authors are planning further studies tied to design case studies, giving attention to how the images are sourced as well as how the information is incorporated into the design process. In addition the authors see value in the flexibility of MTurk and other crowdsourcing applications to access first hand responses from individuals.

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