Doodle Health: Games as Cultural Probes

José P. Zagal, Roger Altizer, Qing Zeng-Treitler, Jean Shipman,
Erica Lake, Heather Aiono, Marty Malheiro, Carrie Christensen
University of Utah
{jose.zagal, roger.altizer, q.t.zeng, jean.shipman, erica.lake, heather.aiono, marty.malheiro, carrie.christensen}@utah.edu

ABSTRACT
Doodle Health is a web-based online social game designed to elicit participation from under-represented communities to help design and evaluate pictographs used in patient-centered health communication materials. By drawing and guessing pictures representing medical terms we hope to gain culturally-specific knowledge useful for designing pictographs that are more effective across communities. More generally, we argue that a slightly broader view of serious games, in this case games that can be used as cultural probes, offers opportunities for exploring research questions and problems not considered previously.

1. INTRODUCTION
It is becoming increasingly important to develop written materials for better communicating health information such as medical discharge information or instructions for at-home care. Significant efforts have been made in both simplifying the textual language [e.g. 7] together with incorporating pictographs and illustrations [e.g. 5]. There is some evidence to suggest that using pictographs can help patients better recall medical instructions [6]. Since the interpretation and meaning of a pictograph is culturally situated, people from different cultural backgrounds might not understand, be confused, or even be offended by certain iconography. Figure 1 shows an image developed to represent 'chicken pox' (varicella). When this image was tested in a variety of field clinics, it became apparent that for some communities the primary interpretation of the image was either concern (e.g. what did the chicken do to that person?) or confusion (e.g. is this bird flu?). The association of 'chicken' with the name of the disease made no sense to members of non-English speaking communities. There are other less-obvious examples including some with imagery that was found to be offensive or otherwise inappropriate in certain communities (e.g. pictographs depicting the excretion of fluids).

To address this problem we are using a game to help us elicit community participation such that we can develop a library of pictographs that are culturally sensitive and also evaluate the efficacy of pictographs currently in use. We plan on making these available to clinical teams and others for use in the health materials they provide to their patients. Our work is inspired by games with a purpose and the notion of cultural probes as developed in human-computer interaction (HCI).

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1.1 Games with a Purpose
Von Ahn describes games with a purpose (GWAP) as a class of games where people "as a side effect of playing, perform tasks computers are unable to perform" [1]. The idea is that a large number of players could, generally in aggregate, provide information that is directly usable to answer some sort of research question or problem. For instance, players could take turns tagging a photo with meta-data describing the content of the picture; points would be awarded for using the same words as other players. In this example, a knowledge base would be created that could then be used for improving automated image recognition software. Games with a purpose can be seen as a form of crowdsourcing [4].

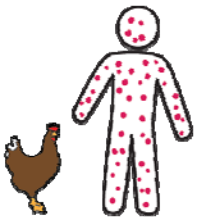

Figure 1: Pictograph for 'Chicken pox'

1.2 Cultural Probes
In HCI research cultural probes are often used as a technique for collecting data, either instead of, or to supplement other social scientific methods [3]. A cultural probe is something (often a physical object or collection) that is provided to a study participant to use or reflect on in an environment that may not otherwise be accessible to the researcher. For example, someone studying the use of technology in the home might provide a participant with a camera and a notebook and ask the participant to record moments of frustration with technology. The researcher would then collect the cameras and notebooks from their participants and analyze them for insight. Cultural probes are also described as participatory because they provide a richer and more meaningful way for engaging with research. Participants often find cultural probes more interesting, enjoyable, playful and creative than traditional surveys or interviews [3,8].

1.3 Doodle Health
Developing medical pictographs that are both culturally sensitive, informative, and accurate is challenging. For instance, different minority communities might come from different cultures, speak different languages, and thus require different iconography. So, we needed to find a way to engage a broad variety of local underrepresented minority communities in a way that was

tractable in terms of time and resources while remaining as widely accessible as possible.

Our current solution is an online web-based game called *Doodle Health*[1] (http://www.DoodleHealth.org) that is accessible on a variety of platforms (mobile, tablet, web, etc.). In *Doodle Health*, players first declare allegiance to a community and then earn points for that community. Points are earned by drawing images of medical terms or by guessing what medical term an existing images represents from a list of options. Images shown are either drawn by other members of the same community (after an editorial approval process to weed out clearly inappropriate images) or come from an existing database of professionally designed medical pictographs. Figure 2 below shows a screenshot of the game being played on a mobile device where one of the authors has drawn a (mediocre) picture representing 'Arm Sling'.

Figure 2: Screenshot of drawing an image (mobile device)

In most games with a purpose, the idea is that the input provided by the players will be directly useful (sometimes in aggregate) to the broader problem that is being solved. In our case, it is unreasonable to expect our players to have the skills of a professional graphic designer. We do not expect to directly use any of the pictures drawn by our participants. Rather, our goal is to analyze these images, hopefully determine some culturally significant aspects of these images for specific communities, and then have images professionally drawn. In this way we might uncover 'cultural knowledge' that is otherwise invisible or hard to elicit. We see this game as a cultural probe: a tool that can encourage participants to reflect on their health, their language, and their culture in a playful way while at the same time (hopefully) providing us with insights and ideas we can use to develop better iconography.

1.4 Design Process and Rationale

We used the Design Box method [2] as a way to generate ideas for the game we wanted to develop. We were also careful to include leaders from local community groups in the design process. In collaboration with the community leaders we developed guidelines to help us better address a diverse audience of players with varying degrees of English proficiency and technological literacy:

a) The game should feel familiar to players. We made sure to look at current drawing games (e.g. Draw Something) available on social networks and the web and emulated their designs. We also took cues from Windows 8's interface.

b) Respect people's privacy. We don't collect any personally identifying information in order to lower barriers to entry.

c) Minimize reading and text. We opted to simplify instructions and text to a minimum in order to increase accessibility and allow more room for players to interpret terms as they saw fit, 'play with the system', and explore alternate ways of thinking about pictorial representations.

[1] This is a mirror of our data collection site used for demonstration purposes. Readers can participate without concerns of interfering with our data collection.

2. DISCUSSION & FUTURE WORK

We are currently getting ready to begin a field-trial of *Doodle Health* with local community organizations. From this field trial we expect to collect data to help us develop ideas and concepts we can use to create new pictographs. It is at this point that we hope to verify our initial premise: games can be used as cultural probes. Regardless, we feel that this notion deserves further exploration – it seems that too often we focus on the direct and immediate effect that playing a game can have and miss out on opportunities where the 'serious' or 'purposeful' aspects are one step removed. This slightly broader view might be more amenable to research questions and problems we had not considered previously.

3. ACKNOWLEDGEMENTS

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