

Applying Persuasive Technologies in Developing Regions

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ABSTRACT

In this paper, we argue that, in developing regions, there is a need to disseminate information about education and health whose value is not always immediately recognized by local communities. We believe that we can draw inspiration from the design space of persuasive technologies in order to create effective interactions between users and technology so that such information can be learned and utilized. We present some background on persuasive technologies, and discuss our initial work with persuasive speech-based interfaces. We conclude with an outline of our future work on making health information accessible and effective using mobile, persuasive technologies.

Author Keywords

Persuasive technologies, speech interfaces, developing world.

INTRODUCTION

Most of us who work in the area of HCI for Community and International Development do so because we believe in it: that is, we believe that community and international development can be a long-term effect of appropriate technology design and use. In this spirit, we use early stage iterative design practices of understanding users, assessing needs and involving local stakeholders in the hope that the technologies we introduce to developing regions communities fit in with their cultural practices, needs and values. We believe that technology that is an appropriate match to the local culture will be widely adopted and therefore sustainable.

Many potential technology applications for developing regions fall under the umbrella of information access. Projects that have been successful provide information which end-users consider valuable, i.e. information about market prices, agricultural practices and job availability [1][2][3][4]. More often than not, information that community members expressly want is directly linked to some immediate economic advantage, i.e. more income. What we can learn from these projects is that if it's the information users want, and it's easy to access, they will utilize it. Thus as designers, we ask users to participate in choosing valuable content, and then we focus on improving usability based on local context.

However, as designers coming from the industrialized world, we are also exposed to so much important information (especially related to improving health and education) that is unfamiliar, culturally inconsistent, and has no immediate economic advantage to developing regions communities. In short, it is not the kind of information that end-users will expressly want or necessarily value. Yet, from our perspective, there is a clear need to disseminate this information. Therefore, we argue that not all motivation for information technologies can come from within the community, because the information itself is intended to overcome cultural barriers and change existing practices and values. In designing such technologies, we must focus not only

on ease of access to information, but also on motivating its utilization.

The following examples demonstrate this point more concretely:

- Government-employed teachers and health workers are expected to deliver their services to rural populations. These jobs often do not enforce accountability so many workers do not do their jobs [5]. In many cases, workers actually lack the confidence and skills to do their jobs [6]. The issue is not just in the delivery of services from the worker to community, but in the delivery of information to the workers themselves. *Technologies designed to help workers deliver their services must empower them with confidence to improve their skills and incentive to do their jobs, encouraging a new work ethic that is entirely inconsistent with what is typically enforced.*
- Basic primary education is critical for opening up higher education and career opportunities. Yet some children come from communities where generations have made their living without primary education. Some parents see little reason to send children to schools when there is a clear economic advantage in sending them to work [6]. *Technologies used in schools must emphasize and promote the value of literacy and learning and complement the values children are taught at home.*
- Family planning allows for couples to have children only when they are ready financially, to have only as many children as they can support, and to avoid pregnancy in the case of health or other issues [7]. Yet many religious and other cultural factors forbid its use. In many cultures, it is considered a woman's responsibility, but husbands must also play an active role in supporting family planning. *Any technology used to teach information about family planning must motivate users to act against cultural barriers by authoritatively asserting benefits and consequences.*

In these examples, information access is not entirely motivated from the user side. Thus, we must focus on the interaction between the user and the information technology such that it is not only easy access, but utilization that is our end-goal. For this, we draw inspiration from *captology* - the study of computers as persuasive technologies - which encompasses technologies designed with the intention of promoting and causing behavioral change among users [8].

We next describe a framework for understanding the design space of persuasive technologies. Then, we present our own initial work on persuasive speech-based interaction and our proposed application of this to smartphone-based health information access.

PERSUASIVE TECHNOLOGIES

Fogg has introduced the *functional triad* as a framework for thinking about the roles through which computing technologies

can persuade users [8]. The first role is that of a tool, which motivates a behavioral change in the user by enabling or simplifying a task. The second is that of a medium, in which a technology can actually provide a virtual environment where users can understand and experience the consequences of different behaviors. The third is the role of a social actor, in which users form a social relationship with the technology that provides support and encouragement to motivate a behavioral change.

Persuasive technologies which use mobile platforms can take advantage of intervention at the opportune moment, and thus be more effective at promoting behavioral change [8]. In addition, the always-connectedness of mobile platforms can promote more social interactions such as collaboration and competition that can be used as incentives for persuasion.

INITIAL WORK: PERSUASIVE SPEECH INTERFACES

Whether it is resolving a miscommunication, asking for a favor, or exchanging an idea, live interaction lends persuasive value to a social exchange that is difficult to match. Using speech-based persuasive technologies, we are interested in capturing these same social dynamics through new media. We conducted an experiment with 52 university students and staff members comparing the persuasiveness of two speech-based systems, one which used speech by playing pre-recorded messages (resembling many typical information access systems), and the other which engaged in interactive dialogue with the user (resembling a more social interaction). We measured the persuasiveness of the systems using a “Lost at the Moon” task [9] and initial results showed the interactive dialogue system to be more persuasive. This motivates the use of speech recognition and interactive interfaces in persuasive technologies for our ongoing work in health information access.

ONGOING WORK: PERSUASIVE TECHNOLOGIES FOR HEALTH INFORMATION

As statistics indicate, mortality rates due to preventable tragedies in the developing world are devastatingly high. For example, 99% of all maternal deaths due to complications in pregnancy, childbirth and unsafe abortions occur in developing regions [11], suggesting that they could be avoided with proper information and care.

However from field experience, we have learned of social barriers to information utilization. One is that health workers often find it difficult to establish their own authority among community members on information they are expected to teach. Another, closely related, is that the health workers themselves do not have the confidence to practice and preach what they have learned.

Our focus is to promote behavioral change and ensure that health workers are empowered and willing to practice the information they learn such that they can create an impact on their communities. We believe that smartphones might offer a solution in two ways: (1) by enabling timely and widespread access to information and (2) by conveying existing health information through interfaces which utilize text, animated diagrams and speech. Hesperian Foundation [10] has been publishing health handbooks for decades that target rural community health workers with low literacy and training. Together with Hesperian, we believe we can complement the textbook materials by designing simplified audio and visual forms of the content on smartphones,

and by utilizing speech recognition for persuasive, interactive access and presentation of information.

Specifically, we will target five goals within the mobile, persuasive design space. They are,

- To motivate health workers to practice what they learn in training programs,
- To teach health workers new skills and information,
- To enable health workers to readily refer to information while learning materials, consulting with patients, or preparing for consultations or group activities with community members,
- To aid health workers in teaching and encouraging healthy practices among community members, and
- To help health workers record and track patient information.

Our goal is to create accessible and effective health information for community health workers; we see *mobile* and *persuasive* technologies as providing respective solutions for *access* and *effectiveness*.

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