

# Designing A Mobile Application for Complementary and Alternative Medicine: A Usability Approach

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**Abstract.** The use of complementary and alternative medicine (CAM) is growing rapidly, and this trend has a significant impact on conventional healthcare. The lack of CAM disclosure between patients and physicians presents a serious challenge for successful treatment. The current study addresses this problem by proposing a CAM mobile application designed with a focus on usability. The goal of the study is to provide a platform where patients, physicians, and CAM practitioners can communicate, exchange ideas, and share their experiences. The mobile application is centered on the needs of the different user groups, and it provides an easy to navigate interface with responsive design, which is based on best practices in human-computer interaction. The study extends current knowledge by incorporating design science principles in the application development process and focuses on the usability of the proposed artifact to ensure successful communication on CAM between patients, physicians, and CAM practitioners.

**Keywords:** Complementary and alternative medicine · Mobile healthcare · Mhealth · Usability · Human computer interaction · HCI · Design science

## 1 Introduction and Background

The use of complementary and alternative medicine (CAM) in the United States has been constantly growing in the last couple of decades [1–3]. In 2007, almost 4 out of 10 adults had used CAM therapy in the last 12 months [4]. The trends indicate the increasing influence of CAM on healthcare and the demand to integrate both approaches to achieve better outcomes and improved quality of care.

In spite of the growing use of CAM and its documented benefits, still many patients do not disclose the use of such therapies to their physicians. This can be due to: physician disinterest, anticipation of negative physician response, belief the physician is unable or unwilling to contribute useful information, and perception that disclosure of CAM is not relevant [5]. Further, discussions of biomedical treatment are much more frequent with CAM practitioners and CAM practices are poorly integrated into the medical encounter with physicians. Such a misbalance represents a serious challenge in medical communication [6] and can potentially lead to harmful treatment and adverse effects of prescribed medications.

There are numerous calls for medical practitioners to acknowledge the concerns and beliefs that drive patients' healthcare decisions and work with patients so that the use of CAM is acknowledged and the patients' needs, beliefs and concerns are respected [7–9]. Yet, accomplishing such a major shift in physicians' perception and attitude is still difficult to achieve.

## 2 Proposed Solution

We propose a mobile application that can improve the communication process between patients, physicians, and CAM therapists. We approach the CAM disclosure problem from a design science perspective [10, 11], and we integrate principles of HCI and usability in the design, development, and evaluation of the CAM mobile application. Mobile applications for CAM have been overlooked by researchers in the past. Existing CAM mobile applications have been created mostly from a business perspective, and there is lack of a scientific approach to the development process. Thus, a more rigorous method involving HCI and usability principles is needed to improve the quality and effectiveness of CAM mobile applications. The research question that guides this study is the following: How can a mobile application be designed to improve communication between patients, physicians, and therapists and how it can address the lack of disclosure of CAM therapy based on: (1) demonstrated usability, utility and usefulness of the artifact, and (2) transfer of successful design science principles to mobile application development?

### 2.1 Theories Informing the Design

Due to the existing lack of trust among patients, physicians, and CAM practitioners, we integrate in the design process theory of social capital which involves social cohesion to build trust and to engage individuals [12]. To improve the usability of the mobile application, we also refer to theories on “deep” and “thick” trust [13, 14], and we explore in more detail the specific needs of individuals in the community [15]. To develop a high quality application and ensure its adoption by the community, we also apply patterns of persuasion suggested by [16]. In addition, we elicited requirements from best practices established in prior literature and observations on other applications for healthcare, well-being, and health promotion. We also consulted with two experts on CAM.

### 2.2 Design Science Approach

The research approach we utilize for this study is based on design science principles suggested by [10]. They discuss an iterative approach to designing, building, and testing artifacts, which consists of the following three cycles: relevance, rigor, and design.

Starting from the application context, the relevance cycle begins when the research requirements and the acceptance criteria for evaluation are identified. When the

problem is defined, the rigor cycle starts. In this case, theories on CAM, mobile applications, and healthcare communication are used to inform the design. The requirements and theories identified earlier are used as inputs to the design cycle. A prototype of the mobile application is currently ongoing using experimental situations before field testing. The mobile application prototype will then be made available to the public and an evaluation will be performed. Based on the feedback obtained from users (patients, CAM practitioners, and physicians) a number of iterations will occur.

### 2.3 Description of Artifact

The main function of the CAM mobile application is to serve as a platform for communication between patients, physicians, and CAM practitioners. Upon registration users are asked to identify themselves with one of these three categories which promotes trust in the community and improves the communication process among the individuals. When interacting with the application, users are prompted to watch a series of CAM videos and are encouraged to participate in a discussion about them. The ultimate goal is to generate high quality content on CAM and engage all stakeholders in the communication process. Figure 1 presents some mock screens to illustrate some of the activities a user can perform using the mobile app:

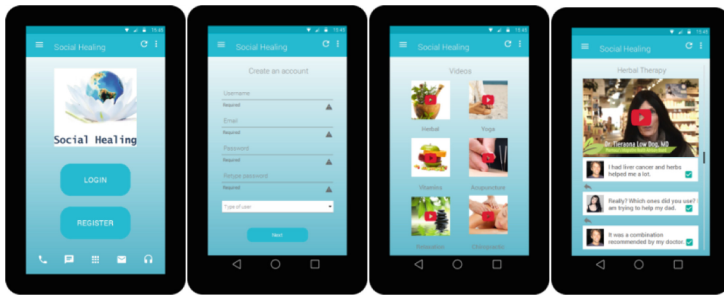


Fig. 1. CAM mobile application mock screens

## 3 Evaluation

To evaluate the proposed mobile application, we apply a test plan suggested by [17]. In Stage 1, we are currently testing the technical effectiveness of the application. In Stage 2, we will test the relative usability of the application, with users being timed while they perform standardized tasks in order to examine the usability of the application and whether the user interface is easy to navigate. For these two stages we are collecting both quantitative and qualitative data. In Stage 3, we will examine whether the mobile application actually impacts CAM disclosure by conducting pre and post semi-structured interviews with patients, physicians, and CAM practitioners.

## 4 Conclusion

The current study extends knowledge on CAM mobile applications and provides a number of advances to science and practice. First, it identifies gaps related to CAM disclosure and provides a solution to improve the communication process. Second, by considering best practices in HCI and usability testing, we propose a more successful strategy for building and managing a CAM mobile application. Third, we add knowledge on CAM mobile applications which is still a relatively unexplored area. We transfer successful models from mHealth HCI to establish a solid foundation for future research and motivate developers to take a more rigorous approach when creating mobile applications for CAM purposes.

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