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# TransitionMate: A Mobile Application for Chronic Illness Transition Support

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**Abstract**

Adolescent patients with a chronic illness eventually undergo the transition from paediatric to adult health care. This transition typically occurs simultaneously with other changes in the surrounding environment and patients need to develop skills such as independence and autonomy to improve their overall health. Although these patients have the support of medical personnel, barely any information has been collected to understand this transition and the way it can be better supported. In this paper we describe "TransitionMate", a mobile phone application that aims at collecting data from patients during the transition to adult care using a variety of interaction modes.

**Author Keywords**

Mobile application; intervention; chronic disease; behaviour change; self-determination theory

**ACM Classification Keywords**

HCI: Miscellaneous.

**Introduction**

Chronic illnesses are long term conditions that might affect a person for her whole life, and if left untreated or incorrectly addressed, they may cause numerous complications that seriously affect the overall wellbeing. The management of the illness can be divided into different stages that differ significantly based on the condition and the age of the patient.

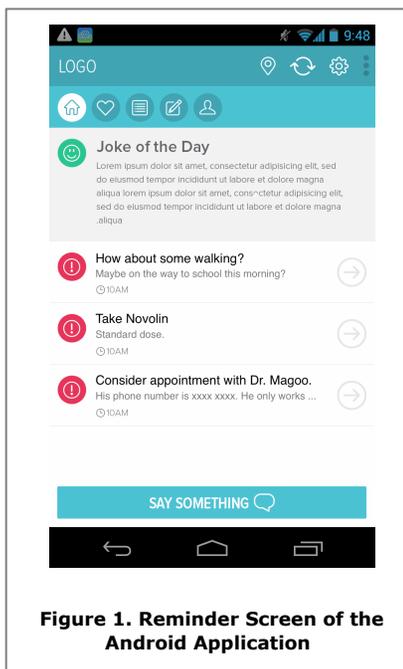
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**Figure 1. Reminder Screen of the Android Application**

For example, when young people are receiving treatment for diabetes and make a transition from paediatric to adult health care, they become independent from their parents, who may have help them with all the aspects related to their treatment. Additionally, during this transition phase, the treatment itself may change, thus requiring an additional level of adjustment. Patients may still maintain the yearly or quarterly appointments with the corresponding specialists, and keep the insulin injection at regular frequencies. But they usually need to include the disease management process into their lives which may have undergone important changes such as university study, a new job, or a relationship. In these complex scenarios the initial question that might be posed is "how can patients be motivated to change their behaviour and increase their autonomy and independence with respect to the treatment?". But as recent research on Self-Determination Theory [14] has suggested this might be the wrong question. Instead, the problem should focus on how the appropriate environment can be created so that patients motivate themselves.

A communication channel is needed to connect chronic young patients with doctors, to enable a constant communication channel during the transition, and at the same time help them to develop autonomy and independence in disease self-management. Numerous studies have been carried out to evaluate the effectiveness of so-called interventions to foster behavioural changes using different platforms (e.g., mobile phone, browser, wearable devices). But, to date, these studies have focused on treatment compliance [6, 13], behavioural changes [4], and illness education [3]. The review of these previous studies highlights the need for empirical evidence about interventions that

promote health self-management together with adherence during transition [11], and more generally a rigorous evaluation to increase the evidence that electronic-media provides an effective means of promoting health behaviour change in young people [7]. This work is part of a larger research program on what we call 'Positive Computing' [1, 2] i.e. technologies that support psychological wellbeing.

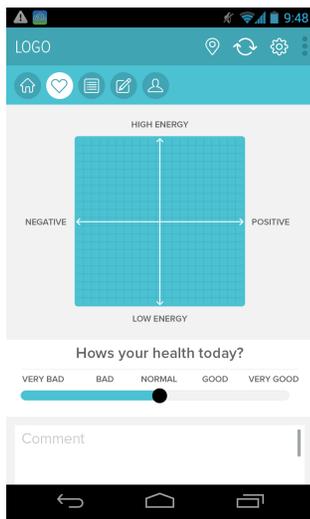
The solution proposed is the Android mobile application called TransitionMate that seeks to:

- allow researchers to better understand health-related behaviours in young people with chronic illness who leave paediatric health care and transition to adult health care,
- be engaging/attractive/useful enough for young people to continue to provide data for researchers over time, and
- improve young people's health behaviour.

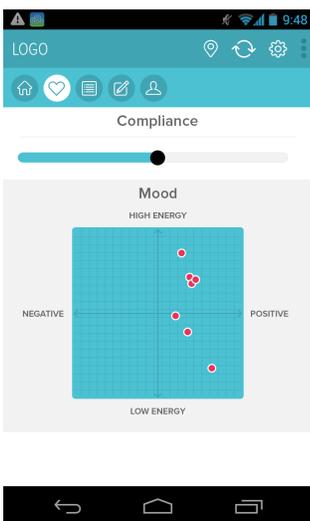
This paper focuses on the design of the mobile application. Section 2 explains the research question while Section 3 describes the system design. Section 4 is dedicated to overview the evaluation mechanisms. Finally Section 5 concludes the paper and highlights future research opportunities.

### **The Mobile application**

TransitionMate was implemented on the Android platform, a mobile operating system that has a large market share. Android was chosen as development platform due to the availability of low cost devices running Android as well as the widespread adoption of the development toolset.



**Figure 2. Reminder Screen of the Android Application**



**Figure 3. Emotion & Health Self-**

### ***Interaction with a Dedicated Server***

The Android application is implemented as a mobile client, which connects to a dedicated server. The application downloads and uploads newly entered information from/to the server. The availability of the bi-directional communication channel depends on the availability of wireless Internet connection. Whenever the user enters some information, the mobile application tries to upload the newly entered data to the server; conversely, whenever a doctor or researcher on the server side enters some data to one or multiple mobile users, the data will be sent to all referenced mobile users.

### ***User Interaction***

The application includes three major interaction components: target behaviour measurement (Figure 1) [5, 11, 16], emotion and health self-assessment (Figure 2, 3) [8, 9], and self-reflection (Figure 4, 5) [10]. These three interactions have been conceived to approach the transition process from different angles, and provide interventions and reflections from different perspectives. Our current work focuses on evaluating the effectiveness of these three interactions to find out the most appropriate approach to help young people become independent during the transition.

### ***Evaluation***

The Treatment Self-Regulation Questionnaire (TSRQ) [14], which is a standard questionnaire that measures autonomous versus controlled motivation, will be used to assess self-regulation in terms of diabetes self-management. Participants will be given a stem, for example, "The reason I follow my doctor(s) advice is that." The stem is followed by items that represent reasons that vary in the degree to which they represent autonomous motivation. An example of more

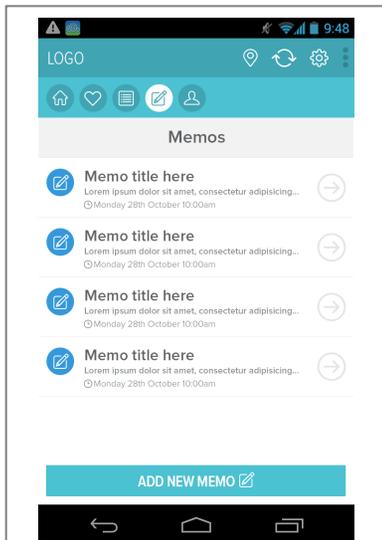
autonomous reasons is "I personally believe that these are important in remaining healthy", and an example of more controlled reason is "Other people would be upset with me if I didn't". Participants will be asked to rate each reason on 7-point Likert-type scales ranging from "strongly disagree" to "strongly agree". There are three sub scales to the scale: the autonomous regulatory style; the controlled regulatory style; and motivation (which refers to being unmotivated). Apart from TSRQ, the Summary of Diabetes Self-care Activities questionnaire will be used to measure diabetes self-management, and an adapted version of the Health Care Climate Questionnaire (HCCQ) will be used to assess patients' perceptions of the degree to which TransitionMate is supporting autonomy.

Correlations, t tests will also be used to test the relations between the mobile application usage and a participant's motivation.

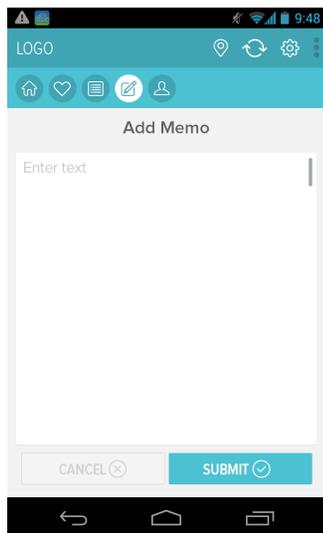
### ***Conclusion***

In this paper, we presented the preliminary design of TransitionMate, an Android application that aims at helping young people during the transition from paediatric to adult health care. We described the design of the application and the three types of interactions supported by the application. The objective is to explore how the communication with these patients can be established as to foster a sense of autonomy and independence with respect to their conditions. We also introduced the evaluation mechanisms that will be used to test the effectiveness of the mobile application.

The project will conduct an initial trial to analyse the effectiveness of the Android application, and refine and upgrade the application based on feedbacks from participants.



**Figure 4. Memo screen**



**Figure 5. Write Memo screen**

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