Designing an Anxiety Self-regulation and Education Mobile Application for High School Students

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Abstract. High school students often experience high pressure in relation to their learning and social activities, which can increase their worries and anxiety. Giving students access to relevant information and teaching them how to manage anxiety are important for their school performance and wellbeing. Given the wide use of smart phones, local community organisations have decided to develop a mobile application to help high school students cope with anxiety as part of a collaborative project with us. Developing applications for high school students requires thorough understanding of preferences and phone usage habits of this special user group. We followed a user centred and collaborative design approach involving target users throughout the design process and in this paper, we report the activities and findings of this project.

Keywords: Stress and anxiety · Collaborative design · Mobile application

1 Introduction

For an increasingly vulnerable population like teenagers, a significant barrier to education is stress and anxiety. According to a youth survey of 24,055 people aged 15–19 held by Mission Australia [2], "coping with stress" was one of the top three concerns held by young people in Australia, with over 40% of respondents either extremely or very concerned with coping with stress. In addition, the 2012–2016 Youth Mental Health Report by Mission Australia & Black Dog Institute [3] found almost one in four respondents met criteria for having a probable serious mental illness.

As part of an effort to address this issue, several local community organisations in Melbourne have begun a joint effort for the development of a mobile application (app) aimed at providing mental health support and education to high school students. The app is intended to be distributed through a local education network of 33 secondary schools in Melbourne's southeast suburbs, helping remove mental health concerns as a barrier to education. Potentially, the app's adoption will spread beyond this initial user base to more schools throughout Australia. More specifically, the app is intended to be used by school students to help them better understand issues of stress and anxiety and provide support through education and self-care. For example, students

Y. Luo (Ed.): CDVE 2018, LNCS 11151, pp. 270–275, 2018.
https://doi.org/10.1007/978-3-030-00560-3_37

may use the app to calm themselves during high stress periods such as exams, to discover their best selves and which coping methods work for them, as well as to encourage users to develop good self-care habits through regular engagement. To complement personal development, opportunities for social engagement with other users may also be a feature.

In this paper, we report on the design process of this app which is part of our collaborative project with the community organisations (client). We first describe the user centred approach [1] that we took for the app design. Then the results of focus-group studies and user testing and design examples of the app interfaces are presented. Finally, the paper concludes with a short summary and our future plan.

2 Method

2.1 Understanding Context, Users and Task

Literature on adolescents, anxiety, mental health apps, mental health treatment, and coping with stress were reviewed to understand the context. The understanding derived from the review of literature was used to develop a dimension upon which the app could be developed [4, 5]. Concurrent to the literature review, a competitive analysis of existing apps aimed at addressing anxiety were also reviewed [6–8]. The knowledge discovered from these sources was used to design a line of general enquiry for the first focus group held with secondary users.

The knowledge sourced from literature review, competitive analysis, and the first focus group were used to determine the client's exact position and desired development direction for the app. This determination also involved discovering the exact intention for the apps work flow and content.

2.2 Design and Validation

The design process was divided into two phases. The first phase involved getting user input to make design decisions about high-level design concepts relating to the app's structure, look and feel. The second phase involved getting user input to make design decisions about user interactions with the app's various activities.

To meet the objectives of the first phase, several independent design alternatives were formulated for various aspects of the app, which were taken to the second focus group. Comments and preference data were collected to determine the designs most suited for the general adolescent user group. The opportunity was also taken to further verify and validate the conclusions drawn from the first focus group to help ensure generalisability. This was especially important because the demographic makeup of the two focus groups were very different. The first group had a strong majority of males of an Asian heritage, whereas the second group was all female of an Anglo background.

To meet the objectives of the second phase, conceptual designs for the various tasks and activities specified by the client were made into interaction prototypes. Where possible the design team made alternative interaction styles for each activity. These

prototypes were coded using web application technologies, such that the users could interact and use the various alternatives.

The interaction prototypes for the various activities of the app were then taken for user testing at a local school. Students attempted each activity on a mobile phone. Comments and difficulties with the interactions were noted. A menu design that was derived from the second focus group was also validated with this group via the use of an interactive prototype of the menu systems. This test also allowed for drawing more data about the naming of sections as users attempted to navigate the proposed app.

3 Results

3.1 Focus Group One

Due to space limitations, only high level results are presented. The same applies for the next three subsections. The first focus group was a group of six adolescents, mostly aged around sixteen years old. Five of the six adolescents were male.

The focus group was first asked about their general mobile app use and reasons for use. The group generally mentioned apps with specific goals and intentions in mind, and these tended to be quite specific and for immediate purposes. Examples were messaging apps, dictionaries, and photo apps (such as Instagram). These apps came up as favourites and were used for social reasons, convenience, and due to their mix of features. Ease of use, good organisation, and aesthetics were cited as what was liked about apps in general.

The next line of questioning related to the context of use in which adolescents used mobile apps. The group generally indicated that they use apps when they are not engaged in another activity. Usually when they are alone and bored. They also indicated that they will use an app when they have an immediate need (such as looking up a map when lost). They used all kinds of apps in during these times.

Regarding privacy the group viewed this as largely a question of self-regulation. Whilst the group certainly had privacy concerns, they saw most of these as simply a question of being sensible with what they shared and with whom. They generally indicated a greater tendency to share things in personal channels (such as messaging) than in open forums (such as social media).

3.2 Focus Group Two

The second focus group aimed to investigate user preferences for the apps structure and style. The focus group consisted of three fifteen-year-old girls from the same high school whom were recruited as a convenience sample. All the girls used phones with the iOS operating system.

The focus group began with some general questioning about the participants' use of apps anxiety management and self-improvement apps, as well the coverage of stress and anxiety topics at school. The group's initial responses to these questions were generally dismissive. However, with some further thought it appeared that they did have some exposure. This suggested that these topics were not of great importance to

the group. For example, they initially indicated that they had not used anxiety management apps, but then later recalled using Smiling Mind as part of school. They also indicated not being too aware of mood and mental health topics, but then indicated knowledge of their being avenues for help for those who needed it, but that they did not need it themselves. This was further reinforced by comments about topics of stress and its management at school being boring and unengaging.

3.3 User Testing

The user testing session was conducted with two year nine students at a local secondary college. The students were asked to use various interaction prototypes to complete activity tasks. During the session, they were observed for any difficulties that they had in interaction and were encouraged to provide comments about the prototypes. For our discussion, we present the results of the Breathing Waltz activity here as an example.

The Breathing Waltz activity had the most number of prototype variants. These variants were divided into two general categories; passive and active. Passive variants involved an animation with instructions for the user to follow. The active variants involved animation plus user interaction via gestures. Active variants generally required the user to follow an on-screen animation with their finger as well as following instructions to breath.

Overall it was found that the active variants required too much attention to be done properly. The users were too focused on trying to complete the gestures with their fingers to be able to follow the instructions and do the actual breathing exercise. Two of the active prototypes that involved drawing a line on the screen with their fingers however were enjoyed. One involved a free drawing of a line and the other involved tracing a line that was charted out by the app.

The passive variants were generally better followed as breathing exercises, with the users doing the breathing. Of these variants an animation in which a linear gradient transition gave the appearance of moving up the screen for breathing in, changing colour at the top of the screen for holding the breath, and then moving down the screen was liked the most. The users stated that this was because it followed their expectations of breathing most closely. Another variant that used a radial gradient which grew, pulsated, and shrunk was seen as too intense, whilst another variant that involved a dial the rotated around and changed direction for in and out was seen as ‘mesmerising’ but did not meet their expectations for breathing in terms of its directions of movement.

3.4 Final Prototype Features

Based on the feedback from the client and users (focus groups and user testing), the prototype was further updated and improved. The latest version of the app is divided into seven sections including the front page as shown in Fig. 1. Each section may or may not contain additional sub-sections. Common features are explained as follows:

Quick access menu: the quick access menu will be visible on every page of the app, and is the primary means of app navigation.

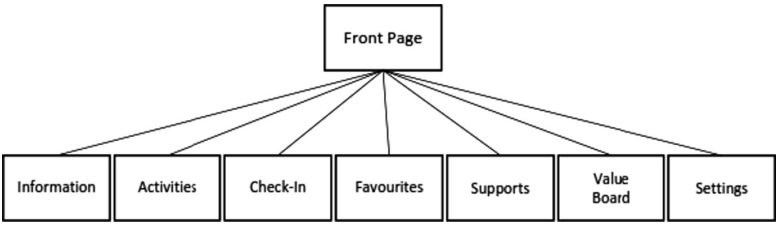

Fig. 1. App section overview.

Section menus: some sections with many items also have subsections to help organise the content. Both subsections and actual items will be presented in a card format. Cards when pressed will link to the subsection or content.

Section information: each section and subsection will have an information section. This information will be navigable to by an information icon on the top right corner of the page (see Fig. 2). The information will provide in-depth explanations of the purpose and aims that correspond with that context. This information is separate and different from any instructions that may be presented as part of an activity.

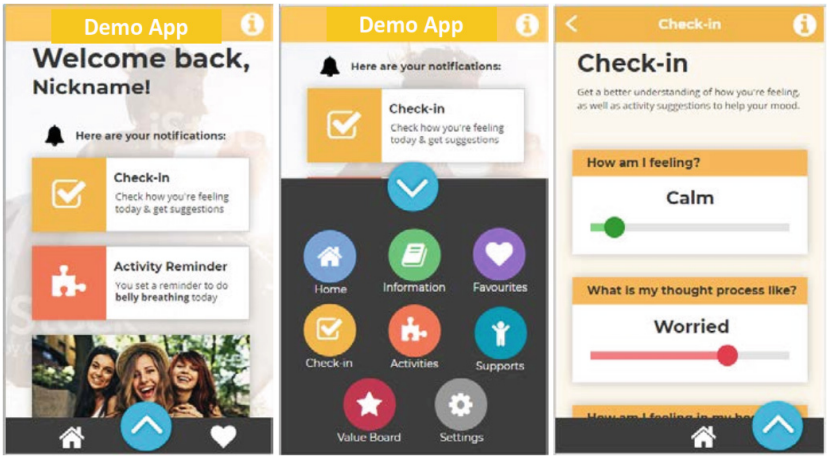

Fig. 2. Interface examples of the app prototype.

Notifications: many of the apps items (activities, information) will have a corresponding notification that may be switched on. These notifications will provide reminders to complete activities or to enact certain behaviours (e.g., drink water). Notifications will either be displayed on the app's front page or sent as device notifications. Front page notifications will be presented as a card.

Favourites: activities, information, and other in app content will be able to be added to Favourites by the user. All content sections with some exceptions will have the facility to be tagged as favourite.

4 Concluding Remarks

In this paper, we presented a design process experience of a mobile app that is part of our collaborative project with community organisations. The design process showed that requirements set by the client can be implemented with different types of interaction. As such, it is quite important to obtain feedback from the target users and observe their interaction with the prototype. It was also found that what was perceived as plain English used in the navigation by the client, is interpreted quite differently by the user. This may be attributed to the different app experiences encountered by the user and the client which are from different age groups. In addition, interaction of active variants had been found to be more difficult to use by the users compared to passive ones.

The process of having focus group studies is extremely helpful, as this enabled the designer to capture candid feedback from the user and provides an opportunity for the user to contribute to the design in both interface layout and interaction. This resulted to having a more intuitive design that is based on interaction.

For the design examples, the colour pallet adopted was based on what the client is currently using in their website and corporate branding. Further investigation can be conducted on what is the best colour scheme for users facing stress and anxiety. Moreover, designing of appropriate icons may also be explored.

Finally, the design document that was produced from this design process is to be turned over to the development team as part of the requirements specification document.

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