Creating an Interactive Aid to Mediate Obesity Diagnoses and Management

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Abstract

The purpose of this research was to design an application using iterative design and usability testing to convey nutrition, exercise, and obesity information to a patient with obesity. The study consisted of three phases: the research phase (Pre-phase), prototype phase (Phase 1), and application phase (Phase 2).

In the pre-phase, group discussions were held with four experts, where they discussed the desired functionality of the proposed application. Their suggestions were incorporated into a paper prototype that was developed for iterative design testing in Phase 1. Experts first answered questions about their patients and then were given tasks to complete using the prototype.

In Phase 2, the application was developed in the Unity 2D gaming engine. User feedback from Phase 1 testing was considered for Phase 2 design and functionality choices. Test subjects were given either the mobile application or a handout with the identical written content. All subjects were given a pre-test, including questions about comfort level with their health care provider and knowledge of exercise and nutrition, before they were given either the application or the handout. A post-test was given after subjects had interacted with their materials for one week.

Qualitative data from prototyping and iterative design testing is a valuable tool for improving future health and wellness applications.

Background Info

Obesity is a disease characterized by excessive weight. It is usually diagnosed by looking at various factors, the most common being body mass index (BMI). BMI is a measurement that compares a person's height to their weight (kilograms to meters) to define a general proportion indicating body composition. A normal BMI is in the range of 19 to 24, whereas a BMI of over 30 is considered obese (Normal, n.d.). Aside from having excess weight, obesity can lead to many other health consequences and comorbidities such as heart disease and Type II diabetes (Obesity, 2018).

Though this condition is serious, patients are not provided with enough information through their healthcare providers (HCPs) (Petrin, 2015), and online information is either misleading, or written at a higher reading level than the average American's (Davis, 1994). Thus, patients are left uninformed about their condition.

One method of bridging this information gap is through the use of mHealth applications. Mobile apps are convenient ways to disseminate information because they are portable, accessible, and easily updated. They have the potential to convey complex information in a simplified and engaging manner through avenues such as gamification. Gamification is "the act of making something game-like" in order to make "tasks more intriguing, motivating, and even 'fun'" (Chou, 2017, p.6). An app that employs these techniques, can inform users in an engaging and user-friendly manner.

Objectives

The study aims to determine:

- Successful principles of user experience design and gamification for development of a personalized mHealth application
- Effect of personalized mHealth app content on the comfort of diagnosis in patients with obesity
- Increase in knowledge of nutrition and lifestyle management information in patients with obesity

Summary of Methods

The study will be conducted in three steps. In the Pre-phase, informal discussions were held with a group of experts where questions were asked about the content, aesthetics, and feasibility of this app. In Phase 1, a prototype was tested for content, functionality, and UI/UX design. The app was developed, incorporating feedback received from testing in Phase 1. In Phase 2, the app was tested on individual patients at the UIC Cardiac Rehab Center examining comfort of diagnosis as well as any increase in nutrition and lifestyle knowledge.

Methods

Results

No statistical analysis was done on the results, therefore no quantitative conclusions can be drawn from the data. However, qualitative results from developing an mHealth app stimulus to communicate personalized educational information about obesity and comorbidities are summarized below:

- Certain principles of gamification will successfully engage patients and app users
- Iterative design is crucial in creating a UI/UX design that works for this audience and could be applied to future applications with a wider audience

Discussion

The following boxes summarize the study, as solutions to the problems presented through the background research.

Limitations for this study included small sample size, time limitations that made it impossible to observe long term outcomes of patients, and limited time for app development. Due to time constraints, the individuals in the sample size were not representative of the average population, and knew more about nutrition and lifestyle than the average patient. However, this study led to important qualitative results such as important app features, icon design, organization of app, and the importance of iterative design. Participant feedback on the app was also valuable in determining the effectiveness of chosen gamification techniques for this population. Future research could involve a more developed app, a longer time frame of study, and/or more participants. Design logistics from designing this app could be used in the future to make apps that are more tailored to other types of patients.

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