

Product Design Specifications

Development of a user-friendly MP3 player for older cancer patients

Team Members

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Problem Statement

Our client's group is conducting a research study using recorded relaxation, distraction, and imagery exercises to help patients with cancer manage symptoms including pain, fatigue, and sleep disturbance. Research indicates that these strategies can help patients to achieve a personal sense of control over symptoms and diminish their severity. In today's busy cancer care settings, there is not sufficient staff or time to provide these symptom management strategies precisely when and where patients need them. Their team has developed an intervention using recorded strategies, delivered on an MP3 player, so that patients can carry them throughout their day, and use the interventions whenever their symptoms become bothersome. For example, a woman with advanced ovarian cancer may use an imagery exercise to help control pain that occurs after walking, or a relaxation exercise to facilitate return to sleep, if she wakes with worries in the middle of the night. Because cancer is a disease associated with aging, many patients are elderly and are not familiar with common MP3 devices. Moreover, the elderly may have difficulty visualizing the small display screens / text and have fine motor limitations that interfere with operating small controls. In a recent feasibility study done by our client's group, older cancer patients said that they enjoyed learning to use the MP3 player and listening to the recordings, but struggled with managing controls (on / off / hold), and navigating between recordings and menus. Our goal is to develop an MP3 player that will be more user-friendly for these older patients. Other characteristics might also be built into the system including (1) the ability to monitor treatment 'dose' by logging specific recordings played, length of time they were played, and frequency of plays; and (2) the ability to enter and record numeric symptom severity ratings on the device before and after listening to each recording.

Client Requirements:

- Mp3 player capable of playing 12 relaxation exercises
- The browser and menu should be easier to use for patients
- The screen should be visible to people with slight vision problems
- The controls should be easy to manipulate for someone lacking fine motor skills
- The mp3 player should be able to accurately record "dose" (number of plays)

Design requirements

Physical and Operational Requirements

- a. *Performance Requirements* – The device should be able to play songs for relaxation therapy and monitor frequency of use.

- b. *Safety* – Volume restrictions should be implemented and the risk of electrocution should be considered.
- c. *Accuracy and Reliability* – If the device records the frequency of plays it should be able to do so accurately.
- d. *Life in Service* – The life of the device should be similar to the standard life of an ipod.
- e. *Shelf Life* – The unit should not degrade while in storage.
- f. *Operating Environment* – The device will be used in a clean dry environment at room temperature (hospital or home). It should be able withstand being dropped from a reasonable height (5 ft)
- g. *Ergonomics* - The device should be easy to manipulate for someone who lacks fine motor skills. The screen should be easily visible to someone with impaired vision.
- h. *Size* – The unit must be portable for patient use (footprint no larger than 25 in²)
- i. *Weight* – The device should weigh less than 2 lbs.
- j. *Materials* – Non-magnetic materials and nothing toxic (i.e. Lead) should be used.
- k. *Aesthetics* – Pleasant to touch, comfortable to hold, soothing colors.

Product Characteristics

- a. *Quantity* – One Prototype
- b. *Target Product Cost* – Under 250 dollars per unit.

Miscellaneous

- a. *Standards and Specifications* – Patient confidentiality should be maintained.
- b. *Customer* – Easy to navigate interface for clinicians.
- c. *Patient-related concerns* – A patient should be able to use the device even if they are unfamiliar with current mp3-player technology.
- d. *Competition* – We are not aware of any competition for a patient friendly mp3-player designed for hospital/therapeutic use.