

Therabot™: The Initial Design of a Robotic Therapy Support System

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ABSTRACT

Therabot™ is an assistive-robotic therapy system designed to provide support during counseling sessions and home therapy practice to patients diagnosed with conditions associated with trauma. Studies were conducted to determine desired features of potential end-users of the system, such as clinicians, with feedback from past survivors of trauma to guide the participatory design process. The results from a survey of 1,045 respondents revealed a preferred form factor of a floppy-eared dog with coloring similar to that of a beagle. The most requested features were that the robot be of a size that would be comfortable to fit in a person's lap and a covering that was soft, durable, and had multiple textures.

Categories and Subject Descriptors

I.2.9 [Artificial Intelligence]: Robotics; J.4 [Computer Applications]: Social and Behavioral Sciences—*Psychology*

General Terms

Design

1. MOTIVATION

An issue of growing concern in the United States is the prevalence of sexual victimization and violence [1]. When a victim of sexual violence initially comes into a crisis center or other related facility, they will typically be distressed or exhibiting symptoms of numbness and detachment. Therapists have found it helpful to provide these victims with stuffed animals not only as a means of comfort, but also as a tool to ground the victims by providing them with something they can hold, touch, pet, and cuddle [3, 4, 5]. Dur-

ing therapeutic interventions patients without supplemental support may experience additional trauma and may leave treatment.

2. RELATED WORK

While a variety of robots have been designed to provide comfort to users, Therabot™ is unique because it both serves as a comfort object and as a device that extends traditional therapy efforts. Paro, a seal robot, is the most closely related existing system. Paro has been successfully used to increase the well-being of elderly users by acting as a companion [2]. Therabot™ builds on this capability, adding the ability to work cooperatively with a therapist and support the patient at home.

3. THERABOT™ DESIGN APPROACH

During the design process of Therabot™, three different surveys were conducted: (1) form factor, (2) past trauma survivor, and (3) clinician. These surveys were used to determine the form and coloring for the robot and also to obtain opinions on what features would be most beneficial during therapeutic interventions to support and assist patients. The surveys were hosted in a secure manner. Approval was obtained from the Institutional Review Board and clinicians distributed the surveys to ensure that their patients were at a stage that the questions were not expected to trigger negative effects from past trauma(s).

3.1 Form Factor Survey

For the form factor survey, ten different forms were sketched: a long-eared dog, a short-eared dog, a cat, a bear, a frog, a monkey, a chipmunk, an elf, a dragon, and a puffball. For each form factor, there were various types of colored coverings available to select. These forms were selected to resemble pets, wild animals, or fictional characters that all had a similar shape. Participants ranked each form and coloring from most to least preferred.

3.2 Clinician Survey

Clinicians could use the robots to provide complementary support during counseling sessions and home therapy practice. Understanding clinicians' thoughts and suggestions concerning home therapy robots was deemed important, as

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they are potential end users for the system. The clinicians were recruited from different sources, including a nationally recognized board of social work. The survey asked for the clinicians' demographics, followed by questions concerning their use of comfort objects. The last part of the survey asked what features may be helpful for the Therabot™ to have to provide therapeutic benefits.

3.3 Past Trauma Survivor Survey

The past trauma survivor survey asked questions regarding their experiences in therapy, their use of comfort objects, and features they would like included in a therapeutic assistive robot. They were asked if they had used any type of comfort objects or owned any types of pets and whether having comfort objects or pets helped during counseling and/or home therapy.

4. SURVEY RESULTS

4.1 Form Factor Survey

The results of the form factor survey of 1,045 participants (327 past trauma survivors) indicated a preference for the long-eared dog form (refer to Figure 1). Votes in favor of the long-eared dog form totaled 237, representing 22.7% of the total responses. Of the 237 participants surveyed who chose the long-eared dog as their favorite form, 92 participants chose the "Multicolored" natural coloring, portrayed as Item 1 in Figure 2, as their favorite. The "Gold" color, portrayed as Item 2 in Figure 2, came in second, followed by a brown bear in third. A significant correlation was found between female respondents and the desire for acoustic sounds to be emitted from the robot as part of requested features from the form factor survey, $\chi^2(4, 1045) = 15.24, p = .004$.

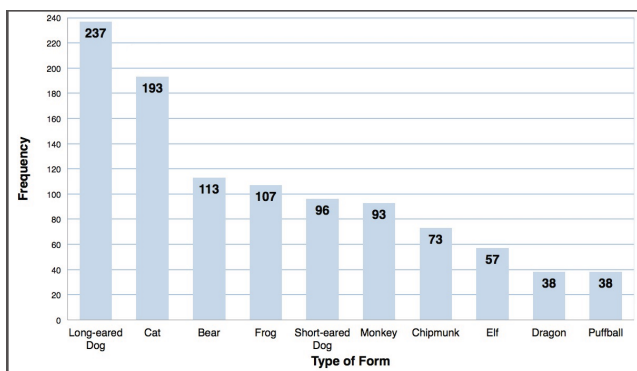


Figure 1: Result of forms.

4.2 Clinician Survey

A total of 13 clinicians were surveyed concerning the use of comfort objects in therapy sessions. When asked whether the clinicians had ever used a comfort object during intake/counseling, seven of the clinicians, indicated that they had not. The 13 clinicians indicated unanimously that trauma survivors will accept a comfort object. Eleven indicated that a comfort object would calm their patients when aggravated. All 13 clinicians responded that giving a comfort object to survivors would be effective in increasing expressiveness when the survivors were unresponsive.

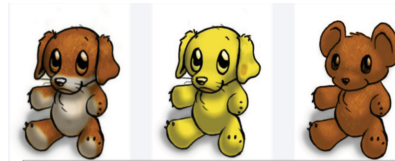


Figure 2: The top three overall forms and covers.

From the clinician perspective, the most desired feature for an assistive therapy robot was simulated breathing capabilities to be used for breathing exercises. Nine clinicians felt that the ability for the robot to record instructions for use during home therapy practice was considered beneficial. Nine clinicians indicated that they would be willing to use an assistive therapy robot in a stuffed animal form.

4.3 Past Trauma Survivor

A total of 36 survivors of past traumatic experiences were surveyed to determine their use of comfort objects, and the overall effectiveness of comfort objects in their experiences with therapy. The survivors who took the survey were all in their recovery phase. The majority of past survivors, 31 of the 36 people, indicated that they were *not* provided a comfort object as a part of their therapy. When asked whether a comfort object would have been helpful in relieving stress, the responses from 21 of the past survivors indicated it would have been helpful. Responses regarding what qualities an assistive therapy robot should have included being huggable, having multiple textures, having the capability of being manipulated, and having a soft feel.

5. CONCLUSIONS

A participatory design approach that incorporated feedback from possible end users of a robotic platform provides essential information for product development that is both usable and provides a positive user experience. The approach used in the development of the Therabot™ robot was to solicit input from the general population regarding a preferred form factor and covering for the platform, followed by information gathering from potential end-users (clinicians and past survivors) for their opinions on desired features.

6. ACKNOWLEDGMENTS

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