Designing for Children: A Fear Therapy Tool

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Abstract

Software for young children requires specific attention to a variety of details that range from the used metaphors, interaction modalities and even used language. These aspects gain further relevance when creating software for critical activities such as fear therapy, requiring specific approaches during the design process right from the start. This paper describes the design process of a set of software solutions for young children's fear therapy using mobile devices. We address the used techniques, procedures and describe the resulting prototypes. Initial evaluation results and future work plans are also presented.

Keywords

User Centered Design,Therapy,Children,Mobile Devices.

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation (e.g., HCI)]: User Interfaces – Evaluation/methodology, Prototyping, User-centered design.

General Terms

Design, Experimentation, Human Factors.

Introduction

Children are often faced with a wide variety of frightening situations during their daily lives (e.g., bullying, school, dark places). In certain cases, these

situations and feelings lead to anxiety, depression and may severely affect their lives, requiring therapy even at very early ages. Therapy is usually comprised by an initial diagnosis stage where therapists try to assess the fear's origin, its intensity and how it affects the child. Currently, to achieve so, paper artifacts and questionnaires are used, during therapy sessions with the therapist and, if necessary, at home or at the situations that cause the child to feel fear.

However, this type of procedure poses several issues to both therapists and patients, especially when of young age. For therapists it is difficult to manage the gathered data and collect reliable information through the various situations that may cause problems to children. For children, among others, engagement to the therapy process is reduced and, for younger patients (especially those without reading skills), the utilization of the traditional questionnaires is often problematic.

Recently, software tools have been introduced to support some psychotherapy procedures [4][5] and partially overcome existing problems. Examples range from simple anxiety measuring questionnaires [1] to more complete relaxation and breathing tutorials [3]. Some tools support cooperation between therapists and patients and some level of adjustment, resulting in artifacts that suit specific context [6]. However, and although the use of software to support therapy in these situations is not new, specific care is required when directed to children [2]. Some of the existing tools, despite comprehensive and showing good results, are directed to adults and are either too specific for some disorders or to generic and do not provide the necessary customization to be used by young patients.

In this paper we describe the initial development process of a set of prototypes that aim at supporting fear therapy for young children (e.g., between 5 and 14 years old). The work has been carried by two research teams, one from computer science and another from psychology and psychotherapy, and with cooperation from practicing therapists as well.

Initial Requirements and Participatory Design

As a bootstrap for the design process, a set of brainstorming sessions took place, where the two involved teams discussed current issues and where the psychotherapy team described and explained the used procedures, artifacts and their goals regarding therapy. Following these sessions, in order to understand existing issues from a different perspective, a set of interviews with young children undergoing therapy, and with some parents, were held. These interviews were conducted in order to understand children's habits and knowledge regarding computers and technology and how their disorders affected their daily life, especially in regard to how and when they usually accomplished their tasks (related to therapy).

A second set of practicing therapists provided detail on the goals of the existing artifacts, how these were adjusted to specific patients or situations and on the problems that usually affected their patients during the sessions in which these artifacts are used. These initial studies demonstrated that children feel reluctant using the traditional paper based artifacts, which leads to therapists resorting to new forms to gather information and measure fear using metaphors and drawings.

figure 2. Low-fidelity prototype for a mobile artifact to set the fear's height (marked on the ruler).
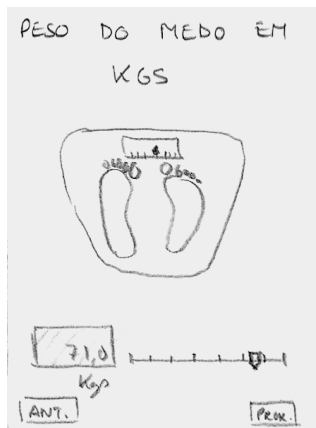

figure 3. Low-fidelity prototype for the "fear's weight" therapy artifact. The screen includes a gauge in which children can set their fear's weight.

Figure 1 depicts a paper artifact, where the patient is usually requested to point (e.g., marking with a pen directly on the ruler – on the left side) the amount (or the height) of fear s/he feels in a certain situation. For this particular exercise, therapists commented that they are frequently inquired by patients if, rather than marking on the ruler, they could draw a new building (on the city landscape) representing the height of their fear. On the right side, a second artifact shows a simple drawing with a gauge on the left side for patients to point the strength of the fear. These different options are mostly used at the beginning of the therapy process, when therapists try to assess the most suited metaphors and artifacts to each particular child. This pictorial based artifact approach is essential to entice children and to offer them an easy to comprehend approach that allows them to quantify their feelings.
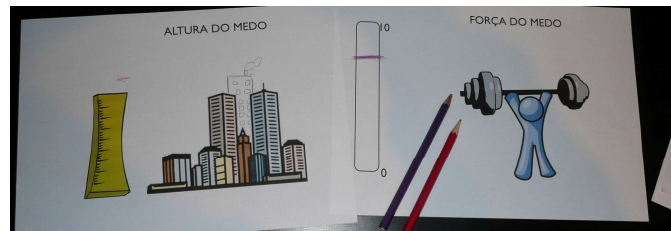

figure 1. Paper artifacts used to measure a child's fear.

However, given the paper-based support, a set of additional issues can affect this procedure. For instance, it is common for children to also want to edit a previous selected intensity for a specific drawing or to misunderstand what is being requested. Moreover, at very early ages, it is also difficult for some children to write and provide the requested information for some of the used drawings (e.g., type in the fear's weight). Nevertheless, and most importantly, the main

challenge when using such approaches is to persuade children to use these artifacts and keep up with the registration tasks, even while away from the therapists. When questioned about the use of technology, children responded very positively. Most stated that they frequently use games and portable devices (e.g., portable media players, cell phones) and are very familiar with and were highly motivated to use them. Even those that had little experience with computers and technology feel very compelled and interested by computers. Parents confirmed these results, especially emphasizing that sometimes they would not allow their younger children to use their computers but that most provided cell phones and mobile devices to be able to reach and keep in touch with them.

From these initial studies, the following requirements were identified:

- Allow children to express their feelings through metaphors that they could understand.

- Include technology to overcome some of the current issues that affect diagnosis and therapy.

- Select technology that is suitable for young children and that can be used at various locations, coping with the diversity of situations in which children have to complete their tasks (e.g., mobile devices).

- Provide interactivity with the graphical elements that compose the artifact, facilitating interaction for younger children without reading abilities.

- Support direct interaction and manipulation of the components that provide means to measure their feelings, without requiring previous computer usage knowledge and using appealing modalities.
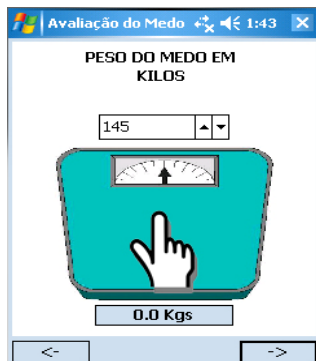
figure 4. Software prototype. Children can set the fear's weight by (1) typing it; (2) using the up/down arrows; and (3) by **pressing the drawing, just like an actual scale**.

figure 5. To set the fear's height, users only need to drag the "Aqui!" sign and stretch or shrink the building that represents the fear.

- Be adequate to all ages and require little or no text input, suiting children with various ages and even without writing skills.

- Reinforce their positive actions and attitudes using icons that are meaningful and appealing, promoting a more engaging procedure.

Low Fidelity Prototypes

Taking into account the initial requirements, a set of preliminary sketches and prototypes were created (figures 2 and 3). These targeted mobile devices (e.g., smart-phones) and included three of the studied artifacts, namely the ones to measure the fear's intensity through its weight, height and strength.

To assess the prototypes and sketches, these were tested and reviewed by therapists. To properly understand how the tool would be used in real-life situations, a set of simulated therapy sessions were performed. Three young children (9 and 10 years old) also participated on initial experiences. These took place at different settings within a school, emulating real-world experiences and aiming at understanding the children's behavior while using the prototypes in different settings. All these sessions, involving children, were carefully planned. The goals, procedures and used equipment were explained to every participant.

The wizard-of-Oz technique was used to allow the participants to interact with the various screens and simulate the tools' behavior according to their actions. Figure 6 shows a child interacting with a low-fidelity prototype, during one of the early evaluation sessions. Every session took less than 15 minutes and was followed by a short interview.

figure 6. Initial low-fidelity prototypes used during the early stage evaluation sessions. The designer is switching the various sketches/screens while the child uses the device.

Although the younger patients had some difficulties while understanding the concept behind the tools and imagining the actual application's functionality based alone on the interaction with paper-based sketches, results were very positive. Here, the prototyping approach (using physical prototypes to emulate the actual devices) played an important role and provided a much more realistic usage experience to which the participants could relate and understand. In fact, their interest and enthusiasm towards the physical devices was overwhelming and their acceptance of the overall layout and suggested sequences and affordances of the used components was very promising. Some of the new ideas that were applied on the software artifacts were directly obtained by observing children's expectation s when interacting with the paper-based sketches. In particular, the used metaphors worked not only for the usual measurement of fear but also as the selected interaction modality. For instance, their perception of the fear's weight was clearly related to the pressure they used while pressing the drawing of a scale, shown in one of the prototypes (Figure 3). Additionally, it was clear that the most used approach to interact with the various
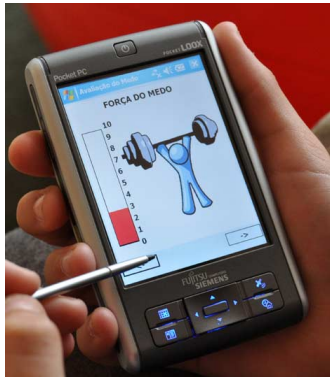
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figure 7. Child testing the software prototype on a PDA. The screen allows the user to quantify the fear by indicating its strength, selecting its intensity on the scale on the left. To provide additional feedback, the weight lifter (representing the patient) shrinks or grows in reverse proportion to the fear's strength. As the fear loses strength, the patient gains power, which is a simple metaphor to understand and also motivates him/her.

interactive components (explained to them at the beginning of each study) was direct manipulation.

Software Artifact Catalog
Following the positive results from the initial low-fidelity prototypes, a set of software interactive artifacts was developed (figures 4, 5 and 7). These were based on the paper-based counterparts and considered the initial requirements and the results from the low-fidelity tests.

Evaluation and Early Results
To validate the developed software artifacts, a set of tests was conducted. These tests were performed by a team of therapists who, during several sessions, presented the tools for their patients to use. The tests were conducted during a one week period at one of the therapist's office. A total of 8 children and teenagers, aged between 8 and 14 participated on the study. Every child was a student, attending school from the 4th to 9th grade. All of them were undergoing therapy for anxiety and associated disorders. Additionally, five more therapists and four parents were also included on the trial and utilized the tool. All the participants completed several tasks with the artifacts. They were asked to go through all the screens, using the several features at each step. The tests, for each participant, were followed by a short interview and a questionnaire that users were requested to complete. Tests, interviews and questionnaires were controlled and managed by therapists, in order to select the appropriate timing, language and request to each of the patients, and provide them with a comfortable and familiar setting to which they were accustomed to.

Results from the interviews that took place after each evaluation session, were clearly positive. From the initial

interviews, where the various participants were asked to rate whether they enjoyed the tools and the various components and whether they thought they were easy to use, three out of the eight patients were very pleased with the tools, scoring them as a 7 on a scale from 1 to 7. Only one of the participants, an adolescent, scored the tools as a 3, saying they were a bit too childish, while the three remaining children scored them as a 6. Moreover, five of the eight participants thought the tools were very easy to use, selecting 7 and three of the participants giving it a 6.

The post-test questionnaire aimed at assessing the tools usability wise, and to understand whether they were preferred over the paper-based artifacts. All the participants stated that they understood what they had to do in each of the screens, where to touch, with which components to interact, and what was expected with each drawing and question. In addition, all concurred that they would be able to use the tools even when away from the therapist, by themselves, without requesting assistance. Finally 7 out of 8 participants thought that it was easier to use the digital artifacts than the traditional paper-based versions. The questionnaire included an open end question for suggestions, where children were requested to freely provide their thoughts. Although results from both the interviews and questionnaires were very positive, every participant had suggestions on how to improve the tools. General comments, shared by most of the children, requested audio feedback and additional visual feedback (i.e., shrinking monsters representing the fear disappearing or increasing the number of weights on the dumbbell or for the human figure to gain more muscles when the fear was lower). Parents and therapists were also very satisfied with the selected features and with the overall usability and interactivity of

the tool. Parents were unanimous in stating that this would probably make it much easier to convince their children to do their homework and therapy tasks while at home. Therapists were very pleased with the possibility of using mobile devices with their patients, especially considering the selection of tools that can be used by children without requiring computer skills and with a very short learning curve.

Discussion and Future Work

The experiences that took place during the evaluation period demonstrated that children responded very positively to the tools. We believe this is a direct result from the used devices and interactive features, which provide an appealing and engaging way for children to assess and express their own feelings. This belief was in accordance with the opinions of the involved therapists who stated that besides the clear ability that younger patients have to adapt and learn how to use technology; these devices also emphasize their excitement and willingness to participate on the various tasks. However, as shown by some of the suggestions, and the overall results, care has to be taken while selecting the used content and by offering several alternatives on how to classify their feelings. Here, the ability to interact and manipulate the drawings was crucial, propelling children's interest in using the tools.

Parents and therapists were peremptory in stating that they strongly believed that the tool could improve their children's long term commitment to therapy. However, it is also necessary to consider that constant evolutions and additions to the tool will be necessary in order to maintain children's interest through longer periods of time, renewing the novelty factor that seemed to be paramount. Nevertheless, when compared to the

traditional paper based approach, the new artifacts overcome the initial limitations that motivated this work by supporting: (1) a much easier editing process; (2) younger children to easily interact with it and quickly provide the necessary information to their therapist; and (3) increase their enthusiasm and engagement to the therapy process.

Future work includes the refinement of these artifacts, the development of new ones and their integration within a complete tool. Further tests are also planned.

References

[1]   Grasso, M. A., Clinical Applications of Hand Held Computing. 17th IEEE Symposium on Computer Based Medical Systems,pp.141-146, 2004.

[2]   Hailpern, J., Encouraging Speech and Vocalization in Children with Autistic Spectrum Disorder, SIGAccess Newsletter, pp.47-52,89, 2007.

[3]   Newman M. G., 2004. Technology in psychotherapy: an introduction. In Journal of Clinical Psychology. No. 60 (2) pp 141-145

[4]   Proudfoot, J., 2004. Computer-based treatment for anxiety and depression. Neuroscience and Biobehavioral Reviews, No. 28 pp 353–363.

[5]   Przeworski, A., Newman, M., 2004. Palmtop computer-assisted group therapy for social phobia. Journal of Clinical Psychology.60(2)179–188.

[6]   Sá, M., Carriço, L., Antunes, P., Ubiquitous Psychotherapy, Pervasive Computing, Special, vol. 6, nº 1, pp. 20-27, 2007, IEEE.