ScWiz: Personalizing Psychotherapy

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Abstract

This paper presents ScWiz, a framework that provides psychotherapists with means to tailor specific therapies for their patients. Used artifacts can be easily adapted to the patient's problem, to his evolution rhythm, therapy stage or even to possible filling in situations. Furthermore, the artifacts can be configured to pro actively adapt to the patient's behavior, according to previously defined rules, extending the therapist's motivating role. Besides it also enables deferred analysis of the patient's interaction and behavior with the therapy artifacts. The framework ranges from desktop computers, to mobile devices (e.g. PDAs and TabletPCs) covering the various therapeutic tasks for both patient and therapist. Special care was taken on the design stages, minimizing the intrusiveness of the solution and maximizing the simplicity of usage, particularly on the resulting patients' artifacts.

Keywords

Psychological diagnosis, self- therapy, PDAs, TabletPCs, patient/clinician interaction.

1. INTRODUCTION

Cognitive Behavioral Therapy (CBTs), on specific pathologies such as depression and anxiety may become a long, demanding and sometimes expensive process. Patients are driven, by the therapist, on a self learning and introspective process, replacing, whenever existing, their distorted cognitions with more adequate ones [12]. This requires a multitude of tasks to be performed by the patient and by the therapist, either cooperatively or individually. Therapists define procedures, questionnaires and the therapy itself before each session. On the other side, patients register life events and respective behaviors, schedule activities, etc, throughout the day. During face-to-face appointments, all the data gathered and produced between sessions is transferred between actors, orally or through paper artifacts. At this time, the therapist annotates the patient's evolution, conversation topics or even attitudes during the session.

Until recently, this process was supported mainly by paper or through some computer applications. However, due to the diversity of problems and associated therapies as well as the work flow inherent to the process, these solutions presented themselves as rigid, sometimes obstructing communication, therapy adaptation and even cooperation during sessions. This also caused delays, leading patients to frequently disengage from therapy. Based on this, a recent effort addressing these topics is providing new solutions and alternatives to previously used methods [4, 3].

For the therapist, the main problems to overcome are to:

(1) enable an easier creation or adaptation of the existing therapeutic material; (2) personalize therapy to the patient's specific needs; (3) create quick but structured annotations during sessions; (4) manage patient and session's information (5) a way to understand patient's difficulties with the therapy, outside the office and finally to (6) ensure that the patient's learning curve on the therapy process is short. As for patients, the main challenges are to provide means to easily fulfill their tasks, focusing on the treatment itself, and to ensure that motivation is kept during and between sessions, without the therapist's presence.

This paper presents **ScWiz**, a framework that supports the therapist's work, allowing him to tailor the therapy throughout the entire process. Integrated within the SCOPE architecture [5], it is also complemented by tools that allow therapists to perform deferred analysis, through the visualization of the patient's interaction with the therapy artifacts when apart from him. Furthermore, the resulting artifacts, configured by the therapist, enable patients to ubiquitously and quickly perform their tasks during their daily lives with aids and incentives, reducing effort and enhancing the therapeutic tasks. Special care was taken to provide therapists with enough power and functionalities to create diverse therapy artifacts but still maintaining usability and simplicity levels, on the resulting applications, very high.

It starts with a brief overview on current systems that relate to psychotherapy, followed by the description of the design process, the chosen architecture and an outline on available

features. Afterwards, the therapist framework **ScWiz**, this paper's main focus, and the patient's tool are presented. Finally, the evaluation that took place is addressed, some conclusions stated and future work is drawn.

2. RELATED WORK

Computer applications directed to psychotherapy have been gaining some momentum in recent years. As in many other areas on the health care domain, they often focus on data gathering or visualization, analysis and especially organizational tasks within the health care domain [8]. Specific software, directed to the psychiatric and psychological use, allows patients to follow particular methods of therapy and even diagnosis [14]. Excluding patient solutions that, relying on expedite approaches of diagnosis, have revealed strong human rejection [6], studies have demonstrated the effectiveness of the computer role in the process of anxiety and depression therapy [9, 19]. However, most of these systems provide either isolated therapist solutions or isolated patient solutions with no therapist control. Moreover, mostly rely on desktop approaches, which are incompatible with most of the previously described scenarios, including office consultation [11].

Several web-based self-help applications and websites are also emerging [1]. Overall, in spite of the common advantages, such as remote assistance and costs lowering, these techniques have many disadvantages as well [18]. Patient disengagement is frequent, as well as patient misinterpretation of the sites' objectives; sites require constant management and monitoring; and email and telephone assistance is often required.

More recently, hand held and overall mobile devices, such as PDAs or TabletPCs, became available, and new applications have appeared. However, they only cover partial steps of the therapy process and do not allow the customization of the patients' tasks or artifacts. The majority is rather simple and allows simple measurements of the severity of pathologies, indicates drug dosage or provides therapists with reference information about diseases or drugs [10]. On the patients' side, some self-control or relaxation procedures are available on hand-held devices [15]. Other applications developed for the treatment of specific pathologies, such as *bulimia nervosa*, also had positive outcomes [13]. But once again, these lack the possibility of adapting each step of the procedure or application to patients' specific needs.

Finally, none of the work found in the available literature addresses the therapy stages where the patient is away from the therapist, nor the problems that the patient faces during his homework.

## 3. SYSTEM DESIGN AND ARCHITECTURE

SCOPE is a project that addresses the aforementioned problems and aims to solve them [16]. The project followed a contextual design approach [2]. Whilst gathering the requirements interviews, with practicing therapists and researchers, were conducted, videos observed [7], sessions simulated and literature reviewed. During early stage

evaluation sessions, low-fidelity prototypes (for PDAs and TabletPCs) were created and used individually and collaboratively in simulated sessions by therapists and a group of varied background users [17]. Throughout this iterative process, users also participated and several sketches of possible user interfaces were drawn. These were repeatedly used and redesigned until high levels of user satisfaction were achieved.

The results of this process emphasized the need to use mobile devices, which ensure that the therapy artifacts can be carried along, used and (re)viewed by both therapist and patient whenever possible. Nonetheless, a larger platform should be included for the most complex features, for its larger computational power, storage space and working area.

3.1 Overall Architecture

Figure 1 depicts the general settings of SCOPE: one presumes a full resource environment (called fixed) that usually comprehends a PC, possibly a patient record server, and peripherals (e.g. printer); another (referred to as mobile) copes with the mobility requirement with variable resource capabilities and may be supported by a laptop or a hand held device; and the last covers the co-presence situations (named face-to-face), where TabletPC and hand held solutions are envisioned. The first two presume, primarily, an individual stand where therapist and patient work isolated from each other - collaboration through a network is also possible but it is the subject of JoinTS, a continuation of SCOPE.
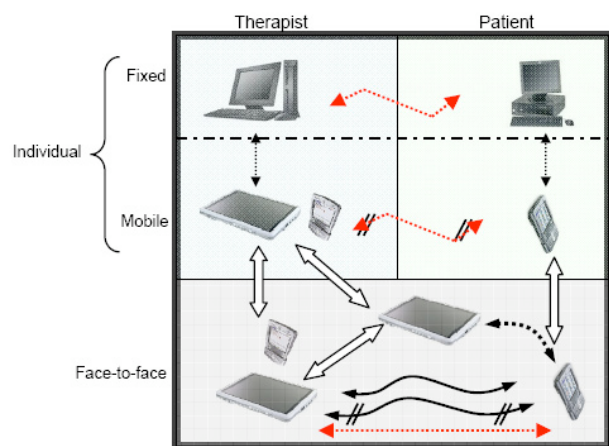
Figure 1. Global Architecture and usage scenarios.

On these settings, some scenarios can be envisioned that result in one or more applications. In general, each application may operate in stand alone mode, possibly integrating a classic paper based therapy procedure. On the other hand, applications can be articulated with each other, covering most of the therapy activities. Integration is accomplished through a shared database, exchanging artifacts and data through a synchronization process (represented by a strait-dashed line in the figure), or through di-

rect communication (a curly arrowed line). Note that direct communication also occurs between therapist and patient in the face-to-face setting. Applications can also be configured (depicted by a fat arrowed symbol) to become more adequate to a specific usage scenario.

3.2 Procedures and Features

Each procedure and feature is better suited to a specific scenario and correspondent platform. The following sections detail the usage scenarios and common tasks that are performed in each.

3.2.1 Therapy Definition

The therapy definition involves the selection and customization of forms; the creation of the items that compose it or even the analysis of gathered data. With SCOPE, using **ScWiz**, these tasks can be carried out ubiquitously, on a mobile device or at home/office, usually through a desktop computer. This latter platform provides therapists with a larger working area, particularly adequate to artifact customization practices or even analysis. On mobile settings, all the features are available. However, some of these are generally reduced to lighter versions due to the hardware's limitations. Still, synchronization between platforms is offered, allowing therapists to transfer data from one device to other, carrying only the necessary information for a specific day or session.

Depending on the used device's capabilities, information exchange can be done using a common connection between devices or Bluetooth. Alternatively, all the data can be exported to XML files and sent by e-mail or a digital card.

3.2.2 Therapy Adjustment and Collaborative Tasks

On face-to-face sessions, therapies and correspondent artifacts are usually adjusted instead of created, and tasks are mainly done in collaboration. On early stages of therapy, patients are usually guided and helped while completing forms or questionnaires, sharing a pencil and a paper or writing the same answers on separate paper sheets. SCOPE encompasses a similar scenario, where a shared device (e.g. Tablet PC) is used. When this cooperative mode is selected, all aids are disabled since direct intervention by the therapist is available.

When each actor has his own device, collaboration is done with wireless communication (Bluetooth and Wi-fi). Users interact with their own device and information is transferred between them as needed. However, this latter scenario also allows the therapist, when using a larger device (e.g. Tablet PC instead of a PDA), to monitor on his device the patient's application and actions, remotely disabling or enabling some functionalities. On these occasions, the therapist's interface is divided into a private space, where annotations can be taken and previous results analyzed; and into a public space where the patient's actions and screens are displayed.

3.2.3 Therapy Tasks

Therapy homework is usually done individually and away from the therapist. Mobile platforms are better suited for this type of therapy; however patients are also allowed to use their desktop computers for homework. However, this scenario is rarely applied since most of the tasks are to be completed during the day. Information exchange with therapists is also available through e-mail.

4 OVERALL FEATURES

To cope with the demands and complexity of the entire process of psychotherapy, including both session activities and homework, SCOPE contains some smaller applications that pertain each to a specific activity.

4.1 Annotations

Annotations are an important and recurrent activity during sessions. However, many times, the simple act of taking a note may retract from the conversation or task at hands. Preferably, these must be taken without distracting the patient but still with some detail and corresponding to the situation and action that was noteworthy.

SCOPE offers a set of utilities that cope with these difficulties. Annotations are taken on a mobile device just by choosing a theme and writing the note. They are automatically stored with the date of creation, the session number, the patient's name and with the chosen theme, for an easier recovery. On posterior analysis they can be (re)organized and new annotations can be attached to previous ones. Furthermore, recurrent themes, frequently used words are highlighted and emphasized if chosen by the therapist.

4.2 Analysis

Analysis is also possible for the remaining data handled by SCOPE (e.g. forms, questionnaires, thoughts, etc). On the desktop/laptop versions deep and thorough analysis is possible. Graphics and charts are automatically created for some questionnaires and hierarchic views of thought registers can be made. These forms of visualization help to emphasize patient's main problems or patterns of behavior. During analysis, categorization of data can also be done according to these results.

On mobile devices, a lighter version accommodates sufficient features to allow an easy search of the patient's previous results, common subjects within annotations or thought registers. These simple features are particularly suited to on-consultation settings where therapists can show patients details of their repetitive errors and frequent answers.

4.2.1 Deferred Analysis

Since a great part of the therapy process is accomplished away from the therapist, it was necessary to introduce a mechanism which allowed therapists to gain conscience on the patient's problems while working outside the consultations. To tackle this problem, a logging back end was introduced on the mobile applications. When a patient starts using an application, the log starts recording every action

until the patient exits the application. For each action that the patient takes (e.g. pressing a button, selecting an option or answering a question) a new log entry is added. Thus, the log is composed by a sequence of events that are recorded, including the type of event (e.g. main events or simple events) and the instant when the event was raised. However, the granularity of the events that are logged is also configurable by the therapist. Several levels are available ranging from logging each time the user taps the mobile device's screen or clicks the mouse button, storing the coordinates of such click, to higher level events such as when the user moves back or forward from one item to another within a form. This is particularly important when using mobile devices where the amount of memory is usually smaller.

The log files are stored in an XML like format and can be analyzed either manually or using the log player described on the following section.

4.2.2 Log Player

The log player is the application used to review the logs that were created whilst the patients used their applications. Typically, it presents a view of the application that the patient used and replays all the actions that the patient took. The amount of actions and events that are displayed depend on the granularity of the log that was recorded. However, when all the events are logged, the player also allows the user to increase the level of granularity, reviewing only the actions that are relevant for the patient at question. Furthermore, the speed in which the events are displayed is also configurable, particularly for large forms or questionnaires which contain up to hundreds of items.

5. TAILORING THE THERAPY

The artifacts that are commonly used on psychotherapy are based on groups of multiple-choice or free-text questions, items or fill-in fields. These items are grouped following pre-defined standards, composing, at times, extensive documents. Moreover, these are not always suited to every situation. For instance, a questionnaire containing questions regarding the patient's professional activity is not suited to an infant.

5.1 Personalized Artifacts

SCOPE offers therapists a way to overcome this problem. The **ScWiz** tool comprehends a set of mechanisms that permit therapists to personalize artifacts and correspondent applications to their patients. It integrates a database of standard used items, questions, etc; still allowing therapists to create any other item that is needed. Furthermore, it also supports the customization of each item's presentation (e.g. image, text) and interaction (e.g. multiple-choice item, free-text answer, gauge, drawing, etc). Creating a new questionnaire is resumed to simply selecting a set of items, to arrange them within a sequence and to define their above mentioned characteristics. This flexibility allows therapists do adapt the artifact, its presentation and interaction. For instance, when the patient is a child,

the form/questionnaire may be composed mainly by pictures with multiple-choice answers. On the other hand, for an adult, the same items may be textually presented and answered.
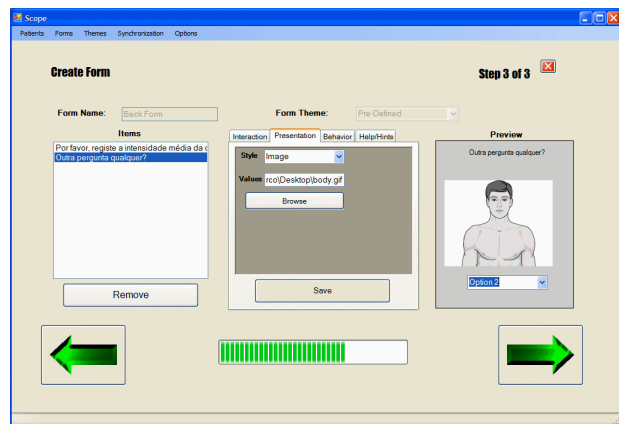

Figure 2. ScWiz: Form Creating Wizard

Another useful feature is to define questionnaires according to the place or time in which they will be completed. Imagine, for example, that a thought registering form must be completed during the patient's working hours. Here, time may be of utmost importance. Therefore, the therapist may define the artifact with hints or recurrent thoughts that can be easily chosen form a list, instead of written. On the other side, if the form is to be filled at night, then the patient is given space and freedom to write whatever he wants. The same methodology can be used to adapt a particular artifact to the patient's device. Smaller devices have limited capabilities regarding images or long answering lists. Furthermore, generally input possibilities are limited and data introduction should be facilitated. With **ScWiz** selecting adequate answering options and presentation types, the user interface is modeled taking into consideration all these dimensions.

It is also noteworthy, that default profiles are included and questionnaire patterns available to be chosen from wizards. To improve usability and promote a simple design and customization process, templates are provided, so that therapists can easily create either generic or more specific tools for their patients. Figure 2 depicts a wizard for creating an image based form. On the left side a list of the selected items is available. The box at the center presents the customization options (detailed in figure 3). Finally on the right, an automatically updated preview of the resulting application is shown. In this case, the form is completed with 3 steps: choosing the form name, the items and their presentation. However, the latter can be skipped and the default presentation is shown.

As shown in figure 3, several options to customize a resulting form or application are available. On the left, some of the interaction customizing possibilities are displayed. The first drop-box allows users to choose the type of interaction that will be used (e.g. drop-box, textbox, trackbar, etc). The remaining options are presented according to the

selection that was made on the interaction style dropbox. In this case, a list, representing the collection of items that will compose the drop-box, is shown. On the right side of figure 3, the help and hint configuration menu is presented. Here, therapists are required to select an operator, which, together with the value that is inserted, will trigger the help or hint that will be shown. Again, several options are available to define the presentation of the hint/help sentence or image. These are addressed with more detail on the following section.
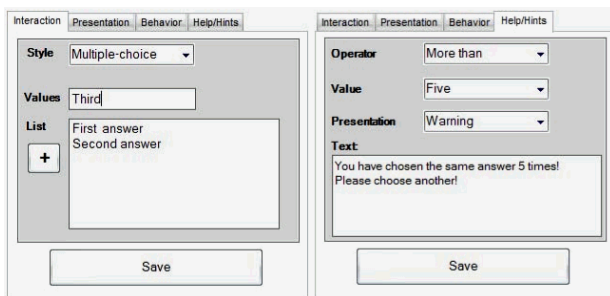

Figure 3. Customizing Features of ScWiz

Another advantage of such system is the ability to adjust these forms during sessions, on the mobile devices (Figure 4), according to just gathered information. Overall, forms, questionnaires, items and their composition can be matched to the patient's age, pathology, symptom, etc. These simple provide therapists with sufficient power to select the user interface of the patient's artifact.

5.2 Pro-active Motivation and Help

Through SCOPE, the therapist's work can be extended outside the office and sessions. For each item within a form, a number of answering aids can be provided (Figure 4). These can also assume various presentation and interaction forms. The therapist, while creating a new artifact or updating an existing one, is able to choose the schedule, type and amount of help that will be provided to the patient (Figure 4). Generally, each type of item and corresponding interaction and presentation is associated with a type of hint (e.g. image presentation uses a new picture to help). However, new combinations can be made, switching either the content of the hint message or even the way it is displayed. Again, details such as the location and time of completion can be anticipated, thus optimizing the artifact according to it.

Patient's motivation is also kept when away from therapy sessions. Using similar methods, the therapist defines motivating comments, incentives and congratulations when an item is correctly answered or even when a certain amount of thoughts is registered during a day. To activate these rewards, the therapist defines rules for each item within a form. Each rule is composed by a message (e.g. hint, warning or motivating message), the presentation and interaction types, the trigger and the frequency with which it should be presented. However, rules that entangle various items are also possible. For instance, if the patient

answers correctly to the first five questions, then hints are automatically disabled. On the other hand, if the patient fails to answer correctly the five following questions, then hints are once again activated. Details such as the amount of positive or negative results are also configurable.
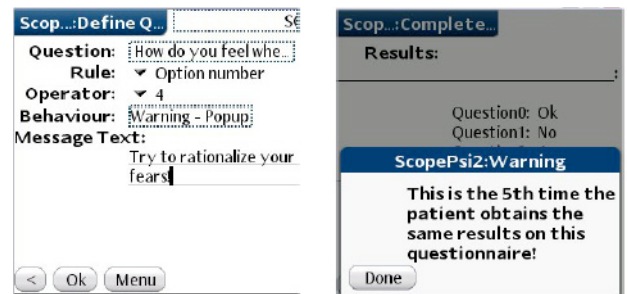

Figure 4. Defining rules on a Palm Device

An alarm mechanism assures that patients are reminded to complete their tasks during the day. Once again, the frequency or time of day of such occurrences is also defined by the therapist. However, the therapist is also allowed to define criteria that force the alarm to repeat more frequently if the patient fails to perform one or more tasks that were scheduled.

6 THERAPY ENDEAVOR

The patient's tool allows patients to engage on therapy as previously defined by the therapist. It reads each created specification materializing it into a pro-active artifact.

6.1 Using the Artifacts

Each task that is usually done during therapy is replicated and enhanced so the effort in accomplishing it is diminished and the focus directed to the content that needs to be provided. For instance, multiple-choice questionnaires are easily filled by selecting the correct answer. However, browsing the questionnaire forth and backwards allows patient's to update questions at any given time without creating confusing or unreadable documents. Furthermore, each of these updates is stored and provided for later analysis. On thought registers, specific fields are generally provided (e.g. situation, emotion, behavior, etc) and hierarchically presented in order to facilitate the filling-in process.

Activity scheduling is also improved since recurrent activities are available for the patient to choose and the day is divided into several slots for an easier organization. On this aspect, later classification of each activity is also possible.

During each of these tasks, the application adapts to the patient's behavior, according to the rules that were defined by the therapist.

6.2 Therapy Tutorials

Also included on the patient's tool is a customizable tutorial on several techniques and common procedures (e.g. relaxation, etc). Patients that are selected to be enrolled in group therapy can study previously and on a regular basis

the main activities that will be undertaken. Alarms are generally activated for patients on early stages of group therapy whereas for those who are more experienced, alarms are only sounded when an appointed task is missed. As for the therapy artifacts, tutorials can also be presented in different ways. Suggestions and hints can also be popped up during browsing, if defined so by the therapist.

7 EVALUATION

The therapist framework and corresponding patient's tool are being used on a clinical and on an academic scenario. However, these were firstly evaluated during two months by several users with different backgrounds.

7.1 Usability Evaluation

The therapist's framework was tested by a group of three practicing therapists and two researchers. The main focus of this group was to test the feasibility and effectiveness of the artifact creation and customization feature. Analysis and respective features were also assessed during this stage. On a later stage, therapists also tested the therapy application. However, a larger group of users from various backgrounds was responsible for carrying a mobile device with the therapy tool for several days. Various tasks were scheduled and completed during this period. Some sessions were also simulated with the various devices (Figure 5). All of these sessions were filmed for posterior analysis. During these tests some measurements were made.

7.1.1 Results

Again, the mobile devices proved to be adequate on the various settings that were tested (e.g. individual, consultations). Therapists were required to create three different artifacts (e.g. questionnaires, tests) composed by different types of questions and items. Once again, different subjects were involved. Therapists also responded to the created artifacts, took some annotations and transferred the information between devices. In order to assess the system's advantages during consultation activities, some users were asked to accomplish the same tasks in the traditional way. The time spent in accomplishing each set of tasks was measured.

Users took approximately 1 minute to create each item, choosing its hints, behavior, interaction element and content. To create a 10 item questionnaire (after the items were created), the time spent was about 2 minutes. The users took from 2 to 4 minutes to complete the artifacts, depending on the amount of free-text questions on the artifact. Comparing to the time used for the same tasks without the system, SCOPE proved to be an advantage for both therapists and patients. The major benefits were noticeable when creating the artifacts with differences ranging from 50 to 80% less time using SCOPE.

Overall, results demonstrate that the **ScWiz** tool can be used effectively for artifact creation and content organization. Therapists welcomed the ability to configure the interaction elements and choose the questions/answer types. For specific therapies, therapists were particularly interested in the possibility of providing help and hints to their

patients. Globally, the integration of the several activities within the same tool was positively received by all the users.

Regarding the analysis application different opinions emerged. Some of the therapists thought it should allow more complex visualization of data, namely different types of graphic charts. The rest preferred the tool as it is, since the output is easily interpreted both by them and by patients, stating that if more power was needed a desktop or TabletPC could be used. The users who tested the patient application appreciated the possibility of completing questionnaires using the hand-held devices, particularly because they can browse through the already answered questions and update them if necessary. Another major benefit was the immediate feedback that the tool provides, if configured to do so, by the therapist.

Figure 5. Evaluation session with mobile devices

7.2 Resulting Applications' Evaluation

To validate the expectations regarding the customization capabilities of **ScWiz** a second evaluation stage took place. The main goal during this stage was to replicate and enhance existing and successfully used psychotherapy applications. Accordingly, these tasks were accomplished by therapists, some with previous experience in working with such software. However, now, they were given the capability to manage and adjust the applications to their specific needs.

As expected, some rearrangements were necessary to accommodate all the applications that were emulated. However, these were successfully accomplished and are now integrated within the current version of the software.

7.2.1 Anxiety

Most of the available applications which address anxiety problems rely on relaxation tutorials or anxiety assessment inventories [15]. With **ScWiz**, therapists were able to adjust tutorials for similar procedures but further enhancing them. Among others, they were able to include exemplifying images, hints on how to execute the movements as

well as a classifying field on the effectiveness of the results. Some of these methods were previously available on the usual paper based artifacts while others were here introduced since the used medium provided new possibilities. The used images were previously owned by the therapists or were quickly downloaded from the web.

For the anxiety inventories, therapists selected a simple arrangement of a few items and the correspondent levels of intensity for each (e.g. Beck Anxiety Inventory, Max Hamilton Test). These were particularly appreciated by final users who tested the therapy application. The main reason was the simplicity, quicker response time and possibility to update each item at any time, especially when compared with the traditional paper form. For the therapists that participated on these evaluation sessions, these results were extremely important, since the ease of use is essential for the success of the therapy process. Patients frequently disengage from therapy due to the effort involved in completing all their tasks.

7.2.2 Depression

Pleasant Activity Scheduling is a common practice during depression therapy. Using **ScWiz**, therapists were also able to compose a simple scheduling form which integrated classification fields for each task that was scheduled (Figure 6). Hints were added mainly as lists of common activities that could be selected for a slot within a day (Figure 6, right). Furthermore, the system includes a mechanism that memorizes recurrent activities that are introduced by the patient. These are also provided through lists, minimizing the need to write on the device.

Alarms were also defined for these forms so that final users were alerted when tasks needed to be scheduled. A set of different arrangements resulted from this stage. For instance, one of the therapists composed a scheduling form where a patient could browse each hour of the day sequentially. For each hour an activity could be planned and an annotation could be attached to it, including information such as the location of the activity or any other data that the patient might find usefull. On the other hand, another resulting form, allowed patients to introduce the date (e.g. hour) and choose an activity for that slot. According to the therapist, this form was particularly adequate to latter stages of therapy, where the patient is given freedom to plan his activities as wished. However, despite the different arrangements that distinguish these forms, both could be re-visited and updated, registering also the pleasure and efficiency with which the activity was complete.

7.2.3 Pain and Weight Disorders

For the treatment of pain associated disorders, therapists created image based forms. One of the resulting forms displays body images where users point the location of the pain directly on the image (Figure 7, left). Associated to each image is a set of questions related to pain intensity, used medication or associated symptoms. Generally, each item pairs an image with a trackbar, allowing the patient to quantify his pain. Once again, hints and triggers were
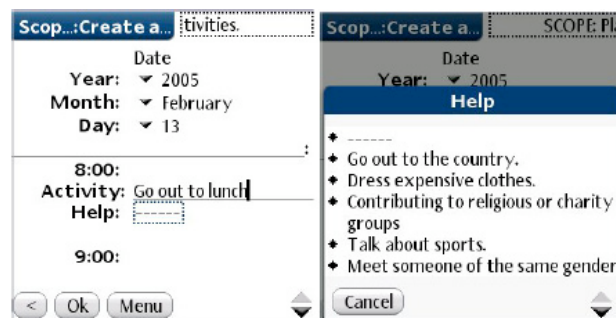
Figure 6. Activity Scheduling on a PalmOS PDA

defined. Whenever patients choose a high level of pain intensity, relaxation sentences and hints are displayed. On certain occasions, instructions on how to react to the symptoms were also defined.
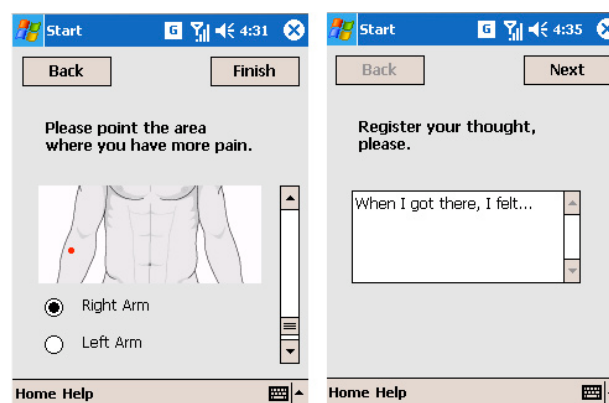
Figure 7. Pain Therapy on a Pocket PC

Some forms addressing weight associated problems were also created. These were mainly questionnaire based but some also incorporated a thought registration component (Figure 7, right). Regarding this latter facet; it was easily incorporated and achieved through a simple arrangement of a few items (e.g. situation, consequent thoughts, behavior and adequate thought).

8 CURRENT AND FUTURE WORK

The framework and resulting tools are being used on a clinical environment where new usages are already being discovered. The achieved flexibility of **ScWiz** allows therapists to replicate previously successfully used tools, to extend them and adjust them to the same pathologies to which they were designed. Initially intended to support anxiety and depression, it was quickly extended to other pathologies. Weight disorders and pain treatment are examples of different applications that SCOPE is able to accommodate.

Following the positive results that are being achieved with SCOPE, a new project that deals with group therapy sessions is already being developed. Besides providing individual support for each patient, this newer version provides

streams of communication between (1) patients within a group therapy session; (2) therapists also within a group therapy session; and (3) between all the patients and the therapist. Finally, a (4) shared space where both patients and therapists can post their comments is also available through an interactive smart board. Outside sessions, smart phones will allow therapists to be notified of patients' accomplishments or even permit distributed motivation through group members.

The use of new equipment will also provide new functionalities to the system. Sensors (e.g. temperature, heart rate, etc) will be incorporated so that patients with severe situations can be monitored. If necessary, their therapists might even be notified through an automatic SMS message. Also, using smartphones with built-in cameras, new techniques for weight disorders can be used as well.

9 CONCLUSIONS

Recently, some attempts to support psychotherapy with the use of computers have been made. These are available either through the internet, desktop computers, and lately even on mobile devices such as PDAs. Desktop approaches are clearly inadequate to the ubiquitous needs of therapy tasks and can be intrusive during consultation settings. When it comes to mobile applications, these are too specific, either covering only partial steps of the process or specific pathologies. Moreover, therapist intervention and management over the therapy is never offered, particularly when away from the patient.

This paper presents a novel approach which addresses the majority of these problems. It includes a wizard based tool, which allows therapists to compose specific artifacts to each patient and his needs. Furthermore, with the resulting applications, patients can engage on their therapeutic tasks whenever and wherever they are, using a less time consuming and demanding tool than the common passive paper approach. The extension of the therapists' motivating and educational role is also accomplished by the presentation of hints, aids and incentives during form and task completion.

10. ACKNOWLEDGEMENTS

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