# Supporting talk-based mental health interventions with digital whiteboards

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**Abstract.** The potential of mental health interventions supported by computers has rarely been explored to date, and the use of technology has hence been limited. There is a need for finding new ways of providing engaging psychotherapy services. We introduce the digital whiteboard system Tele-Board MED (TBM) as a new approach of promoting patient-therapist interaction and joint documentation. Based on observations of cognitive behavioral therapy (CBT) sessions and a text material review we identified possibly useful features. We conducted a qualitative and quantitative feedback study with 34 therapists in the form of a questionnaire based on a video showing the system's fundamental concept and features. This allowed us to evaluate the therapists' attitudes and the ability of a system like TBM to meet user needs. We encountered willingness to use the system primarily driven by practical interest in fulfilling administrative and legal requirements. Skepticism regarding patient file transparency and technology use was also found. The main insight is that reestablishing the nature of CBT sessions towards higher patient engagement can more successfully be pursued if technology provides incentives for therapists, such as features that speed up administrative tasks.

**Keywords.** Patient-doctor cooperation, psychotherapy, digital whiteboard, electronic patient record, patient empowerment

## Introduction

Cognitive behavioral therapy (CBT) is a widely used approach to talk-based mental health care applied for a wide range of problems, including phobias, depression and anxiety disorders. CBT aims to enhance the patient's self-efficacy and uses treatments like coping tactics, relaxation training and social skills training.

The potential of mental health interventions supported by computers has rarely been explored to date, and the use of technology has hence been limited. Coyle et al. [1] give a comprehensive overview of the research field combining mental health care (MHC) and human-computer interaction. They identify domain-specific reasons for skepticism towards technology but also point out that it can play a significant role in helping to address the need of finding new ways of providing accessible, engaging, cost effective MHC services. Most technology used to date in MHC, like electronic contact means, online information sources and electronic questionnaires turned out to improve access, but didn't improve patients' personal engagement in the treatment [1].

We introduce the digital whiteboard system Tele-Board MED (TBM) as a new approach of engaging patient and therapist in cooperation. As an adjunct to the traditional face-to-face therapy it should allow patient and therapist to document

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sessions jointly in a digital format. Figure 1 shows a user scenario with an interactive whiteboard to display and operate the documentation panel via touch gestures, and tablet computers with keyboards as additional input devices.

Traditional whiteboards are common tools in therapy rooms. Digital whiteboards have the potential to broaden the therapeutic space even more by increasing the scope of interactions. One of our highest priorities is to improve – or at least not to damage – the patient-doctor relationship, since a high quality relationship is considered one of the major curative factors in psychotherapy [2].

We are building TBM on the concepts and infrastructure of Tele-Board – a whiteboard software system to digitally support distributed teams in creative, collaborative work [3]. Basic functions include drawing with digital pens, erasing pen strokes, and writing, posting, arranging and clustering sticky notes.



**Figure 1.** Therapy session with Tele-Board MED, using an interactive whiteboard and tablet computers.

The concept of patient empowerment is discussed extensively both in science [4, 8] and politics. Ajoulat et al. [4] identified two directions in which the process of patient empowerment is brought forward: patient-doctor interaction and the view on the patient alone. In Germany, a law was passed in 2013 which regulates medical documentation anew to promote patient-doctor cooperation at eye level [5]. The law states that doctors are obliged to document the whole process of treatment promptly and comprehensively. Patients have the right to see their record, and to attain an electronic copy.

## 1. Methods

The research was conducted in three steps. First, we used qualitative, explorative methods to collect data about CBT sessions. Afterwards, insights about common practices were incorporated into system features such as whiteboard panel templates. Finally, a feedback study for the conceptual evaluation of TBM was conducted. Measures involving therapists and patients took place in an ambulant psychotherapeutic clinic and training academy in Germany. The therapy session attendance was done by one research team member who is a psychologist herself and a trainee at the institute just mentioned. Patients at the institute agreed to the possible attendance of trainees at the start of therapy.

## 1.1. Observation of cognitive behavioral therapy sessions and review of text material

We started by observing the entry phase of over 100 patients, recording which information therapists asked for and wrote down. The sessions were held by three different therapists, each having more than 30 years of therapy experience. Additionally, text material was reviewed, such as anamnesis questionnaires (forms to be filled in by patients as well as guidelines for therapy sessions) and training material. In the German public health service, therapists make a case-based funding application. After up to five probatory sessions assessing therapy need and prospects of therapy success, a case report is sent to the patient's health insurance as financing request.

## 1.2. Iterative design of an anamnesis template

We designed a template according to the information that is recorded most frequently in anamnesis sessions, and tested it with three experienced therapists. Documentation was done in parallel by the therapists using their standard material and our research team member using a paper prototype of the template. After the sessions, recorded content was compared and missing information led to template revision. After five revision-and-test-cycles no further amendments were suggested by the therapists.

## 1.3. Feedback study with therapists on the basis of Tele-Board MED explanation video

We conducted a feedback study with 34 behavioral therapists (age: 27 to 61yrs, avg. 35.4, working experience: from less than 1 to more than 10yrs, majority 1-2yrs).

To introduce the aims and functionality of Tele-Board MED (TBM), we generated a 15-minute video [6]. It explains the requirements of the new German patients' rights law with associated documentation needs, and introduces the concept of TBM in terms of setup, interaction, functionality, and hardware. Ideally a big touch screen is used to instantaneously document the therapy session via keywords on sticky notes or in the form of drawings. Additionally, both patient and therapist can use mobile input devices such as tablet computers to write sticky notes (cf. fig. 1). They are sent via a wireless connection to the server and appear instantly on the whiteboard where they can be put in the right place with a swipe of a finger. The template function can help guide the therapy session and allows for documentation from a prepared, yet flexible framework. The Word-export function allows sticky note texts on the whiteboard panel to be exported into a text file. The protocol function generates an overview of opened whiteboard panels during a session. Furthermore there is a picture export function.

A 9-page questionnaire was sent out to therapists per e-mail containing an information text, and the link to the video. In the first part, we asked questions about their attitude towards and use of technology, and about their attitude towards and practices of writing case reports. We then asked questions about the perceived usefulness of TBM after having seen the video.

## 2. Results

We gained insights in writing case reports, discovered that CBT is highly structured and thus well suited for templates, and we were able to evaluate the concept of TBM.

The anamnesis template shown in fig. 2 addresses the most prominent issues discussed in any first CBT sessions: patient history, emotions, thoughts, family status, plans, energy, therapy experience, concerns, self-endangerment, and medical issues. Since one cannot predict patient-doctor conversations, templates are adaptable and can easily be changed like any other whiteboard panel.



**Figure 2.** Anamnesis template containing keywords and icons filled with sticky notes regarding the case.

The analysis of text material showed that the case report is a condensed summary of the information worked on in the therapy itself. This often entails redundancy in writing. As the basis for health insurance companies to make pay/no-pay decisions, the case report is an essential document which covers three subjects: a description of the patient's case, an analysis of the problems, and an outline and justification of the treatment. In the feedback study we found that the writing of case reports is regarded as an annoying, time-consuming necessity. At the same time, the questions addressed by case reports are considered highly important and sensible. TBM can support this task with the Word export function whose text output can be used as building blocks to assemble the case report.

More than 2/3 of the therapists need at least 5 hours to write one case report. Therefore the writing is often not done in one sitting – all therapists occasionally or often need one week or longer to get done with one case report. It happens to more than 1/3 of the therapists in every fifth case that they cannot read theirs patients' handwriting. Asking therapists about their pragmatic strategies to cope with the tedious task of writing case reports, we found that more than 2/3 of the therapists often copy passages from existing reports, and more than 1/3 even often copies entire reports.

With the help of TBM therapists would on average save one third of their time for writing case reports. It would also be much easier to provide patients with electronic copies of their own file using TBM as opposed to other strategies they could think of. 88% of therapists stated they could imagine using TBM with their patients. Detailed results of the statistical analysis can be found in [7].

By means of qualitative questions we gained insights about the thoughts, wishes and criticism of therapists. Some expressed fears that a system like TBM might hinder the therapeutic contact and process, due to the mere presence of the device in the room as well to difficulties using the technology. Another user group predominantly was skeptical about the new patients' rights law with its demand for full transparency and

had concerns about data security issues. A third group of users had a thoroughly positive attitude and shared wishes and ideas for new features and templates.

## 3. Discussion

In order to reach the best possible treatment outcome in CBT, patients need to become actively engaged, patient and therapist need to cooperate productively and the therapist needs to provide an effective treatment. Apart from these curative necessities, there are also administrative or legal requirements on therapists that need to inform technology design for CBT. Considering these goals, which purposes should a digital whiteboard system serve in order to be more advantageous than traditional media? Most importantly, it should support therapists because they decide in the first step whether or not to give technology support a chance. This can be realized by offering features to carry out auxiliary tasks more efficiently. Time can be saved by avoiding handwriting readability issues and by avoiding redundancy in documentation. Current strategies like copying parts of or entire documents from other cases do save time, but may reduce the quality of documentation. Completeness and correctness in documentation are purposes to bear mind – with the highest priority of data security. With a system like TBM, documentation can be turned from a necessity into a curative factor if the patient's access and involvement leads to engagement. The issue of full record transparency is challenging though, especially finding ways of documenting delicate information, such as a therapist's observations that offend the patient when spoken out aloud. Moreover, technology in CBT should be adaptable to the individuality of each case and at the same time take into account the way the treatment is structured. Further research remains on how a system like TBM will impact patients and the actual interaction in a session, and if the joint documentation has the potential we envision.

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