

To go: Gameful Extension for Cognitive Rehabilitation Software

Annika Endler¹, Mareike Gabele^{1,2}, Tom Heidel¹, Steffi Hußlein¹ and Christian Hansen²

Abstract—Regular use of software-based cognitive training in the patient's environment can promote rehabilitation success after acquired brain damage. However, existing pieces of training are often conducted without motivation support or lack of therapeutic guidance. We present a prototypical connection of a gamefully motivating training to a medically approved training software. In an expert interview, this was evaluated as well suited for patients and a high potential for use.

I. INTRODUCTION AND RELATED WORK

Software-based cognitive training is successfully used in the therapy of acquired brain damage [1]. It is mainly used in in-patient and out-patient therapy under the supervision of therapists during specified training times. Rehabilitation success is based on regular and long-term use, but workplaces must be available for this purpose. Frequent independent use of the learned skills in the own environment can promote rehabilitation. However, this requires an appropriate level of motivation of the patient: In addition to enjoyment and personal responsibility, autonomy as part of the self-determination theory contributes to support motivation [2]. Our research question, therefore, dealt with how these required elements can be used according to the needs and abilities of patients to supporting training. In this work, we propose to extend the existing cognitive training in a casual mobile game with short training sequences on a smartphone or -watch. Our contributions are its conceptual and prototypical development of this approach and the first evaluation of the system.

II. DESIGN CONSIDERATIONS AND PROTOTYPE

As a basis, we used an existing cognitive training for logical reasoning (RehaCom). Logical reasoning allows us to recognize patterns and establish coherence. The developed mobile casual training game is designed to complement the cognitive training given by the therapist. By a server-based connection of the app to the training profile of the patient, an adjustment of the difficulty to the abilities of the patient is possible. We created a video prototype of the function, screens and interactions. Within the game, shapes are displayed in a row must be logically completed. If the answer

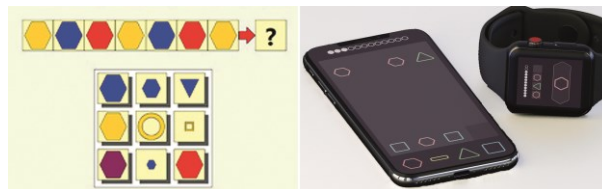


Figure 1: Left: Current Training (Computer), Right: Mobile Training

is correct, the row disappears. If the answer is wrong, it remains. The goal is, similar to the game ‘Tetris’, to get as few as many remaining rows as possible, or to achieve a number of correct rows. Figure 1 shows a gameplay situation in current and mobile training.

III. QUALITATIVE EVALUATION AND RESULTS

We presented the concept and our video prototype to a psychologist and a product manager of the rehabilitation software used as a basis. Then, we conducted a semi-structured qualitative interview of 30 minutes. We asked questions about the use for patients as support for motivation, patient skills and possible use. It was found that the time-reduced task at their own ability level is suitable to promote the practice that is necessary for rehabilitation. A changing environment makes training more challenging, but promotes the learning effect. The gameful approach expands the current training in a motivating way and thus shows a high potential for use in clinics and home training. The combination with an existing training system separates it from existing brain-jogging apps and provides a reliable therapeutic background.

IV. DISCUSSION, CONCLUSION AND FUTURE WORK

The selection of the mobile device should be flexibly adapted to the patient's abilities, as additional visual and motor limitations may exist. Rental devices can be a possibility here. The presented concept extends the potential of cognitive therapy flexibly in the personal situation of the patient. This can have a positive influence on the extent and period of rehabilitation success. The next step is to analyze the effect of the system on patients in terms of effect, use and training success parameters.

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¹ Authors are with the Magdeburg-Stendal University of Applied Sciences, Department of Engineering and Industrial Design, Germany

² Authors are with the Otto von Guericke University Magdeburg, Faculty of Computer Science, Germany