A comparative analysis for mobile and computer-based aphasia therapy

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Abstract - A developing movement in the administration of aphasia therapy is the utilization of computer-based treatments and mobile-based treatments, with limited amount of tentative writings that prove the benefits of a computer and mobile approach. As researchers implement treatments from the computer and through mobile devices, it is essential to promote research that would progress treatments in a programmatic way that are significant to clinical trials. This paper examines the authenticity of two projects designed to aid in programmatic research on an aphasia treatment: computer-based software named MossTalk Words, and Constant Therapy an iPAD based application. Results show the practicality and initial achievement of a structured and continuous therapy in providing evidence of the implementations of autonomous treatments.

Keywords: Aphasia, MossTalk Words, Constant Therapy

1 Introduction

1.1 MossTalk Words

MossTalk Words was developed for those with aphasia whom possess a deficiency in word retrieval. Designed by researchers and clinicians, the software was proposed for a clinical environment as well as by patients in an autonomous environment. It offers practice in word comprehension and construction using cues and feedback. The two main treatment modules were designed after treatments that are used by clinicians that have been effective in experimental studies [1, 2](Figure 1).

1.2 Constant Therapy

Constant Therapy is a mobile rehabilitation application designed for brain rehabilitation that incorporates evidence based therapy in the recovery of aphasia patients. Therapy tasks were divided into language and cognitive tasks and were created based on a review of evidenced based treatment recommendations [3] (Figure 2). Under each main task exist sub-tasks, for example, Language consisted of, the following tasks; Naming Therapy: phoneme identification, category matching, feature matching rhyme judgment, syllable identification, and picture naming [3].

2 Technical Analysis

2.1 MossTalk Words Training and Support

Researchers who perform research with patients with aphasia were asked to take part in a clinical research trial. For participants they were encouraged to; participate in a training program; complete evaluation forms; use the software to evaluate its effectiveness in a study of their design. Aphasia researchers and clinicians from sites across the United States met the standard and agreed to participate (Figure 3). For those unable to attend the workshop, a videotape of the conference was given to them online. During the workshop organizers offered a summary of the software and its features;
trained them to use the treatment module; explanation of the reporting requirements; and assist with interaction among the colleagues. Preceding the workshop, participants received continued training and support through, e-mail and an electronic bulletin board.

Figure 3 Reasearch and Clinician Sites

The organization of therapy tasks consisted of; multi-method matching, core vocabulary, and cued naming. The multi-method matching module consists of exercises that aid lexical comprehension and vocabulary expansion using printed or spoken words and images. The core vocabulary module focuses on patients with severe impairment in association. This module uses a progression of matching and naming exercises that restricts words with high implications. For the cued naming module, exercises in aiding in single word creation implementing an order from most common to uncommon in written and spoken cues. Vocabulary selection is based on categories, parts of speech, and linguistic characteristics.

2.2 Constant Therapy Training and Support

Constant Therapy is considered as a mobile application to aid individuals in rehabilitation in off-site treatment, the participants were selected through a standardized language test (Western Aphasia Battery) before the initial experiment took place. The experiment last for 10 weeks with respects to the patients advising clinician.

Therapy tasks were divided into several language and cognitive tasks. For language, the following tasks were designed; naming therapy, writing therapy, and reading therapy. For cognitive tasks the following task were designed; visuospatial processing, memory, mental flexibility, and problem solving. The language tasks were created from a database of concrete words spread from semantic categories. For reading comprehension, task extended across several topics with about 140 different items. The incentive for cognitive tasks covered anywhere from 50 items to 100 items per task.

3 Performance Analysis

The importance of a performance analysis is to obtain the effectiveness and efficiency of the system to aid in future implementation and design. In this section we review both the procedures in their performance analysis.

At the end of the first year, participants from the research sites had created a research proposal and in various stages of implementation such as data collection.

For the researchers who have developed projects, have then completed several studies, which lead to publications on relevance of the software, including its effectiveness for various language symptoms; its effectiveness when self-administered, and the impact of therapy [5, 6].

In conclusion to the first year of the project, a discussion took place to discuss the practicality and the implementation of the software. During that time an agreement was made that the data showed promising and encouraging outcomes with an interest in a continuous study and collection of data. In addition, a source of funding multiple research sites became a concern. In concluding the discussion, a preliminary evaluation was made to aid in the implementation and research for a multi-research study.

For Constant Therapy, in addition to an hour per week clinician-interaction sessions, patients also logged into the iPad therapy software with an average duration of a 30 minutes. For each patient, a comparison graph was created showing accuracy and reaction time. With respects the patient’s pre-evaluation test an average change was computed and the difference between the last two sessions and the first two sessions were outputted for evaluation. Due to the large sample size, a large amount of data has been collected leading to an unparalleled outcome that promotes the implementations and use of an iPad based therapy.

4 Discussion and Conclusion

4.1 Discussion MossTalk Words

Preliminary issues, such as, scheduling and intensity of treatment, must be attended to along with a developmental path toward clinical trials of rehabilitation interventions. A promising model for promoting development: identification of a treatment for critical effectiveness research, assist with organizations to provide a valued network, and offer methodological support to produce the optimal form of the intervention to be assessed.

4.2 Discussion Constant Therapy

This review of Constant Therapy emphasize that patients with brain damage are suitable to conduct therapy at home when provided with appropriate access to therapy and observed by a clinician. In addition, therapy tasks were personalized for each patient, based on standardized tests and performance and their baseline performance. Therefore,
patients showed much interest in practicing therapy tasks at home on a habitual basis. Patients also showed improvements in reaction time and accuracy on many therapy tasks that were dependent on the level of impairment, the level of difficulty and frequency of treatment.

4.3 Conclusion

In conclusion to the introduction of two autonomous therapy applications, the realization that a new form of therapy is proven to be effective in the rehabilitation of persons who suffer from aphasia. Within both cases, participants demonstrated improvements in accuracy and reaction time through computer and mobile treatment. The feasibility and success of a structured and continuous therapy with the use of a mobile device and/or personal computer provide accessibility and affordable means of receiving treatment and therapy.

5 References