Word Generation Interventions for Individuals with Aphasia: A Systematic Review

Bruno da Costa Sales[1*], Claudia Simões Pinto da Cunha Lima[1]
[1]SENAI CIMATEC University Center; Salvador, Bahia, Brazil

Aphasia is a disorder that affects a person's ability to communicate, compromising their ability to understand or express themselves. Although aphasia rehabilitation aided by computerized tools already exists, there are gaps in this area. This study aims to conduct a literature review to understand the current state of technology supporting the treatment of aphasia and to identify areas that still need to be explored, focusing mainly on tools with game characteristics and those that stimulate word generation. The review was conducted using the Capes and Scopus databases, searching for articles published in the last 20 years. The analyzed studies reveal the effectiveness of computational support in treating aphasia; however, few studies address this subject for Portuguese-speaking individuals with aphasia.
Keywords: Aphasia. Rehabilitation. Word Generation. Gamification.

Aphasia is a disorder that compromises a person's ability to communicate. The primary causes are strokes and other brain traumas, but any abnormal condition affecting the brain areas related to language can cause aphasia [1]. The specific brain region affected determines the type of aphasia in the patient. Damage to the front part of the brain results in difficulty expressing oneself, associated with Broca's aphasia, while damage to the rear area impairs comprehension, associated with Wernicke's aphasia [1]. In response to the injury, language functions may be migrated to other brain areas [2].

A speech therapist typically monitors aphasia treatment and employs various tools to exercise the patient's brain functions. The intensity of the treatment is a crucial factor for its effectiveness, with a minimum of 8 hours per week being ideal. However, achieving this intensity in a hospital setting is often challenging [2]. To enhance treatment intensity, the use of computers and mobile technologies has become a well-accepted alternative, even among patients who were not previously familiar with such devices [2]. This study aims to analyze the current state of technology regarding computerized support for the rehabilitation of aphasic patients by conducting a systematic review of the available literature.

Materials and Methods

The systematic review was conducted from October to December 2023 using the Capes and Scopus databases. The search string was carefully assembled and refined to yield results aligned with the study's objectives, covering the last 20 years (2003 to 2023). The search string used was:

TITLE-ABS-KEY (((aphasia AND (rehabilitation OR {serious game} OR {word generation}))) AND app)) AND (EXCLUDE (SUBJAREA, "ARTS")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English") OR LIMIT-TO (LANGUAGE, "Portuguese")).

This search returned a total of 30 articles. Articles not available for full reading online and those not associating aphasia rehabilitation with the use of computer technologies were excluded. After this filtering process, 11 articles were selected for detailed reading and analysis.

Results and Discussion

From the literature review, the study developed by Elien de Cock stands out [3]. Conducted between September 2018 and December 2019, the study observed 25 aphasic patients from Ghent

University Hospital in Belgium using tablets containing STAPP, an online application for speech treatment in Dutch-speaking patients. The objective was to verify the application's viability and acceptability to support patient rehabilitation.

Among the patients, 36% reported having no prior experience with mobile devices, and 32% had no experience with computers. Despite this, the study revealed a high acceptance rate, with an average satisfaction rate of 91%. This high acceptance indicates that technological support in treatment is well-received among patients, even those unfamiliar with the devices. However, it is essential to investigate potential differences in acceptance among Brazilian patients, considering the cultural and technological differences between countries.

Positive results were also observed in the research by Karen Mallet [4], where 30 stroke patients, with an average age of 69, participated in tablet therapy aimed at better understanding their perspective on the treatment. The tablets were loaded with applications selected by the doctors based on each patient's needs. The patients in this study were more familiar with technology, with 43% reporting average knowledge of computers.

The results showed a positive response to tablet treatment despite difficulties in use. While 71.4% needed help using the tablet, 64.3% expressed interest in continuing to use the tablet even after being discharged from the hospital. In her study, Gail Ramsberger [5] followed three patients with different types of aphasia. One of the patients was a 33-year-old woman with severe speech and writing impairments due to aphasia. During the evaluation period, she used an application to convert speech to text for writing messages. The patient would then correct errors in the message using her speech until she was satisfied with the results. In just two sessions, the patient achieved a basic level of competence in communication and could produce an email. This study demonstrated the effectiveness of non-specific mobile applications for treating aphasia in helping aphasic individuals improve their communication skills.

Conclusion

The analysis of the articles reveals that computers and mobile applications are viable tools for supporting the traditional treatment of aphasia when accompanied by a professional. There is also a gap in the use of these technologies in Portuguese, which is crucial when dealing with a language disorder. Based on the results of this review, a support base for the development of interactive technology is expected to be generated that aids in the training of word generation for aphasic individuals. For instance, gamified applications could introduce a playful aspect to the treatment, enhancing patient engagement and effectiveness.

References

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