

## Chapter 8.21

# Mobile Multimedia for Speech and Language Therapy

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### ABSTRACT

*Aphasia is a speech disorder usually caused by stroke or head injury (Armstrong, 1993). Related communication difficulties can include word finding, speaking, listening, writing, and using numbers (FAST, 2004). It is most commonly acquired by people at middle age or older, as a result of stroke or other brain injury. Speech and language therapy is “the process of enabling people to communicate to the best of their ability” (RCSLT, 2004). Treatment, advice, and support are provided based on assessment and monitoring activities that conventionally are carried out*

*in face-to-face sessions. This chapter considers issues in providing technology to continue to support aphasic patients between therapy sessions, through multimedia applications for drill-and-practice in vocalizing speech sounds. Existing paper therapy aids are generally designed to be used under the guidance of a therapist. Multimedia applications enable people with aphasia to practise spoken language skills independently between sessions, and mobile multimedia speech and language therapy devices offer still greater promise for blending treatment and support into an aphasic person’s daily life.*

## **INTRODUCTION**

Current trends in the demography of the developed world suggest that increased longevity will lead to a larger population of patients needing rehabilitation services after a stroke (Andrews & Turner-Stokes, 2005). An essential part of these services is speech and language therapy (SLT) (NHS, 2004) to enable the patient with aphasia to return to the community and live as independently as possible. At present, even in countries where SLT is a well-developed profession, resources in terms of staff and mobile communication devices for loan are limited (Harris, 2004). Therapy generally cannot offer a “cure” for aphasia; instead, the goals of therapy are to support the person in capitalizing on remaining language ability, regaining as much of their prior language skills as possible, and learning to use compensatory methods of communication.

This chapter describes the existing therapy methods based on paper materials and mobile electronic devices commonly called augmentative and alternative communication (AAC) devices and proposes the development of software solutions which could be delivered flexibly via readily available mobile devices such as personal digital assistants (PDA) used in a stand alone mode or via Internet delivered services. These could be designed to suit the needs of not only the patients and their carers, but also those of the professional speech and language therapists (SLTs) who could tailor and monitor the treatment more regularly than presently possible. The process of creating and evaluating prototype applications with SLTs is described and recommendations are made for the direction of future research and development.

## **CONVENTIONAL SPEECH AND LANGUAGE THERAPY AIDS**

Paper-based representations of lip and tongue positions for sounds are a venerable and common

speech and language therapy aid. These are generally provided as line drawings, illustrating how specific sounds are made; the aids are intended for use both during therapy and in practice sessions outside of therapy. Figure 1 is typical of this type of therapy material.

While useful, this paper-based material has obvious limitations. The line drawings are static, and fail to accurately represent the movements necessary to make speech sounds (Harris, 2004). No spoken explanation or auditory reinforcement is possible—this would be provided by the speech therapist, during a session or by a carer. The latter would be untrained and may in certain circumstances reinforce errors. Aphasia frequently includes impairments in processing written language. Notice that these sheets include a relatively large amount of text—some of it possibly redundant (“Make the target sound as clear as possible”), some echoing in a less accessible form the line drawings (“Tongue tip raised behind teeth”), some vocabulary that is highly technical and likely to be unintelligible without training in speech therapy (“Quality: Approximant”). These issues can put off users from practising on their own, or can diminish the effectiveness of their practice.

The problem of confining effective therapy to formal, therapist-facilitated sessions is significant. A meta-analysis of evaluations of aphasia therapy (covering 864 individuals) concluded that concentrated therapy over a shorter period of time has a greater positive impact on recovery than less concentrated therapy over a longer period (Bhogal, Teasell, & Speechley, 2003). Clearly, face-to-face therapy with a trained therapist is the ideal, but availability is a bottleneck for aphasia treatment. Even in an economically well-developed country such as the UK, there are only, on average, 0.6 SLTs per 10 beds in rehabilitation units (Andrews & Turner-Stokes, 2005).

Early attempts at software support for SLT have had variable and limited success (Burton, Meeks, & Wright, 1991), in part because of hardware and

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