

Chapter 6

Assistive Technology for Cognition: Enabling Activities of Daily Living

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ABSTRACT

Assistive Technology for Cognition (ATC) is the use of technology to extend human mental capacity. The present chapter reviews the use of assistive technology in health and social care for people with cognitive impairment. The review conceptualizes ATC in terms of function (reminding, alerting, micro prompting, distracting, storing and displaying, navigating, and biofeedback), as opposed to the type of technology (mobile phone, desk-top computer, etc.). This is necessary as many modern devices can perform multiple functions. Some important distinctions are revealed by this new way of looking at assistive technology. Of particular significance is whether the ATC intervention is enabling the external control of action or whether it prompts internal self-regulation.

INTRODUCTION

Assistive technologies extend human capability. For example walking sticks and wheelchairs are assistive technologies that enhance mobility (McLuhan, 1964). 'Assistive technologies for cognition' (ATC) are a subset of these devices

that relate to mental functions (LoPresti, Mihailidis, & Kirsch, 2004). The use of technology to extend human cognitive capability is ubiquitous in modern society. Calculators are used to extend our ability to calculate, diaries are used to extend our prospective memory, and photographs serve as memory aids for important events.

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Additionally there is an obvious role for assistive technology in supporting people with cognitive impairment to perform activities of daily living. This chapter will review research on the use of assistive technology for cognition in health and social care.

BACKGROUND

Ever since personal computers became mainstream technology more than thirty years ago, researchers and clinicians have seen the potential for Information and Communication Technology (ICT) to assist people with cognitive impairments. Computer functions, such as ‘memory,’ are the very ones that are lost when people have a brain injury. Therefore it was a short step to try and employ ICT to replace or augment impaired cognitive functions.

In cognitive rehabilitation technology has been employed in two distinct ways:

- **In a Restorative Capacity:** That is, training exercises and other therapies designed to restore lost or damaged cognitive functions. For example memory drills performed on a computer.
- **As Compensation:** That is, rather than altering the individual, compensatory strategies change the environment to facilitate task performance. For example someone with a prospective memory impairment listening to prerecorded, time-activated voice messages to remind them to perform activities of daily living is a method of compensation.

ATC is compensatory. It is technology that enables someone to perform a cognitive tasks that they would not be able to perform unassisted.

It is important the researchers and clinicians to have up-to-date information on the efficacy of these devices in order to firstly match potential

users to effective assistive technology devices and secondly, to identify gaps in the evidence base, that is, areas for future research and device development. For this reason we conducted a systematic review of assistive technology for cognition (Gillespie, Best and O’Neill, in press).

REVIEW OF ASSISTIVE TECHNOLOGY FOR COGNITION

Search Criteria and Strategy

We conducted a search of medical (Medline, AMED, EMBASE) and psychology (PsychINFO) literature databases for terms associated with cognitive impairment e.g. attention, or memory, or executive function, combined with cognitive rehabilitation plus a technology term. The databases were searched from earliest to April 2011. Studies where the intervention primarily supported language, reading or writing were excluded. We then searched the reference lists of included papers and reviews in the field.

Results

The review found a total of 89 publications describing 91 studies.

Participants

The 91 included studies included participants with cognitive impairment of diverse etiology: Traumatic brain injury, dementia, intellectual disability, neurodevelopmental disorder, and mental health problems. The majority of studies were of people with acquired brain injury.

Types of Study

The overwhelming majority of studies included in the review were ‘within subjects’ designs (56 of 91 studies, 61.5%). That is, they were studies

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