

Recent Advances in Microprompting Technology

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INTRODUCTION

Assistive technology for cognition (ATC) is technology to extend mental capacity. The majority of people reading this article will use technology to support their everyday cognitive function; by setting appointment reminders on their phone to support prospective memory, using a SatNav to support navigational skills or a search engine as an alternative to storing information in long term memory. If technology can support the cognition of ordinary individuals, potentially it can have an even greater role in assisting the cognition of people who through illness, injury or developmental disorders live with cognitive impairment. In these cases technology can act as a cognitive prosthetic or orthotic supporting or replacing lost or impaired cognitive function (Cole, Dehdashti, Petti, & Angert, 1994).

Research on Assistive Technology

Research on assistive technology for cognition has been accelerating over the last twenty years and has already been the subject of a number of authoritative reviews (LoPresti, Mihailidis, & Kirsch, 2004). It is common for reviews to restrict their scope to a single clinical group e.g. dementia (Bharucha et al., 2009) or technology type e.g. electronic portable devices (Charters, Gillett, & Simpson, 2014) or type of cognitive impairment e.g. memory disorders (Jamieson, Cullen, McGee-Lennon, Brewster, & Evans, 2013). However there is no reason why the application of ATC devices should be limited by the etiology of the cognitive disorder. A device that supports prospective memory is just as likely to work for someone with traumatic brain injury as it is for someone with intellectual disabilities. Likewise devices such as a smart phone can perform a myriad of functions. Therefore examining the effectiveness of smart phones as an ATC lacks specificity. To counter these difficulties Gillespie, Best & O'Neill (2012) classified ATC by the function of the device and looked across all the ways technology can act as a cognitive prosthesis for the diverse etiologies of cognitive impairment. ATC devices were classified into: reminding, storing and displaying, navigating, distracting, biofeedback and micro prompting technologies (see (Best, O'Neill, & Gillespie, 2013; Gillespie, Best, & O'Neill, 2012). This review focuses on one type of assistive technology 'microprompting technologies'.

DOI: 10.4018/978-1-4666-9978-6.ch060

Microprompting Technologies

Microprompting technologies are a type of assistive technology for cognition that support the planning and execution of complex behavioral sequences. Even mundane tasks such as getting dressed, hand washing or making a cup of tea require complex prioritization of action, goal monitoring, decision making and problem solving for their successful execution. Microprompting devices break down complex tasks into steps and prompt the user through each step of the sequence and continually check that the activity goal is being achieved. Microprompting devices guide the user through an immediately present task step-by-step usually using either verbal and/or visual prompts. In this chapter we aim to review existing studies of microprompting devices and discuss the limitations of these studies. We will then cover how these limitations have been addressed by the most recent work in this area and outline the most pressing research priorities. Section 1 of this chapter describes and evaluates existing research on microprompting devices; section 2 discusses how recent research addresses the limitations of previous work and section 3 outlines future research priorities.

BACKGROUND

Gillespie, Best and O'Neill's 2012 review identified 22 trials of microprompting technologies. These studies are shown in Table 1.

Table 1. Studies of microprompting technologies

Authors	Year	Device	Type of Activity Supported	Clinical Group	Sign Rating	N	
Bergman	2002	Computer	Economic self-sufficiency	Traumatic Brain Injury	3	1	Qualitative
Carmien	2005	Alarm	Social & civic - Leisure	Intellectual disability	3	7	Qualitative
Cihak, Kessler & Alberto,	2008	Computer	Major life area - Employment	Intellectual disability	2-	4	Yes
Davies, Stock & Wehmeyer	2002	Alarm	Major life area - Employment	Intellectual disability	2-	12	Yes
Ferguson, Myles & Hagiwara	2005	Alarm	Major life area - Education	Neurodevelopmental disorders	2-	1	Yes
Ferreras et al.	2010	Alarm	Major life area - Employment	Intellectual disability	3	8	Qualitative
Fish, Manly & Wilson	2008	Alarm	General tasks - Daily routine	ABI-other	2-	1	Yes
Furniss et al.	1999	Computer	Major life area - Employment	Intellectual disability	2-	6	Yes
Gorman, Dayle, Hood & Rummell	2003	Computer	General tasks - Daily routine	ABI-other	3	2	Qualitative
Kirsch, Levine, Fallon-Krueger & Jaros	1987	Computer	Domestic life - Household tasks	ABI-other	2+	1	Yes
Kirsch, Levine, Lajiness-O'Neill & Schnyder	1992	Computer	Major life area - Employment	Traumatic Brain Injury	2+	4	Mixed

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