Chapter 52
The Case for Mobile Devices as Assistive Learning Technologies: A Literature Review

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ABSTRACT

Mobile devices are often promoted by the media as being able to offer great benefits for users with special educational needs by supporting and enabling learning. However, there is a strong call from the research community for more evidence-based solutions in the field of Assistive Technologies (AT), so there is a need to carefully consider evidence from existing research. This paper presents results from a large-scale interdisciplinary literature review on assistive technologies, exploring the case for using mobile devices as learning support tools. The review suggests that research findings support this, showing benefits through app availability, portability, sensing and multi-touch capabilities, and their use as mainstream and personal devices. However, cautions can also be found, including needing to consider individuals' specific needs and desires and the constraints and practices of the educational contexts they are situated in.

INTRODUCTION

There is a growing demand for technology to aid learners with special needs, and expectations from the media that as new technologies such as smartphones and tablets become more pervasive and affordable, they will provide novel solutions and additional benefits (e.g. BBC News, 2012; Roxby, 2012). Yet, at present, in the UK, mobile technologies are not often considered suitable devices to provide through assessments such as the Disabled Students' Allowance (Cision, 2012). At the same time there is a strong call from the research community for more evidence-based solutions, and more publications of research than reports of practice (e.g. Maor, Currie & Drewry, 2011; Edyburn, 2010; Gersten & Edyburn, 2007). Therefore, there is a need to consider how and if

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these technology approaches are supported by existing research. This paper will address this, by considering the case for mobile technologies as suitable devices to support people with learning difficulties at any stage of education.

The concept of assistive technologies in education is particularly important as a research topic, as education is considered a human right that all are entitled to receive. The United Nations defines education as "both a human right in itself and an indispensable means of realizing other human rights" (UN Economic and Social Council, 1999), and the Convention on the Rights of Persons with Disabilities mandates that "persons with disabilities receive the support required, within the general education system, to facilitate their effective education" (UN General Assembly, 2007). It is therefore essential to consider if and how technology can help provide this support, while at the same time vital that technology should not be introduced for technology's sake, but as a means to an end that all people are entitled to.

The context for this research is in the UK, where there is no national strategy for assistive technology provision in education. In schools, equipment may be funded by Local Education Authorities, resulting in different practices and levels of support across the country (Atkins Ltd., 2009). In higher education, equipment is purchased individually through the Disabled Students' Allowance. In workplaces, individuals may apply for funding from the Access to Work programme (for an overview of the UK context, see Nath, 2012). Because decisions are often made on a case-by-case basis, and require an assessment process that can be time-consuming, some learners miss out on the support they need, and support does not always transfer seamlessly from one environment to another across the course of lifelong learning. Mobile technologies have been suggested as one potential way of providing low-cost and desirable solutions (e.g. Nath, 2012), but for this reason there is an urgent need to carefully consider the research-based evidence before new strategies are adopted.

This article arises from a 12-month interdisciplinary literature review on assistive learning technologies, supported by discussions with teachers and pupils, and covering over 100 papers and reports. This was conducted through keyword searches and following citations as well as taking guidance from others with expertise in the field. The search included proceedings from high quality international conferences such as CHI and ASSETS, and journals including *Computers & Education, Interacting with Computers, Journal of Special Education Technology*, and the *Journal of Assistive Technologies*. The aim was to construct a broad picture of the state of assistive technologies in education, with no initial focus on specific technologies, disabilities, or academic disciplines. Findings were then grouped thematically in order to draw conclusions about particular topics. The use of mobile devices was just one topic identified in this review, but was felt to be important to address due to the media and governmental attention given to this approach.

This article will therefore begin by outlining the background to this research and definitions of assistive learning technologies, before presenting the case from the literature on the use of mobile devices as assistive tools in education. The known disadvantages and limitations of mobile technologies in this context are also noted, before conclusions can be drawn.

BACKGROUND

Assistive Learning Technologies

Assistive Technology (AT) is a general term used to describe a wide range of tools to support disabled people in all aspects of life (e.g. the

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