

Chapter 14

Impact of Text-to-Speech Software on Access to Print: A Longitudinal Study

Joan B. Hodapp

Area Education Agency 267, USA

Cinda Rachow

Area Education Agency 13, USA

ABSTRACT

This chapter discusses the outcomes of Iowa Text Reader Project's 2006-2007 study that evaluated the impact of Kurzweil 3000 during the second year of implementation. This study evaluates the effectiveness of the text-to-speech (TTS) software as an accommodation to improve student access to core content with fluency and comprehension. Using the Time Series Concurrent and Differential Approach (Smith, 2000), this study examines students' performance on comprehension passages read with and without the TTS software. A balance of perceptual and objective data measures provides data on other student outcomes. Twenty middle school special education students and nine teachers participated in the 27-week study.

INTRODUCTION

In recent years there had been increased interest in the evaluation of the implementation and effectiveness of assistive technology (AT). Particularly, in these times of fiscal restraint educators are becoming acutely aware of the need to substantiate effective outcomes and wise allocation of resources. The 1997 and 2004 reauthorizations of Individuals with Disabilities Education Act (IDEA) mandated that AT devices and services be considered for each student with a disability when developing an Individualized

Education Plan. The inclusion of special education student achievement within the accountability of the No Child Left Behind (NCLB) Act of 2001 raised the level of concern. Now educators are required to use evidence-based interventions with proven effectiveness. Despite these mandates, only limited research has been conducted on the effectiveness of AT to improve student achievement outcomes (Edyburn, 2003, 2007a) with contradictory results (Sorrell, Bell, & McCallum, 2007; Strangman & Dalton, 2005).

In a meta-analysis of 68 studies Alper and Rahrinirina (2006) identified only 20 that evaluated the effectiveness of AT on the basic academic skills

DOI: 10.4018/978-1-61520-817-3.ch014

of reading, math, spelling, and writing. Twelve of those studies addressed the content areas of math, spelling, or writing. Eight of the studies investigated reading skills. The results supported improvement in skills such as comprehension, decoding, and fluency. Balajthy (2005) reviewed the impact of text-to-speech (TTS) software with struggling readers reporting mixed results across various populations from improvements in comprehension depending on student ability level to poorer results for better readers. Strangman and Hall (2003) identified 13 studies related to the effectiveness of TTS software. However, across all these studies it was difficult to draw firm conclusions due to the diversity of disabilities, age span, technology devices, and lack of replication. Also lacking were data on the effects of attitudes and preferences on the integrity of implementation of AT (Alper & Raharinirina, 2006; Smith, 2000).

In response to the need for more research-based interventions, there are an increasing number of studies of AT outcome measures being generated. In an action-based study, Dimmitt, Hodapp, Judas, Munn, and Rachow (2006) assessed the impact of the use of a TTS software program (Kurzweil 3000) on the reading skills of 73 middle school students on outcome measures of reading fluency and passage comprehension. The average reading rates improved by 16 words per minute in 23 weeks, which was 2.3 times faster than would be predicted by research on students with special needs (Fuchs, Fuchs, Walz, & Germann, 1993). The data also indicated a positive trend in the comprehension scores. The average comprehension score improved by 13 percent per student from 59 to 72 percent. Data showed it took 13 weeks for students' comprehension scores on passages accessed by TTS software to exceed comprehension on print materials. The results demonstrate that the accommodation helps compensate for student reading deficits. Responses to online surveys demonstrated that students and teachers associated the use of the TTS software with improved academic performance, better on-task behavior,

more engagement with the instructional material, and improved independent work completion. The study results relate to Parette, Peterson-Karlan, Wojcik, and Bardi's (2007) discussion of the compensatory versus remedial function AT.

Lance, McPhillips, Mulhern, and Wylie (2006) compared the performance of three groups (Read and Write Gold, Microsoft Word, and control groups) on literacy tests. After six training sessions of 45 minutes each, the AT group (Read and Write Gold) showed improvement on reading comprehension, homophone error detection, spelling error detection, and word meanings. The Microsoft group showed improvement on spelling error detection and word meanings with a poorer performance on homophone error detection. Meanwhile, the control group showed no improvement on any of these measures.

One variable that was identified as linked to positive outcomes was the length of training and intervention (Strangman & Dalton, 2005). To make lasting gains in phonemic awareness, Olson, Wise, Ring, and Johnson (1997) reported that more than 25 hours of student training was required. Both Olson and Wise (1992) and Elbro, Rasmussen, and Spelling (1996) demonstrated results linking long intervention periods and extended training with the positive student gains when using TTS software. Gersten and Edyburn (2007) recommend a treatment interval of nine weeks at a minimum, but valued long-term interventions.

Unlike most studies that focused on students with disabilities, Sorrell, Bell, and McCallum (2007) worked with 12 below average readers, grades 2 to 5 who were nominated as below average readers by their teachers. Two of the students were receiving special education services. Employing a counterbalanced randomized treatment design; they studied the impact of TTS software on reading rate and comprehension by randomly assigning participants to either a four-week 40-minute waiting period or treatment group. In this way all students eventually received access to Kurzweil 3000 (version 5) and avoided the problem of

19 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/impact-text-speech-software-access/42838

Related Content

Improving the Implementation of Evidence-Based Practice and Information Systems in Healthcare: A Social Network Approach

Priscilla A. Arling, Bradley N. Doebbeling and Rebekah L. Fox (2011). *International Journal of Healthcare Information Systems and Informatics* (pp. 37-59).

www.irma-international.org/article/improving-implementation-evidence-based-practice/53479

Electrical Impedance Spectroscopy as a Powerful Analytical Tool for Monitoring Microbiological Growth on Medical Implants

Louise M. Oliver, E. T. McAdams, P. S.M. Dunlop, J. A. Byrne, I. S. Blair, M. Boyle and K. G. McGuigan (2008). *Encyclopedia of Healthcare Information Systems* (pp. 487-496).

www.irma-international.org/chapter/electrical-impedance-spectroscopy-powerful-analytical/12976

Multi-Dimensional Criteria for the Evaluation of E-Health Services

Alalwany Hamid and Alshawi Sarmad (2009). *International Journal of Healthcare Delivery Reform Initiatives* (pp. 1-18).

www.irma-international.org/article/multi-dimensional-criteria-evaluation-health/37381

Quality in Telemedicine Services

Eleni Christodoulou, Sofia Zyga and Maria Athanasopoulou (2012). *Quality Assurance in Healthcare Service Delivery, Nursing and Personalized Medicine: Technologies and Processes* (pp. 203-208).

www.irma-international.org/chapter/quality-telemedicine-services/58734

Sustaining Healthcare Through Waste Elimination: A Taxonomic Analysis with Case Illustrations

Sharie L. Falan, Bernard Han, Linda H. Zoeller, J. Michael Tarn and Donna M. Roach (2011). *International Journal of Healthcare Information Systems and Informatics* (pp. 1-22).

www.irma-international.org/article/sustaining-healthcare-through-waste-elimination/61335