

Chapter 17

Speech Recognition Software Contributes to Reading Development for Young Learners of English

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ABSTRACT

Thirty-six English language learners aged 6;8 to 12;6 years received practice with The Reading Tutor, which uses speech recognition to listen to oral reading and provides context-sensitive feedback. A crossover research design controlled effects of classroom instruction. The first subgroup worked with the software for 3.5 months, and following a week's crossover period, the second subgroup worked for a subsequent 3.5 months. Both groups were assessed to obtain comparable gains both in regular classroom with English as an Additional Language (EAL) support and in the classroom condition with EAL support plus the Reading Tutor. Oral reading fluency was assessed by the DIBELS measure. Fluency was also calculated by the program, and grade level of materials mastered was assessed by the software's logs. Both groups made significant gains in oral reading fluency and grade level of materials mastered, according to measures internal to the software. For one period, gains in fluency following experience with the program appeared to have been slightly larger than gains with regular classroom instruction and EAL support only.

INTRODUCTION

Disproportionate numbers of adult Canadian immigrants are reported to have poor literacy abilities (Statistics Canada, 2005) and this constitutes an obstacle to their acquiring the full range of skills in one of the two official languages of Canada, French or English, as an additional language. A steady increase

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in the numbers of children with diverse language and cultural backgrounds in hitherto English-dominant centres in Canada mean that well over 50% of the school populations in Vancouver and Toronto have for some years grown up with languages other than English at home (Gunderson & Clarke, 1998), suggesting an increasing proportion of young Canadian learners may potentially experience similar obstacles to acquiring English literacy. This is underlined by results of reading comprehension testing of 41,962 grade 4 students in British Columbia showing that 32% of students designated as learners of English as an Additional Language (henceforth referred to as EAL learners, and their tailored instruction as “EAL support”) were reading at levels ‘below expectations’, compared to 19% of non-EAL students tested (British Columbia Ministry of Education, 2002). At the same time, the long-term educational importance of effective early reading and writing instruction has been long acknowledged (Strickland, 2002).

A useful approach to promoting reading literacy for EAL learners is to customize instruction by integrating technology into classroom teaching (Reeder, Shapiro, Early, Kendrick, & Wakefield, 2008) and leverage the time efficiencies of automation so as to add individualized reading practice to standard group classroom instruction, which has inherent constraints on instructional time that can be devoted to individuals. One limitation of earlier reading software has been its inability to ‘hear’ readers (D’Silva, 2011; Rasinski, 2013). Recently, prototype software from Project LISTEN, Carnegie Mellon University, entitled The Reading Tutor, (abbreviated to (the) RT throughout) addressed this limitation by using automated speech recognition (ASR) to assist children with oral reading (Mostow, 2001; Project LISTEN, 2007). The RT listens to children read aloud age-graded texts displayed on screen, and offers to read key words or whole sentences aloud, or provide word meanings when children click on a word for help or when the program senses that they are experiencing difficulty as indicated by unusual pauses or otherwise-dysfluent oral performance. Project LISTEN’s study with 178 students, Grades 1-4 from schools in the Pittsburgh area found significant fluency and comprehension gains in RT users when the Sustained Silent Reading (SSR) method of instruction was compared to the use of the RT in classrooms (Mostow, Aist, Burkhead, Corbett, Cuneo, Rossbach, et al., 2002). SSR is an instructional method for schools in which all students and teachers devote a set time to leisure reading of their own choice. Studies with EAL learners have also shown similar results. Thirty-four EAL learners in Grades 2-4 whose home language was Spanish in a Chicago suburban school were part of a study that compared SSR instruction in the classroom with the RT and claimed significantly better gains in reading fluency among children using the RT (Poulsen, Wiemer-Hastings, & Allbritton, 2007). Because the RT had not been assessed using young second language learners at the outset of the present project, its potential as an effective literacy intervention for a major population of North American urban children remained unknown. Successful trials of the RT have also been conducted with English language learners in Ghana (Korsah, Mostow, Dias, Sweet, Belousov, Dias, & Gong, 2010) and India (Weber & Bali, 2010).

Technology to Support the Acquisition of Reading

Technologies such as digital audio, Internet technologies and software programs have become popular in the last decade as viable tools in reading instruction in English language contexts. A Statistics Canada report on Information and Communication Technology (ICT) integration in Canadian elementary and secondary schools claims that governments have recognized the importance of integrating ICT in learning and teaching and have put efforts into installing hardware and software in Canadian secondary schools (Plante & Beattie, 2004). Digital technologies also offer the potential of enhancing oral reading fluency (Rasinski, 2013), which the author notes is a critical element of overall reading proficiency. The

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