

# Selecting the Right Technology for Students in a Changing Teaching Environment: A Case Study

Bronwyn Disseldorp and Dianne Chambers

Department of Science and Mathematics Education,  
The University of Melbourne  
Victoria 3010  
Australia

b.disseldorp@unimelb.edu.au    [d.chambers@unimelb.edu.au](mailto:d.chambers@unimelb.edu.au)

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## Introduction

The increasing availability of technologies is changing the teaching and learning environment. Technologies with the potential to assist some students in the performance of academic tasks present both opportunities and challenges for teachers. The teaching environment is changed when students who have difficulties with particular tasks have the opportunity to approach those tasks in new ways with the assistance of technology. Teachers considering the introduction of any assistive technology into the teaching environment need information about the compensatory effectiveness of the technology, and which students might benefit from the use of the technology.

One of these empowering technologies is synthesised-speech reading of text by a “talking” computer, which allows users to listen to text as well as (or instead of) reading it from the screen. Text reader software allows text to be read from existing electronic documents and can also be used in conjunction with other applications such as word processors or spreadsheets, to give speech feedback on text entered by the user. Many students in the developed world have access to computers at school and at home, and the opportunity to use such software, as basic versions are freely available via the Internet, and software with advanced features can be used with even low-end computers. The increasing prevalence of electronic text has simplified the process of listening to text read by a computer, as the preliminary stage of scanning printed materials to convert the printed text into an electronic form is required less often. Students have access to a broad range of materials already in electronic form, and can use various text-to-speech systems in conjunction with Internet resources such as web pages or e-mails, documents on a school intranet or electronic books, as well as an increasing number of textbook facsimiles and reference materials on CD-ROM.

Assistive technologies can provide some students with an opportunity to reduce limitations associated with a disability or weak skills in particular areas, and can lead to greater independence. However, user experiences of such technologies are varied. Determining if a student is likely to experience a benefit from a specific product in an educational environment is a challenging process for teachers. Practical constraints such as cost, training time, hardware requirements, functionality, and ease-of-use must also be considered in the decision making process, yet these factors are constantly changing.

The use of text reader technology may be valuable to some students whose reading skills make it difficult for them to cope with the level of reading required for their studies. Some form of text reading with speech output is widely recommended as an option that should be considered for students with reading difficulties or disabilities (Raskind 1998, Rivera and Smith 1997).

Research into the use of speech output of text as a support for reading comprehension indicates that the effect is different for individual students; some students experience an improved reading comprehension while for others there is no effect or a detrimental effect (Montali and Lewandowski 1996; Higgins and Raskind 1997; Elkind 1998). Montali and Lewandowski (1996) found that the reading comprehension of the less skilled group using a text reader was similar to the unassisted performance of a control group of average readers. A negative correlation was found between benefit experienced and the students’ unassisted reading performance; students with weaker reading comprehension were more likely to experience an improvement when using a text reader (Elkind 1998; Higgins and Raskind 1997).

Examination of research in this field concluded that:

It seems likely that the effects of screen reading depend on the characteristics of the students. Future research should focus on determining which students benefit from screen reading programs rather than looking for overall effects.

(MacArthur, Ferretti, Okolo, and Cavalier 2001: 297)

Text readers have the potential to change the educational experiences of some students; teachers need information about the effect of the technology and its suitability for individuals. Raskind (1998) recommends a trial of any assistive technology as an important part of the selection process. A trial of a computer text reader was part of a

pilot study to explore some aspects of the use of a text reader as a support for the reading comprehension of secondary school students. This study is described more fully in Disseldorp and Chambers (2002).

## Methodology

A pilot study was conducted in a Melbourne secondary school to gather information about the reading characteristics and needs of students, the compensatory effectiveness of the text reader when undertaking a reading task, and possible indications of which students might benefit from the use of this technology. Students undertook an initial reading assessment, and then a series of reading tasks with and without the use of the text reader feature of *Read and Write 5.0* (textHELP 2001).

## Results

### *Reading comprehension with and without the text reader*

An overall comparison was made of the percentage of questions answered correctly when using the text reader and reading without assistance. The use of the *Read and Write* text reader resulted in a significant ( $p=0.028$ ) increase in the percentage of questions answered correctly (a mean increase of 7.0%).

### *Indications of individual benefit*

Individual experiences of benefit were varied; while some students were able to answer more questions when using the text reader, for others students there was no effect, or indeed it was detrimental to their performance. No correlation was found between students' reading abilities (as measured in an initial reading assessment) and the difference in reading comprehension under the two conditions.

There was a significant ( $p < 0.05$ ) negative correlation between a student's unassisted performance on the reading task and the size of the improvement when using the text reader. Thus students with poorer reading comprehension when reading unassisted were more likely to have greater gains in comprehension when using the text reader.

## Discussion

Although there was an overall increase in reading comprehension when using the text reader, the experiences of individuals ranged from improved to diminished performances on the reading tasks. It is perhaps more interesting to consider the relationship between unassisted reading performance and gains in reading comprehension when using the text reader. The findings of this study are consistent with the studies of Montali and Lewandowski (1996), Higgins and Raskind (1997), and Elkind (1998) who found that the use of a text reader tended to elevate the reading comprehension of the less proficient readers and depress the performance of the more proficient readers.

## Conclusion

The use of a text reader is potentially valuable for some secondary school students, but the identification of students who may benefit from this technology is not yet clear; experience of benefit may be affected by factors not examined in this study. The suitability of this technology in different contexts must also be considered; students may not find it practical or desirable to use a talking computer in a school environment, but may find it a valuable support for study at home. This technology may be a useful alternative for students who experience difficulties with reading, and reading related tasks, and allow teachers to use materials that would otherwise be too difficult for some of their students.

Information and Communication Technologies are changing the educational environment for students and teachers. Teachers of the future will select from an increasing range of ICTs that can be used in an assistive role, they will need information to support careful assessments, as it cannot be expected that introducing a particular technology to all students would be beneficial.

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