

Text-to-Speech Project: A Multi-Jurisdictional Research Project



Success for all Students

Advancing Accessibility Through Technology Institute

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Project Overview

2005 – 2006 School Year



The Text-to-Speech Research Project was conducted in parallel with an investigation of text-to-speech software as a standard solution for Alberta students in response to a need being expressed by many Alberta school districts.



Background: The Provincial Context

- In the 2003-4 school year there were **4 845 Alberta students** who required audio CDs as an accommodation for writing diploma examinations.
- An additional **180 students** were provided with a reader.
- Only **50% of students** with learning disabilities (code 54) completed high school in 5 years as compared to approximately 73% of all students.

(Source: Alberta Education Special Programs Branch)



Characteristics of Students with Learning Disabilities

Students with learning disabilities often have average or above average intelligence but they have:

- difficulties with language processing
- problems decoding words/text
- comprehension difficulties
- cannot read grade-level text

Reading is often a “labor-intensive” process



What can Digital Technologies Offer to Students With Disabilities?

“Millions of students cannot benefit as fully as possible from their education programs because of learning disabilities. Besides providing exciting new ways to communicate, digital technologies can be a lifeline to this latter group...”

Ted S. Hasselbring and Margaret E. Bausch (2006)



What is Text-to-Speech Software?

“Text-to-Speech Software” or “Scan and Read Software”:

- Translates text into digital format so it can be read aloud and edited
- Provides writing support, research and study skills tools
- Provides access to the curriculum and a means to acquire information



Students are able to:

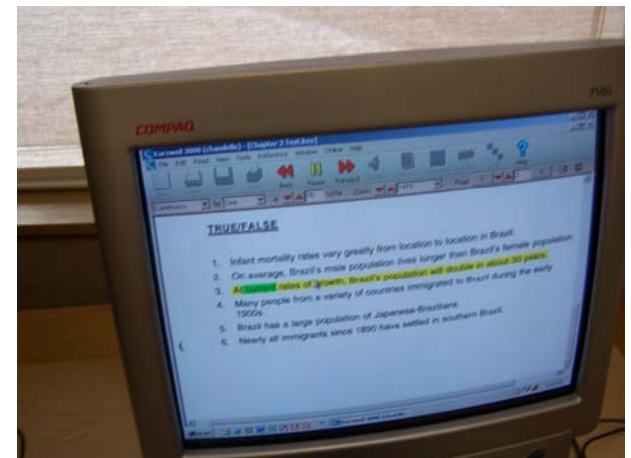
- have selected text read aloud to them
- customize the speaker, reading speed, text size and even the language
- change background colors and dual highlighting options
- access speaking dictionary definitions and word use examples
- experience success and become independent learners

Benefits of Text-to-Speech for Learners

Students can:

- access information from the Internet
- have documents or text that has been scanned, read aloud
- select personal preferences: customize the speaker, reading speed, text size and even the language
- change background colors and dual highlighting options
- access speaking dictionary definitions and word use examples
- access study skills options

Students can experience success, improve their comprehension and their level of independence





Purpose of the Text-to-Speech Project

Research initiative to:

- examine the use of text-to-speech software for evidence of benefits for learning disabled students in the area of reading.
- investigate impacts on student learning experiences and on the practice of teachers who are engaged in designing learning experiences using text-to-speech software

Project Participants

Four jurisdictions agreed to participate:

- Parkland School Division
 - Edmonton Catholic School Division
 - Palliser School Division
 - Calgary Board of Education
- The project was supported by Alberta Education
- Innovative Learning Services of the Calgary Board of Education was selected to lead the research initiative



Calgary Board of Education



Goals of the Project

To determine:

- i. Impact of using text-to-speech software with learning disabled students in the area of reading, specifically reading comprehension
- ii. Changes in achievement in students' independent level reading
- iii. Teachers' perceptions of changes in students' attitudes towards learning resulting from the use of text-to-speech software
- iv. Impact on teacher practice of using text-to-speech software with students
- v. Teachers' perceptions of professional development needs regarding use of text-to-speech software

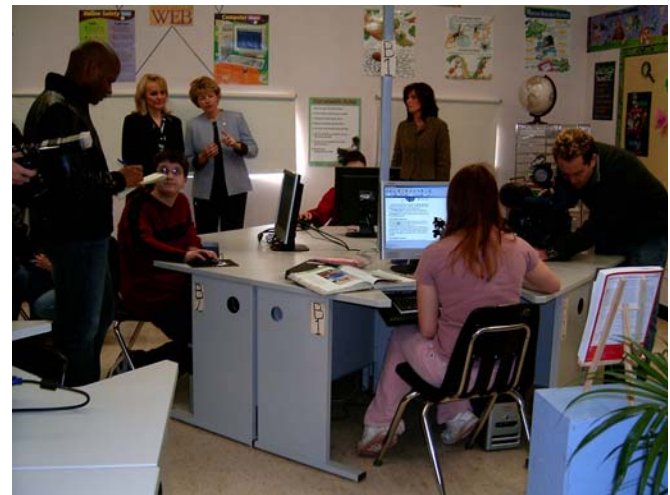


Research Methodology:

- a) an on-line pre and post survey for staff and students
- b) testing of student progress in reading with and without the use of text-to-speech software (Jerry John's Diagnostic Reading Inventory)
- c) personal interviews and video taping
- d) online community of practice observations (Desire2Learn)

Project Participants

- Teachers: Junior High teachers in each of four participating school divisions
- Education Assistants: Invited to take part in the Professional Development process



Project Participants

- Students: Five identified grade eight Learning Disabled students per school division (code 54)





Implementation of the Project

- Committee work with Alberta Education
- Purchasing, installation and testing of software a jurisdiction responsibility
- Training of teachers, educational assistants and students
- Pre-testing of students with a diagnostic reading inventory (Jerry Johns)
- Scanning of resources
- Implementation of software in classroom applications



Procedures: Diagnostic Testing

- Students were tested using repeated measures of performance during two identified times during the 2005 – 2006 school year
- Tool: Jerry Johns Reading Diagnostic
- Students tested when reading with and without the use of text-to-speech software, using two different reading passages



Online Surveys

- Teachers and educational assistants invited to participate in an online pre and post survey to assess teacher perception of changes to students' perceptions of themselves as learners and professional development needs
- Students surveyed to gather information on how they perceived the software and what impact it had on reading

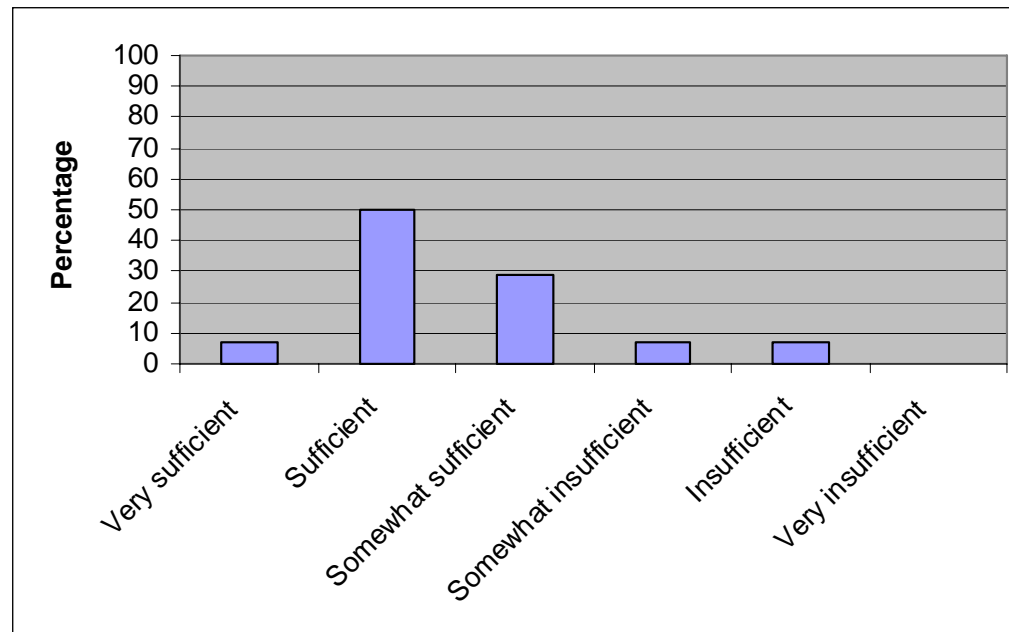
Personal Interviews and Video Taping

- Information collected from participating students, teachers, educational assistants and administrators in each of the four jurisdictions

Data collected and organized to address research outcomes, objectives and critical success factors



Results: Teacher Survey Results Professional Development



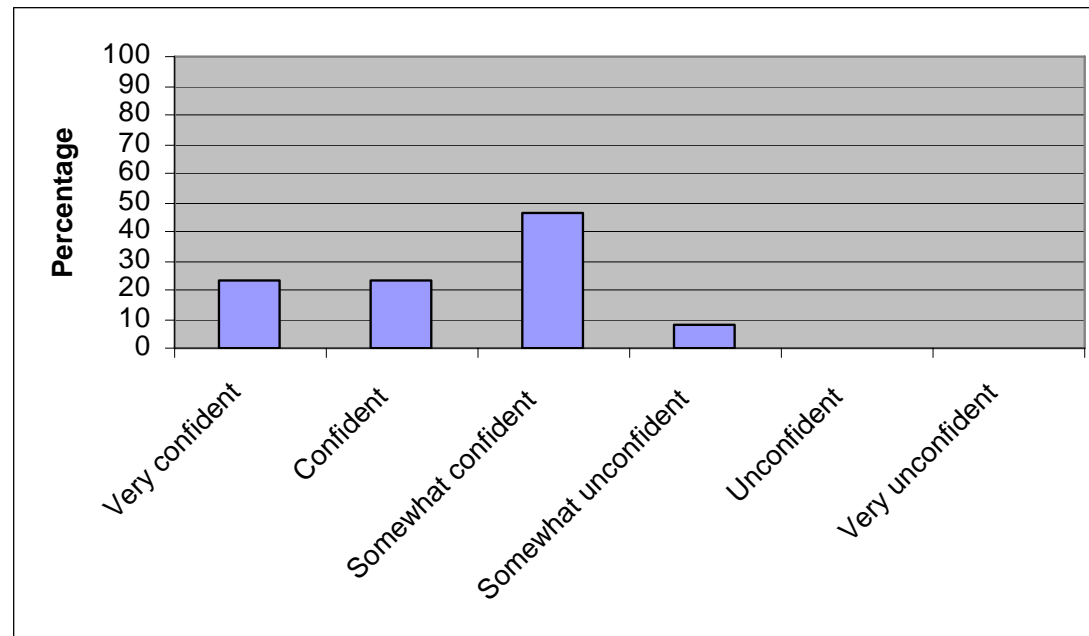
- The majority of teachers participating in the research project (86%) felt that they were provided with at least 'somewhat sufficient' professional development.



Using Text-to-Speech Software

- The setting:
 - Used within a classroom (54%)
 - Used within a lab (15%)
 - Used within a resource room (31%)
- Depending on where the students used the software had an effect on the overall perception of the technology
- Some students may have felt a certain “stigma” attached to the use of the software

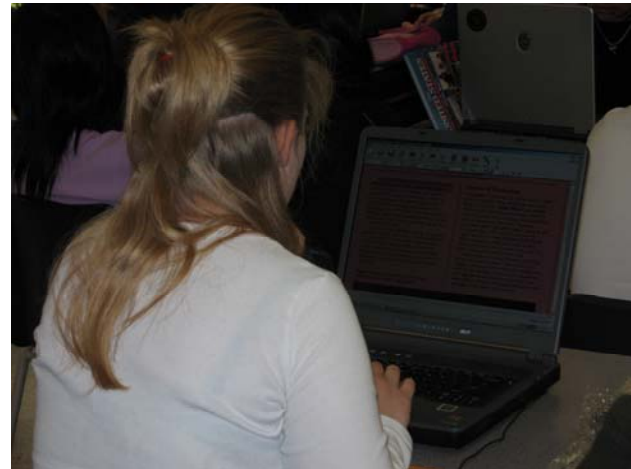
Confidence in Using Text-to-Speech Software



- The vast majority of participants (92%) were at least “somewhat confident” in using the text-to-speech software.

Materials Used with the Software

- Most teachers scanned their own materials (83%)
- Significant number of teachers used resources from the D2L digital repository (41%)
- (41%) also used other materials, including novels, CDs, materials from Internet, students scanned own resources





Time Spent Editing Scanning

Results varied:

- Of the 55% who scanned their own materials, only a minimal amount of time was spent **checking for OCR mistakes**
- 44% of teachers spent a minimal amount of time **checking for pronunciation**, compared to 33% who spent a significant amount of time on this task
- Checking for **reading order (zone editing)** took a minimal amount of time for 44% of participants compared to 44% who spent a significant amount of time



Impact of Text-to-Speech Software

- Overall teachers felt the software had a positive impact on the students:
 - Enabled the students to learn independently
 - Provided a learning environment that significantly improved their reading skills
 - Software should be used in future
 - Distribution should be broadened in order to be used in a number of classes with a variety of students

Impact on Teaching Practice

- Overall teachers felt using the software not only helped their students, but it also allowed them to manage their classrooms better:
 - Able to focus their time and energy more efficiently when helping students with learning needs
 - Reducing the amount of time spent helping them since students able to use the software independently





The Student

- What participating **Students** have to say...
- Students have expressed that they have experienced numerous successes in class and at home
- Achieving higher classroom scores
- Feel more independent and take control of their learning.
- Self Advocacy
- Intrinsic rewards/motivation and self esteem



The Educators

- What participating **Teachers and Educational Assistants** have to say...
- As they become more familiar they are beginning to uncover the possibilities
- Examining the possibilities to utilize this technology on a larger scale
- The benefit to all learners...



Changes in Teacher Practice

- Educators are realizing the potential of Text-to-Speech software
- Designing learning experiences to meet the diverse needs of their students

*Providing support so that all children get
“every opportunity to succeed in school”*

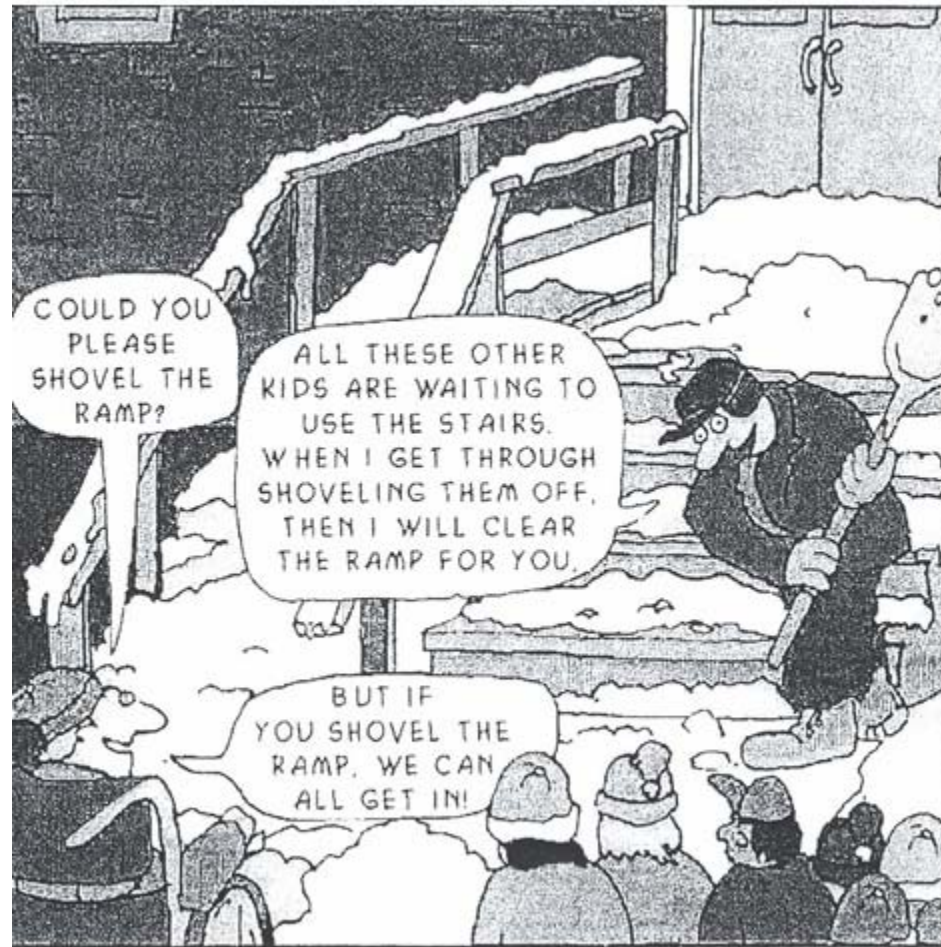
- *(Alberta Learning Commission, 2003)*



Teacher Best Practice

- Allows for creativity
- Another media to teach with
- Curriculum adaptations and modifications made easy
- Assessment for differentiated student population
- Infusion of technology
- Access for all

Classroom and school wide impact



2002 Michael F. Giangreco



School Benefits

- Technological advancement
- Flexibility
- Opportunities for success
- New way of teaching and learning
- Parent involvement

Classroom and School Wide Impact

- All students use it and benefit
- Success for all
- Model of 21st Century teaching and learning



*Not just a tool,
but a way
of learning*



Project Challenges

- Software Purchasing and Installation (network difficulties, technical support)
- Scanning of resources and scanners
- Scanning and zoning
- Storing of documents
- Wireless access and lap tops
- Licenses and access
- Training of staff and capacity building



Project Successes

- Enables students to compensate for areas of weakness
- Achieve in literacy tasks more aligned with their overall ability
- Increase levels of self-esteem and motivation
- Develop independence and self-advocacy skills
- Community involvement



Future Directions

- District approved use of text to speech software
- Schools are investing in this AT technology
- Teachers widely use it
- Administration supports it
- Influx in Professional Development workshops



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Student Survey Results

- Students asked a number of questions relating to their learning styles and attitudes towards school in general
- over half of the participating students either agree or strongly agree that they learn well when:
 - they do things hands-on (89%)
 - listen to others (53%)
 - write things down (53%)
- The majority of students at least somewhat agreed that they learn well when:
 - they read something (72%)
 - work together with a group (66%)
 - memorize things by heart (54%)

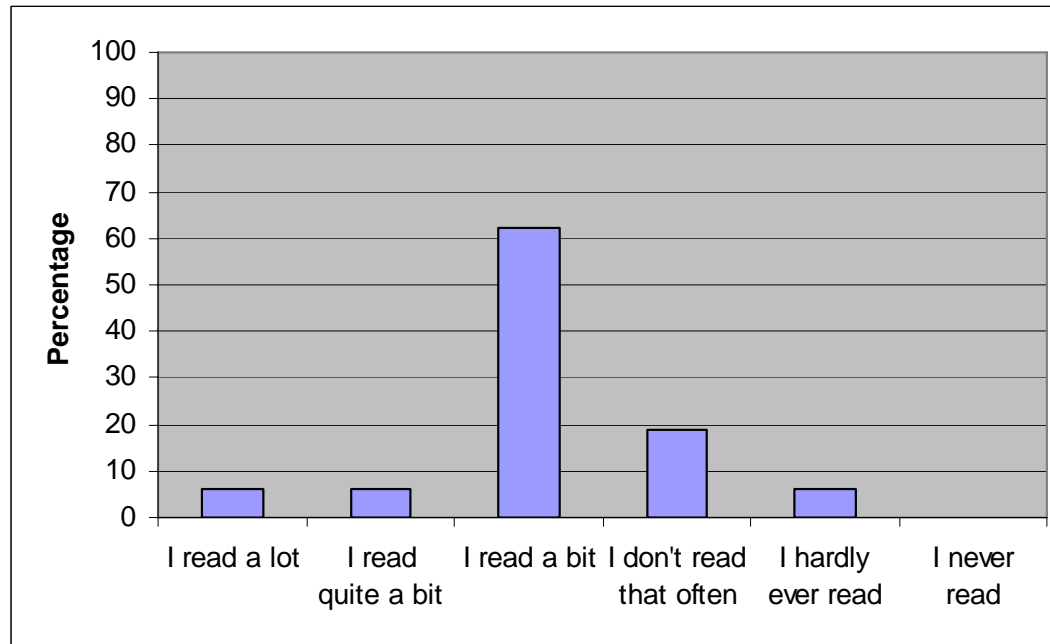


- When asked to describe their strengths and difficulties, there was large diversity in responses



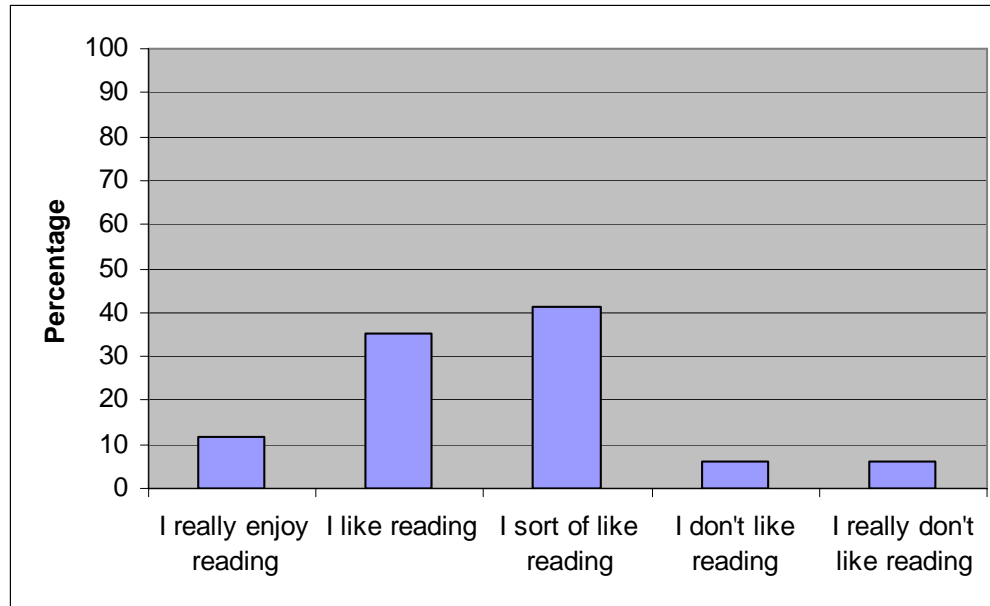
- My difficulties are math and science. And my strength is gym.
- When I know something about the subject it helps me. I am cooperative and follow instructions well. I like doing hands on. I am challenged when I have to write or read a lot.
- When you are reading something and you have to remember it for a unit test or exam. I learn very well when I get to touch something or hands on.
- My best subject is S.S and Science. One of my weakest is Math or L.A.
- Strengths working with others. Difficulties reading and spelling.

Amount of Time Spent Reading



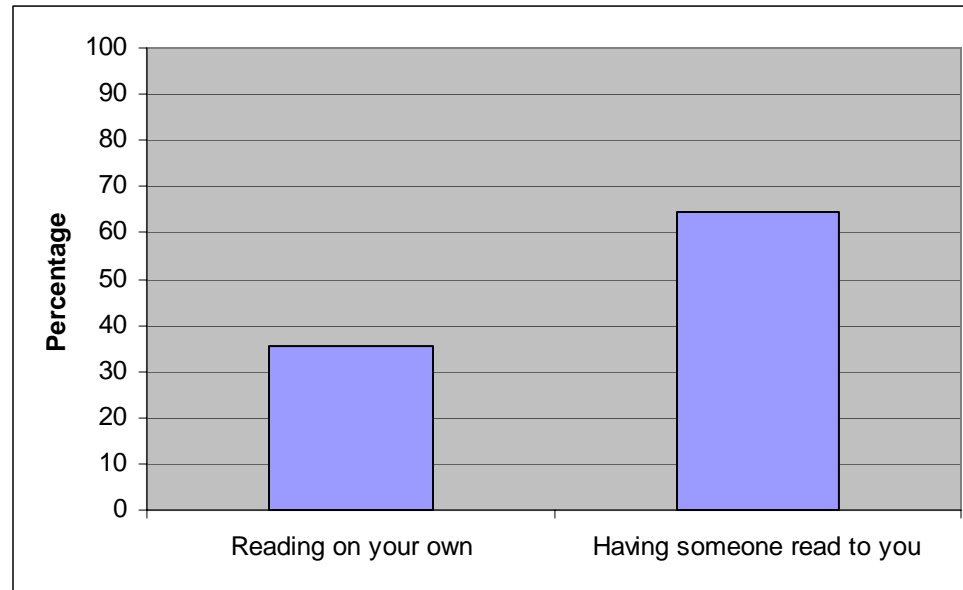
- The majority of students (63%) read 'a bit'

Attitude Towards Reading



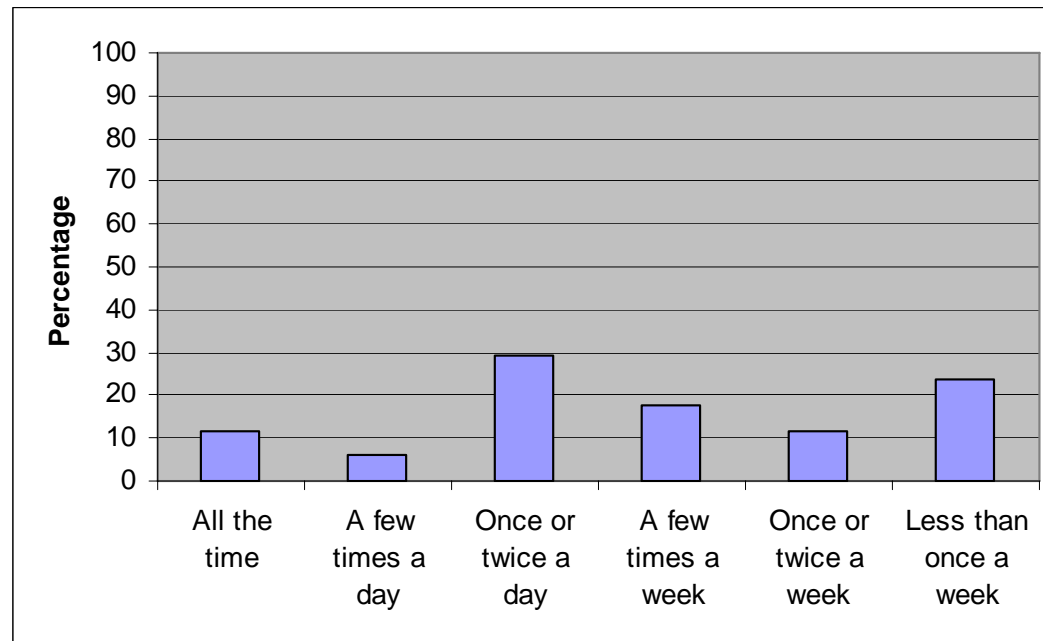
- 47% of students either like or really enjoy reading, 41% 'sort of like' reading

Reading Preferences



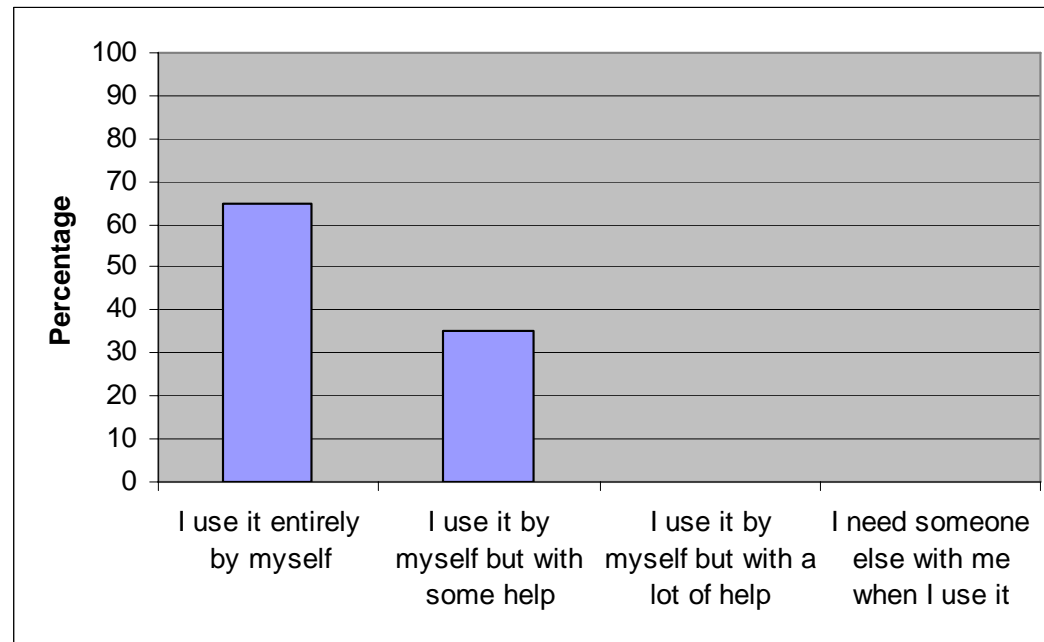
- Majority of students (65%) preferred having someone read to them

Frequency of Software Usage



- 77% of students used the software at least weekly, with 47% using it daily

Level of independence Using Software



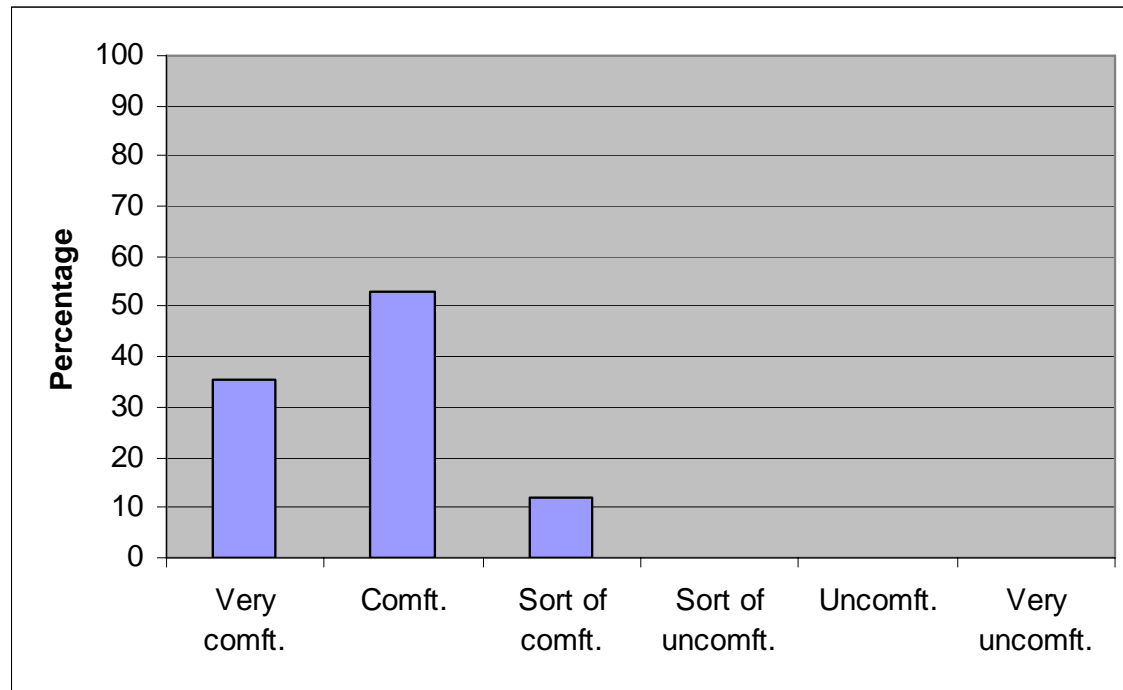
- Most students were able to use the software independently (65%)



Using Text-to-Speech Software

- When asked if the text-to-speech software was **easy to use** 88% of students either agreed or strongly agreed.
- 86% of students either agreed or strongly agreed that they were **comfortable using the text-to-speech software** without any help
- The majority of students (82%) also agreed or strongly agreed that they would **continue to use the software** if it were made available to them in the future
- 76% believed they could **read faster** with the software
- 70% of students also agreed or strongly agreed that the software made it **easier to understand what they were reading** and that they would use it in high-school if it were available
- 64% of the students said they would **read more** if the text-to-speech software was always available to them.

Comfortable Using the Text-to-Speech Software



- The majority (88%) of students were either comfortable or very comfortable



What the Students Liked Best

- It makes it easier for me to read and gain information.
- That it reads to me and when there is a word I don't know it's there to help me.
- I think it is fun and it helps me more than just reading a book on my own.
- That it can help me with my schooling and to help in later in life.
- I can stop, reread, and go faster or slower if I please.



What the Students Would Like to See Changed

- 29% of the students indicated that they felt nothing was wrong with the software. The remaining students primarily commented on the voices (57%), and provided comments such as:
 - The voices are weird
 - It is the voices that I would change.
 - I hate the voices it makes, they're annoying
 - The voices are really hard to understand sometimes

- These results show that while most students did not like the voices, they still felt it was a valuable tool to use while reading. Students felt the software made it easier to read, provided information, helped with understanding the text, and was generally fun to use





Jerry John's Test Results

- Students completed the comprehension section of the exam in three ways:
 - silently
 - listening to someone read to them
 - using the Kurzweil software
- Results from the reading inventory were compared between pre and post test results as well as between completing the exam with and without the use of the Kurzweil software



Pre-test and Post-test Comparison

- Overall, results showed that the students involved in the pilot project displayed a statistically significant improvement in word recognition throughout the year
- Similarly, students also showed a statistically significant improvement in their listening and silent exam marks at the higher levels.
- Using the Kurzweil software had a statistically significant, positive impact on the students' reading comprehension



Student Interviews

- Overall the students involved in this pilot viewed the text-to-speech software in a very positive light
- Students repeatedly mentioned the impact it had on their reading comprehension, understanding of course work, grades, and overall enjoyment of reading
- Despite using the software in different classes and for different tasks, virtually all of the students felt the pilot was a positive experience and expressed a desire to use the software in the future and in a broader capacity



Teacher Interviews

- Overall it was decided that if the proper technology was available and any student was free to use the software whenever and wherever they pleased, this software could have an enormous benefit.



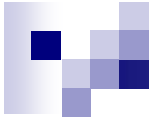
Recommendations

- Purchasing of a **site license for the text-to-speech software**, to facilitate installation on all computers within a school
- **Networked versions** so that access is universal within a site
- **Support from Information Technology** departments in terms of installation and deployment of the software
- **Ongoing professional development** and training on all aspects of the software for all teachers, educational assistants and students
- **Access to wireless laptop computers** so that all students are able to utilize the software within the classroom environment
- **Administrative support** within a district and within all schools
- **Access to a digital repository** of approved and recommended documents and resources for each grade level
- Access to a compatible **networked scanner**

Conclusions

- Text-to-Speech software is one potential solution for students experiencing difficulties in the area of reading and writing
- It enables students to compensate for areas of weakness, and achieve in literacy tasks at a level more aligned with their overall ability
- Positive impact on the practice of teachers who are engaged in designing learning experiences using Text-to-Speech software





- Data gathered from this project suggests that using the Text-to-Speech software had a statistically significant positive impact on students with learning disabilities in the area of reading comprehension
- Positive impacts on student learning experiences were observed
- Increase in student self-esteem, self-confidence, motivation and inclusion
- Enabling students to better understand what they are reading resulted in improved quality and quantity of work and made reading more enjoyable for them overall

- Both teacher and student participants in this project realized the benefits of using the Text-to-Speech software and recommend that it be made available to every student, everywhere, whenever they want it.





Complete Research Report

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Assistive Technology Website

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