Research Monograph # 35

What do we do for students who struggle to read? Do we continue to teach decoding or do we try something new?

The Voice of Text-to-Speech Technology

One Possible Solution for Struggling Readers?

By Dr. Michelann Parr
Schulich School of Education at Nipissing University

Research Tells Us

- Children who fall behind as readers read less; this, in turn, can increase the skills gap between struggling readers and their peers.

- Self-efficacy – belief in oneself as a reader – is half the battle in helping students learn to read.

- Choice – in what to read, when to read and how to read – acts as a powerful motivator for all students and especially for those who struggle with reading.

- Text-to-speech technology faciltates student choice, differentiation and self-advocacy.

MICHELANN PARR teaches language and literacy at the Schulich School of Education at Nipissing University in North Bay, Ontario. Her research interests include family literacy. text-to-speech technology and its impact on the reading process, and writing as a way of understanding. Dr. Parr is also interested in the pre-service development of language and literacy teachers.

> Jacqueline comes to school unable to read. She is slow to recognize the letters of the alphabet and has great difficulty learning the sounds each letter makes. Her knowledge of sight words is minimal. She has limited interest in looking at books or listening to stories. Year after year, Jacqueline devotes extra time to reading activities, while her parents and teachers engage peer readers to work with Jacqueline, use a host of motivational techniques to model, reward and even coerce her to read. Despite everyone's best efforts, including Jacqueline's, she does not develop the reading skills that allow her to derive meaning from text with adequate speed, fluency and comprehension. In Grade 5, Jacqueline is still only able to read at a first grade level.
>
> **– Adapted from Edyburn (2007)**

Classroom and special education teachers use many strategies to help students read at grade level. But what do we do for children like Jacqueline for whom those strategies are not effective? Assistive technology – specifically text-to-speech technology (TTST) – offers a possible solution.

This technology decodes with an accuracy and fluency that children who struggle with text cannot attain on their own. TTST allows any text to be read aloud by a computer-synthesized voice; it has the potential to empower struggling readers to work independently within grade-level expectations and demonstrate high-level thinking.[1] Struggling readers, often limited to low-level activities focused on decoding and literal comprehension,[2] are given new and exciting opportunities to engage with the written word, to make meaning from text and to develop comprehension skills.

reach every student

Ontario

Changing Perspectives/Overcoming Barriers

Traditional reading strategies, designed to support the ability to decode and make the connection between sounds (phonemes) and letters (graphemes), are effective for the majority of students.[3,4] There are some students, however, for whom these approaches are insufficient. The problem is one of information processing. By the time the word is successfully decoded, the child may have neither the energy nor the capacity left to understand and utilize the content.[5] As a result, many of these students enter into a vicious cycle of withdrawal from text. Frustrated, they often stop reading, losing the text exposure necessary for reading development and, ultimately, for the acquisition of knowledge and understanding in all subjects.

Although text-to-speech technology is one way to differentiate instruction for such students, there are obstacles to classroom use. Struggling readers worry that they may be stigmatized, while confident readers worry that TTST users are cheating or receiving a special privilege. Parents and teachers worry that if students read with a computer, they will never read independently. Without TTST, however, students with information-processing and other reading challenges may never read in a way that supports their overall development.

Decisions about the appropriateness of TTST have traditionally been made by teachers or instructional teams who consider (a) the student's strengths and needs, (b) the environmental and contextual demands placed upon the student and (c) the demands of the task.[7,8] Yet as the study we report on below suggests, all students are capable of making a decision about the use of TTST in much the same way as they choose text formats, authors or genres. When students are engaged in making decisions about TTST, this technology becomes a support for choice, differentiation and self-advocacy.[9]

Choice, Differentiation and Self-Advocacy

Three vignettes – of Mackenzie, James and Jacqueline – are drawn from ethno-graphic classroom research conducted with a Grade 5 class over a period of eight months. Specifically, we looked at the links between meaning-making, fluency and the use of TTST.

Mackenzie – A confident reader/confident refuser of TTST

Mackenzie comes to school each day with a book in his hands and a smile on his face. Every spare moment is filled with a good story: history, fantasy, contemporary and classic – he tries them all. He reads despite the activity around him, he reads without being told, and he reads with a rare intensity. He reads because it is fun, exciting and relaxing; he reads to experience different worlds and adventures. In Grade 5, his Canadian Test of Achievement reading scores place him at the 97th percentile. Never has Mackenzie needed instructional supports outside the regular classroom.

Mackenzie is as an internally motivated reader who seeks the benefits that reading offers. He believes that he reads well and approaches challenging texts with the expectation that he will master them.[10] Confident readers, like Mackenzie, have fluent and accurate decoding, strong oral reading skills, and diverse reading interests. Mackenzie reported that TTST interferes with the "voices in my head," thus disrupting comprehension and engagement. For competent readers, TTST requires more more work than conventional reading, making it an unlikely reader's choice.[9]

James – A contextual chooser

Rarely is James seen with a book in his hands, unless it is an informational book used for a particular project. His vocabulary is well developed. His stance toward reading is non-committal: although he tells his peers he doesn't like to read much, he writes that "books are interesting, fun, and help you to read better.… Reading allows me to escape from life for a little while." In Grade 5, his Canadian Test of Achievement reading scores place him at the 71st percentile. James gets what he needs from text with adequate speed, fluency and comprehension; he does not, therefore, require any specialized supports.

Contextual choosers, like James, read when they need to read; they have low levels of internal reading motivation, self-efficacy and reader engagement.[5,10] For contextual choosers, TTST is not required to support accuracy and fluency. Instead, it acts as a regulator, enhancing concentration and providing a scaffold from which to build familiarity with author, genre and more advanced texts. The decision of whether or not to use TTST is one such students feel entitled and qualified to make, dependent on topic and task. These students no longer believe that the computer does "all the work" for them and understand that TTST simply decodes.

Jacqueline – Once a struggling reader, now an enabled user

And then along came text-to-speech technology …

Jacqueline now comes to school looking forward to reading and equipped with the tools she needs to succeed – self-efficacy, self-advocacy and regular and routine access to TTST. It is likely that she will never learn the sounds of the letters of the alphabet. Sight words will never be her best friends, but she reads along with the computer as it highlights each individual word, thus enhancing oral and visual connections. She is interested in looking at books and listening to stories. With TTST, Jacqueline can make meaning and talk about texts with her peers; she is motivated, self-confident and willing to take risks. With TTST, she is, in her own words, "a reader"!

Without TTST, students like Jacqueline would be denied access to texts that allow them to learn at the same rate as their peers. While these students can often decode at high levels, the process is so slow and capacity-demanding that comprehension suffers and energy to engage fully in the reading process is drained, ultimately leading to withdrawal from text. For readers who need it, TTST will never be just a reading tool: it will be the voice of efficient decoding and confidence – an enabling tool – likely for the rest of their lives.[11]

Implementing TTST in the Classroom

Building Understanding/Modelling (Weeks 1–2)

- Discuss what it means to read; use the definitions in the *Ontario Expert Panel on Literacy in Grades 4 to 6*.[2]

- Demonstrate reading with TTST (using a computer with speakers and a data projector for showing the text). Ask, "How is this reading?"

- Read a variety of texts (e.g., stories, poems, or content) with TTST and human voice and discuss and compare.

- Discuss the role of TTST in the reading process. What does it actually do?

TTST creates opportunities for full engagement …

By adding TTST to the reading experience, we are no longer valuing "word knowledge" and "phonological awareness" over comprehension, meaning-making and social/cultural transformation.

TTST allows readers to participate in the discourse communities of their choice, thus creating opportunities for full engagement and enabling learners to do things on their own initiative and their own terms, in their own way and for their own purposes.

"Struggling readers should not be limited to low-level activities focused on decoding and literal comprehension."

Guided Exploration (Weeks 3–4)

- Provide various texts (both teacher-assigned and student-selected) to work through the novelty of TTST.
- Offer TTST as a learning station, simply one way to access text.
- Conduct mini-lessons on the features of TTST, such as voice and speed selection, post-it notes and word look-up.

Practice with Purpose (Weeks 5–7)

- Assign the use of TTST for a specific purpose (e.g., to acquire content).
- Encourage students to read at self-selected rates.
- Conduct ongoing conversations about text content and the function/use of TTST.

Informed Choice (Weeks 8–12)

- Assign an engaging and contemporary text (either literature or content area).
- Allow students to choose or refuse TTST. Discuss the rationale for their choices within the context of other reading decisions.
- Encourage students to apply strategies learned in TTST when reading paper text (e.g., students can use paper post-it notes, or use a dictionary as word look-up support).
- Discuss what students like about TTST, what they don't like, how they would change it and how it impacts the way they read.

In Sum

Allowing all students access to TTST addresses many of the concerns identified by students, parents and teachers with regard to feeling stigmatized or privileged. TTST should be "a ubiquitous and effective option for all students, not an accommodation for a select few" (p. 157).[12] For most, TTST will be a nuisance that interferes with their reading process; for some it will be a choice to be made, dependent on motivation and ability to focus. But, for those whose lack of decoding skills and fluency are a source of frustration, TTST will be a confident voice in their heads, a support for meaning-making and a valuable lifelong tool.

REFERENCES

1. Hasselbring, T. S., & Bausch, M. E. (2005/2006). Assistive technology for reading: Text reader programs, word-prediction software, and other aids empower youth with learning disabilities. *Education Leadership, 63*(4), 72–75.
2. Ontario Expert Panel on Literacy in Grades 4 to 6. (2004). *Literacy for learning: The report of the expert panel on literacy in Grades 4 to 6 in Ontario*. Toronto, ON: Queen's Printer for Ontario.
3. Adams, M.J. (1994). Modeling the connections between word recognition and reading. In R.B. Ruddell & N. J. Unrau (Eds.), *Theoretical models and processes of reading* (5th Ed., pp. 1210–1243). Newark, DE: International Reading Association.
4. National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction, Reports of the Subgroups* (NIH Publication No. 00-4769). Retrieved from http://www.nichd.nih.gov/publications/nrp/smallbook.cfm
5. Hirsch, E.D. Jr. (2003, Spring). Reading comprehension requires knowledge – of words and the world: Specific insights into the fourth-grade slump and the nation's stagnant comprehension scores. American Educator, 10–29.
6. Edyburn, D. (2007). Technology-enhanced reading performance: Defining a research agenda. *Reading Research Quarterly, 42*, 146–152.
7. Balajthy, E. (2005). Text-to-speech software for helping struggling readers. *Reading Online, 8*(4). Retrieved from http://www.readingonline.org/articles/art_index.asp?HREF=balajthy2/index.html.
8. Zabala, J.S. (2000). Setting the stage for success: Building success through effective selection and use of assistive technology systems. *LD online*. Retrieved from http://www.ldonline.org/article/Setting_the_Stage_for_Success%3A__Building_Success_Through_Effective__Selection_and_Use_of__Assistive_Technology_Systems
9. Parr, M. (2008). *More than words: Text-to-speech technology as a matter of self-efficacy, self-advocacy, and choice* (Doctoral Dissertation, McGill University). Retrieved from http://proquest.umi.com.roxy.nipissingu.ca/
10. Guthrie, J.T., & Humenick, N.M. (2004). Motivating students to read: Evidence for classroom practices that increase reading motivation and achievement. In P. McCardle & V. Chhabra (Eds.), *The Voice of Evidence in Reading Research* (pp. 329–354). Baltimore, ML: Paul H Brookes.
11. Elkind, D. (2004, November 27). Assistive technology –More than a reading tool, a life tool. *LD Resources*. Retrieved from http://www.ldresources.org/2004/11/27/assistive-technology-more-than-a-reading-tool-a-life-tool/
12. Anderson-Inman, L., & Horney, M.A. (2007). Supported eText: Assistive technology through text transformations, *Reading Research Quarterly, 42*, 153–160.