POWERUP
WHAT WORKS
powerupwhatworks.org

TECH RESEARCH BRIEF

Using Multimedia to Support Reading Instruction

Center for Technology Implementation

Overview

As students advance through the grades and encounter more complex texts, they may need additional supports to meet the high expectations set by the Common Core State Standards.

Preparing students to meet the College and Career Readiness Anchor Standards in English Language Arts (ELA) involves helping them to become adept at integrating and evaluating information in a variety of different media formats.

To help students become comfortable with multimedia, it is useful to incorporate it into your instruction wherever possible. Providing varied means of representing information (Universal Design for Learning) can also help improve your students' ability to access complex texts.

Multimedia reading materials and environments offer a variety of flexible supports for students. These supports can be especially beneficial for students when they read rich, content-area texts in history, social studies, science, and mathematics and encounter academic vocabulary that is unfamiliar to them. Check out "Using in Your Classroom" for ideas on integrating these tools into your teaching.

In Your Classroom

No one software program or approach will meet the needs of all students, so it is wise to try a variety of interventions and supplemental activities in order to engage students in their own learning, and to consult students in the process.

Programs that are customizable and offer a variety of digital texts will best meet the diverse needs and interests of your students. Look for programs that support the instructional strategies and goals already addressed in the classroom, but beware of programs that bury the elements of instruction in distracting animation or story lines.

Multimedia Supports for Reading

- Text-to-speech technology
- Voice recognition
- Animation
- Embedded dictionaries
- Linked videos
- Study tools such as highlighters and annotation tools

Students need to read engaging material both silently and aloud, and with ready support for words and concepts that they do not know. Given the limited supply of trained reading tutors and specialists who can provide a fluent oral model and one-on-one tutoring, it may be helpful to use e-tutors. Look for multimedia reading programs that provide supported practice.

Comprehension Strategies

Comprehension is the ultimate goal of reading, yet it is notoriously difficult to teach. Multimedia environments can mirror and reinforce proven teacher-led strategy instruction through the use of pop-ups, linked questions, online resources, and animated reading coaches or e-tutors who engage in questioning, prompts, and think-alouds.

Struggling readers' comprehension is often impaired by a limited reading vocabulary. Multimedia texts with supports for vocabulary development—such as linked mini-videos that demonstrate a concept or dictionaries and thesauruses with text-to-speech capabilities—can help students achieve this goal and improve their comprehension.

Students, especially those who are struggling, often need prompting and support to use tools and strategies readily and effectively. Accessing appropriate supports is a skill and habit that students need to learn. In your classroom, consider:

- Using explicit instruction to teach vocabulary and comprehension strategies as a whole- or small-group activity.
- Providing study guides that remind students to access supports while they are reading.
- Providing verbal reminders while students are working to access the supports and strategies they have been taught.
- Employing software and multimedia tools that have prompts and supports directly embedded within the text. There are several programs available that allow teachers to create their own supported materials or you may choose to use a commercially available program with built-in reading supports.

When selecting an appropriate reading program, look for products that prompt students to access supports, apply strategies, and pause to monitor comprehension.

Engagement

Interest and engagement should be considered a significant outcome in literacy instruction, and providing students with choice is key to achieving both. Teachers can help students find motivating material among the growing selection of digital texts available on the Web, for purchase, or through subscription sites for students with diagnosed disabilities. Some Web-based sites embed supports into students' selections. Importing text without embedded supports into reading software programs allows educators to leverage the program's multimedia supports with an increasing array of text. Providing options for your students helps them to feel more in control of their learning and allows them to access text in a way that is motivating and engaging for them.

What the Research Says

Fluency—particularly its relationship to comprehension—has been the focus of much recent reading research. Readers who lack fluency have few cognitive resources left to develop their comprehension skills, and technology-based approaches to improving fluency in struggling readers have therefore received considerable attention. Wolf and colleagues, for example, conducted a multiyear line of research into the RAVE-O Program—a multimedia language and reading training program that addresses the specific deficits of young readers with language or learning disabilities.

The program addresses three instructional goals within an engaging, game-like multimedia design:

- Fluency and comprehension
- Orthographic and phonological awareness
- Engagement

Interventions using this program have consistently been shown to have a positive impact on students' reading skills and reading attitude and the program has been adopted in further large-scale studies (Wolf, Miller, & Donnelly, 2000).

Project LISTEN's Reading Tutor uses advanced speech recognition and text-to-speech capabilities to listen to students as they read and provide corrective and neutral feedback and supports based on their reading performance. Students can choose from a selection of texts at different levels of complexity. Studies comparing the Reading Tutor with a human tutor demonstrated significant student progress in both settings, although further analysis revealed that a trained human tutor may have an advantage in terms of being able to provide a more individualized response to students (Mostow et al., 2003).

Text-to-speech (TTS) technology is a promising tool that is widely used to support the diverse reading needs of students (Arter, Helman, & D'Agata, 2010; Meyer & Bouck, 2014). In a recent research study (Meyer & Bouck, 2014), adolescent students with reading difficulties reported that TTS helped them comprehend the text more fully and read more fluently. When using TTS, students believed they could complete the reading task more quickly than without it. Students also appreciated that TTS allowed them to be more independent and efficient readers.

Building comprehension skills requires more than just practice and strategy instruction must include modeling of the reading strategy, guided practice with well-chosen texts, and reflection on the flexible use of a range of strategies (Duke & Pearson, 2002; Nikolaraizi, Vekiri, & Easterbrooks, 2013). Applying comprehension strategies to complex texts is an enormous challenge for struggling readers, who must coordinate all of their reading skills and monitor their understanding. There are, however, a number of products that can assist students in applying comprehension strategies.

The iSTART project delivers comprehension strategy instruction and practice based on the Self-Explanation Reading Training (SERT) model. This model was developed at the Center for Cognitive Science and Educational Practice at the University of Memphis in order to help youth and young adults read, study, and comprehend science-based texts. iSTART is a Web-based module that uses a variety of animated agents to model and provide guided practice in comprehension strategies, including self-monitoring, paraphrasing, and making inferences, predictions, and elaborations. Several studies have shown the training module to be a significant success with adolescent and young adult readers (Graesser, McNamara, & Van Lehn, 2005).

Thinking Reader® —a commercially available product developed by Tom Snyder Productions (Scholastic)—embeds strategy instruction into award-winning novels for intermediate and middle school students. It is based on a research prototype that has been shown to improve struggling adolescent readers' comprehension (Dalton, Pisha, Eagleton, Coyne, & Deysher, 2001). The books are digitized and embedded with multiple supports, including human voice narration, text-to-speech technology, a multimedia glossary, hyperlinks to support background, strategy instruction, and a work log. Animated agents prompt students to apply reading strategies and provide corrective feedback on their performance.

Many investigations into the use of technology, including multimedia environments, emphasize the importance of student interest, motivation, and engagement (Malin, 2010; Reinking, 2005). These elements are especially important for students who are reluctant or struggling readers, and a few studies have incorporated student choice into their research design. Mitchell and Fox (2001), for example, allowed young students to choose between two computer programs and activities. The Reading Tutor in Project LISTEN (Mostow et al., 2003), meanwhile, takes turns with students selecting articles from Weekly Reader and other high-interest texts at the students' reading level. Fastig and Halaas Lyster (2005) and Lynch, Fawcett, and Nicolson (2000) both investigated the introduction of a scan-and-read program into regular class instruction, where students used the program for their daily reading assignments and personal-choice readings. Both studies demonstrated the positive impact of choice on student engagement.

References

Arter, P., Helman, J., D'Agata, H. (2010). Can you read me now? The practical use of text-to-speech software to improve reading in middle school students. *Journal of Technology Integration in the Classroom, 2*(3), 61–66.

Dalton, B., Pisha, B., Eagleton, M., Coyne, P., & Deysher, S. (2001). *Engaging the text: Reciprocal teaching and questioning strategies in a scaffolded learning environment*. Final report to the U.S. Department of Education. Peabody, MA: CAST.

Duke, N. K., & Pearson, P. D. (2002). Effective practices for developing reading comprehension. In A. E. Farstrup & S. J. Samuels (Eds.), *What research has to say about reading instruction* (3rd ed.) (pp. 205–242). Newark, DE: International Reading Association.

Fastig, R. B., & Halaas Lyster, S. A. (2005). The effects of computer technology in assisting the development of literacy in young struggling readers and spellers. *European Journal of Special Needs Education, 20*(1), 21–40.

Graesser, A. C., McNamara, D. S., & Van Lehn, K. (2005). Scaffolding deep comprehension strategies through Point&Query, AutoTutor, and iSTART. *Educational Psychologist, 40*(4), 225–234.

Lynch, L., Fawcett, A. J., & Nicolson, R. I. (2000). Computer-assisted reading intervention in a secondary school: An evaluation study. *British Journal of Educational Technology, 31*(4), 333–348.

Malin, G. (2010). Is it still considered reading? Using digital video storytelling to engage adolescent readers. *The Clearing House, 83*(4), 121–125.

Meyer, N. K., & Bouck, E. C. (2014). The impact of text-to-speech on expository reading for adolescents with LD. *Journal of Special Education Technology, 29*(1).

Mitchell, M. J., & Fox, B. J. (2001). The effects of computer software for developing phonological awareness in low-progress readers. *Reading Research and Instruction, 40*(4), 315–332.

Mostow, J., Burkhead, P., Corbett, A., Cuneo, A., Eitelman, S., Huang, C., et al. (2003). Evaluation of an automated reading tutor that listens: Comparison to human tutoring and classroom instruction. *Journal of Educational Computing Research, 29*(1), 61–117.

Nikolaraizi, M., Vekiri, I., & Easterbrooks, S. R. (2013). Investigating deaf students' use of visual multimedia resources in reading comprehension. *American Annals of the Deaf, 157*(5), 458–473.

Reinking, D. (2005). Multimedia learning of reading. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 355–376). New York: Cambridge University Press.

Wolf, M., Miller, L., & Donnelly, K. (2000). Retrieval, automaticity, vocabulary, elaboration, orthography (RAVE-O): A comprehensive, fluency-based reading intervention program. *Journal of Learning Disabilities, 33*(4), 375–386.

SUGGESTED CITATION: Center for Technology Implementation. (2014). *Using multimedia to support reading instruction*. Washington, DC: American Institutes for Research.