

Reducing extraneous cognitive load on working memory in students with reading disabilities

Early identification of a potential reading disability in children can greatly increase the amount of time for intervention with that student (Felton & Pepper 1995). Any extra time addressing deficiencies in reading ability will help that student be successful later in school and in life. There are various forms of reading disability, the most well known being dyslexia, but I am not going to focus on one problem in particular. As our understanding of reading disability has grown, there are multiple interventions and resources available to help all children grow into proficient readers.

Typically, proficient readers can do two things simultaneously: decode text and comprehend the body of text as a whole. In other words, you can see each word and understand its meaning while at the same time taking those words in context with the others around it. Over time, readers begin grouping or “phrasing” to speed up their pace of reading. While the research is unclear on where the disconnect comes in some forms of reading disability, much of it agrees that the problem lies within the reader’s working memory. Perfetti (1985) showed that reading speed is tied with working memory and is now used as a component diagnostic for potential reading difficulties (Geoff, Pratt, & Ong 2005).

This is an important point to make as there is a growing body of research on working memory and the role it plays in learning. Sweller, Merrienboer, & Paas (1998) describe “Cognitive Load Theory,” which breaks learning content into three areas of load. For example, a low-load task would be learning something in isolation; tasks or ideas that do not interact with one another. Therefore, those tasks require a low working memory load (Ayers 2006). Conversely, high-load activities are tasks or ideas which *cannot* be learnt in isolation of one another. Because reading is both decoding text *and* comprehension of that text, it can place a high load on beginning reader’s working memory.

One method of reducing that load and leading to more productive learning time is to remove a variable. Perhaps the student is struggling with word decoding. One approach is through a method called “repeated reading,” in which a passage is read and re-read by the student has been shown to increased comprehension (Swanson & O’Connor 2009). Another method is through “continuous reading,” in which students read across a range of materials, has also been shown to be effective in increasing comprehension (2009). Regardless of the method, working memory is playing a role in comprehension, and though the *exact* processes aren’t known, by reducing the load on working memory, struggling readers can be helped.

One common method of helping beginning or struggling readers is through reading passages of text aloud while the reader follows along. They are focusing on comprehension and not decoding. In essence, we are removing that task from the student in the immediate environment to improve comprehension. While this can certainly be done in a group or one on one setting, text-to-speech applications can also be used on demand by students.

While I do not have hard data, I used speech-to-text extensions in the science classroom. Often, articles I gave were to tell a story or add to the content, not for learning vocabulary or new terms. I wanted my students to comprehend what they were reading. Having them install a speech-to-text Chrome extension allowed them to follow along with the reading so they could focus on the scientific context. The great thing about technology is that each student could choose to use the reader when they wanted...it wasn’t a mandate. Some used it every day, others never touched it. The point is all students were having a need met on their own terms. Obvious other implications of the extension are with ESL or ELL students in addition to reading disabled students.

Resources

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