A REFLECTION PAPER ON THE EFFECTS OF READERS’ MISCONCEPTIONS ON COMPREHENSION OF SCIENTIFIC TEXT

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One of the problems that many poor readers share is not their inability to read the words on a page but rather their inability to comprehend what they read. Reading comprehension can be defined as the ability to obtain meaning from written text for some purpose. Reading with comprehension is one of the primary goals of early education. Learning whether in an academic setting or on one’s own tends to be highly dependent on the comprehension of information from text sources. To comprehend successfully, the reader must identify a series of letters as a word, access the meaning of the word from the lexicon or mental dictionary and integrate individual word meanings into a coherent sentence level representation. Reading truly is essential in every academic discipline due to the way we share information. Comprehension difficulties arise for a number of reasons, ranging from poor word-decoding abilities to the inability to use effective reading strategies. Most of the learning that takes place in and out of schools is based on successful comprehension of texts. During comprehension readers construct a memory representation of the text that critically depends on their interpretation in light of prior knowledge. Deep comprehension, however, requires more than the mere interpretation of individual sentences; the reader must also be able to integrate individual sentence meanings into a coherent text level representation. In other words, to achieve deep comprehension, the reader must construct a global meaning that integrates multiple sentences. The success of the comprehension process, therefore, is contingent on the integration of readers’ prior knowledge with textual information.

Students in science classrooms are given numerous opportunities to read expository text in a variety of formats and for a variety of purposes. They read to solve a
problem, understand the steps in an experiment, gain base knowledge about a concept, answer their own questions, compare their inquiry results with what others have found, expand their basic understanding of a concept, and for enjoyment. Students in science classrooms also read a variety of text formats. They read books, directions for experiments, newspaper articles, websites, and peer work. The reading tasks going on in science classrooms today are quite extensive and do complement efforts being made in schools to improve reading achievement. However, science teachers need to support struggling readers with strategies that will enhance their comprehension of science reading materials. Having students predict what they will read be about is important because it can help activate prior knowledge they have on the topic. It allows them to start connecting the new reading with their established knowledge. With this, the teacher lists key words and concepts for the students. Then, based on these words, students must write a prediction about what they will be reading. In this manner, helping students process what they are reading while they are reading it can improve their comprehension. Activities designed to have students reflect during the reading process are effective and easy to implement. Such activities allow the teacher to identify comprehension problems as soon as they occur, instead of backtracking to identify problems once the entire reading has been completed. This metacognition, realizing that meaning is interrupted, is critical if students are to read proficiently. Having students reflect on reading while reading also sends the essential message that reading is thinking and that a reader is actively thinking throughout the reading.

Students of all ages have been found to experience difficulty comprehending and learning from science texts (Brand-Gruwel, 1997). Students' knowledge deficits may take, at least, two different forms. First, many students may lack the knowledge of specific concepts outlined by the text. When students do not have a sufficient understanding of a particular concept, they often have a problem generating inferences to link concepts within or across sentences. As a result, their understanding of the text remains fragmented and isolated, causing a failure to form a coherent mental representation
of the overall text content. Second, students' knowledge deficits may take the form of preexisting misconceptions based on common knowledge or personal experience, rather than scientific concepts. Understanding scientific phenomena often requires adopting a completely different perspective from that acquired from everyday perceptual experiences.

The conceptual change theory states that learners are intelligent people who seek to understand the world around them by using their limited knowledge to make assumptions to explain a topic that can often be wrong. These misconceptions they create persist, even when given correct knowledge on the topic at hand, and interfere with learning. When students are given only the correct information, without addressing where this information conflicts with their prior knowledge, they tend to either persist in their acceptance of the misconception or form hybrid models combining the misconception with the correct information. Conceptual change texts have been found to be effective for correcting student misconceptions across all of the major scientific fields.

Teaching techniques that challenge misconceptions up front improve learning. For example, assigning pre reading can familiarize students with material and their own conflicting knowledge. Pre questions can assess how well students retain new information. It helps students’ express what concepts challenged their prior knowledge the most and communicate relatable past experiences with reading material. Students could be encouraged to recognize when prior knowledge is interfering with new material through thorough self-testing. Seeking feedback from teachers could help students identify their problem areas.

Concepts being taught in science often rely on students’ reading to build background knowledge or to follow inquiry procedures. Science teachers need to know strategies they can implement to aid in students’ comprehension of the specific concepts they teach. If students can’t comprehend the materials science teachers provide them, then their understanding of scientific concepts will suffer. When you teach science, you
are also teaching students how to read for a variety of purposes and with a variety of reading materials, both of which will prepare students to become better readers.

Reference: