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ABSTRACT
        Students often fail to store new information in
memory in a way that is accessible or useful. The information they
have acquired is inert. This paper examines the inert knowledge
problem in the context of learning from informational expository
text. Kintsch and van Dijk (1978) have suggested a framework for
understanding learning from expository text which first describes the
textbase, a representation of the semantic content and organization
of the text. A second aspect is the situation model, closely tied to
the textbase, which represents the reader's understanding of the
situation being described by the text. Reading and constructing only
the textbase may leave the learner with inert knowledge.
Understanding situation models and how to construct them may
facilitate learning from text and is a promising direction for
research. (Contains 154 references.) (SLD)

Overcoming the Inert Knowledge Problem in Learning from Expository Text

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Overcoming the inert knowledge problem in learning from expository text

Summary[1]

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In many situations in which learning is expected to occur, students fail to store new information in memory in such a way that it is accessible or useful. They may be able to regurgitate the information on exams, but when asked to reason and solve problems where the facts and procedures that they have acquired would be useful, they are unable to actively use their knowledge. That is, the information they have acquired is inert.

Educators and researchers are struggling to understand the problem of inert knowledge and to learn how to provide students with the skills and opportunities they need to meet the educational goal of acquiring usable, accessible knowledge. This paper examines the inert knowledge problem in the context of learning from informational expository text. Expository text provides a good context for discussing the problem because it is a common medium from which students are expected to learn. Also, the groundwork for addressing knowledge acquisition in the context of expository text has been laid by several decades of text processing research.

Kintsch and van Dijk (1978; van Dijk & Kintsch, 1983) provide a framework

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[1]Appended to this summary is the reference list from the full-length literature review manuscript. The manuscript may be obtained upon request from Nathalie Coté at Box 45 GPC, Vanderbilt University, Nashville, TN, 37203 (615) 343-2614 or by e-mail over the Internet to cotenc@ctrvax.vanderbilt.edu.

for understanding learning from expository text. They distinguish between two types of representations that readers construct when they process text. The first is the textbase, which is a representation of the semantic content and organization of the text. The second is the situation model, which is usually closely tied to the textbase, but represents the reader's understanding of the situation being described by the text. In this paper, the argument is made that acquiring usable, accessible knowledge from text requires that the learner construct a situation model, which integrates new information from the text with the learner's prior knowledge and experience. Reading and constructing only a textbase representation may leave students with new knowledge that is isolated and inert. According to this argument, understanding situation models and how learners construct them will allow educators and researchers to facilitate learning from text so that the inert knowledge problem can be reduced or overcome.

Learning from text

To begin, the existence and pervasiveness of the inert knowledge problem is established through a brief review of research on transfer and examples of inert knowledge in the domain of health. The second section distinguishes between remembering or comprehending text versus learning from it. Learning from text is defined as the integration of new information with the reader's existing knowledge, such that existing knowledge is transformed or new knowledge structures are created with connections to existing ones. This leads to a discussion of theories of text represe. .ation, in which the discourse processing theory of Kintsch and van

Dijk (1978; van Dijk & Kintsch, 1983) is described in detail. Kintsch and van Dijk's description of the types of representations that readers construct as they process a text provides a framework for understanding the distinction between remembering or comprehending text versus learning from it. In this framework, successful performance on memory and comprehension tasks only requires the construction of a textbase representation, whereas the argument is made that learning from text requires the construction of a situation model representation as well.

Situation model construction

The next section of the paper describes what situation models are, how they are formed and why they are relevant to understanding learning from expository text. Because parsimony dictates that the form of situation model representations of text be consistent with the form of representations of existing knowledge, knowledge representation issues are addressed here. However, the focus of this section is on a theoretical model of how learners construct situation models of text.

Although research has shown that in general readers do construct both a textbase representation and a situation model of a text, the quality of these representations will be influenced by characteristics of the learner, the task or learning context, and the written materials themselves. Much is known about factors that affect textbase construction, because text processing researchers have focused on memory and comprehension, using outcome measures that usually only require good textbase representations for successful performance. However, research on what is involved in the construction of "good" situation models is sparse,

although interest is growing. Fortunately, it is likely that the reader, text, and task factors that have been identified through decades of text processing research as being important to memory and comprehension also influence learning. Thus, in the next section of the paper a discussion of the limited research relevant to the construction of good situation models is set in the context of the general effects that various reader, text, and task features have been found to have on reading comprehension and memory for text. The research that is reviewed in this section includes studies of reader or learner characteristics such as prior general and domain-specific knowledge, cognitive processing and storage capacity, comprehension monitoring skills, and text processing strategies. Characteristics of the text that have been identified include local and global cohesion, sentence complexity, vocabulary familiarity, and use of sequence markers, connectives, and topic sentences, as well as features such as paragraph indentations and titles. Important task factors include the orienting task or purpose for which the text is read and the criterial task or outcome measure. The outcome of this review is that there is a need for a sharper focus on identifying the elements involved in the formation of good situation models. This conclusion leads to a discussion of research that has attempted to characterize a wide range of individual differences in the cognitive activities that learners engage in as they learn from text.

Conclusions

The final section is a discussion of the implications of the argument that acquiring usable, accessible knowledge from text requires the construction of

situation models and that therefore by facilitating learners' construction of situation models, the inert knowledge problem in learning from text can be reduced or overcome. Instructionally, this argument calls for closer attention to the learning context in which readers approach text and to teaching learners the skills and strategies that they need to construct situation model representations. Examples are provided of instructional programs that use meaningful contexts and authentic tasks to encourage students' construction of organized knowledge structures that will guide subsequent thinking. These programs are contrasted with traditional educational contexts in which construction of a textbase representation is sufficient for successful performance. Also, instructional techniques that attend to the comprehension monitoring skills, text processing strategies, and generative activities that learners need to engage in to construct good situation models are briefly reviewed. Included in this final section is discussion of promising directions for research and suggestions for changes in traditional research paradigms. This paper highlights the need for research on how students process text to build well-integrated knowledge structures with multiple ties to other knowledge and on how learner, text, and task factors affect this construction of usable, accessible knowledge. Implications for research paradigm changes include the need for authentic tasks that allow and facilitate situation model construction and for better measures of prior knowledge and learning outcomes than are currently popular.

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