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# Perspectives on Schema and Reading Comprehension: Content or Formal Schema? What Promises?

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It has now almost become a pedestrian perspective in educational research and pedagogical practice that background knowledge influences interpretations of text. The primary assumption is that what students already know affects what they will learn from reading, implying that readers' prior knowledge interacts with text to create psychological meaning. Researchers have alluded to prior knowledge as knowledge structures, plans, scripts, frames or schemata (e.g. Rumelhart, 1975; Shank & Abelson, 1975). Schemata are frameworks for organizing and remembering information about a topic.

Introduction of the term "schema" into psychology often has been associated with Bartlett (1932), although he attributes his use of the term to Head (1926). Subsequent to the mid 1970s, the term schema and the related notions of plans, frames, and scripts have been emphasized in cognitive science (Chafe, 1976; Filmore, 1975; Rumelhart, 1975; Shank & Abelson, 1975).

Since the mid 70s, there has been an increasing body of research providing both explicit and implicit support for the view (often simply interpreted) that the essence of meaning emanates from the readers' fund of experience. Two sources perhaps best summarize the research support for this perspective. According to Langer (1982), the experiences, background knowledge, skills, and abilities that the reader takes

to the reading situation impact the level of comprehension that will result. Adams and Bruce (1982) contend that "comprehension is the use of prior knowledge to create new knowledge" (p. 23).

Most teachers consider the emphasis on background knowledge to be consistent with their usual practices of preteaching vocabulary and providing prerequisite experience. More recent strategies for activating background knowledge such as semantic mapping and student-generated questions are also relevant. Although the notion that teachers should begin with what students already know is often simply interpreted, Langer (1982) has emphasized that it is a "particularly sophisticated concept, and when understood both theoretically and practically will permit the teacher to help students read their texts with greater ease" (p. 149). In other words, proper understanding of the notion of schema holds the promise for improving both instruction and learning.

### **Types of Schemata**

Schemata in reading comprehension are not confined to content information, whether relating to general knowledge or to knowledge of a specific subject area domain. In fact, within the schema-theoretic view of reading, teachers are normally preoccupied with three types of schemata. One type relates to content knowledge, that is, knowledge of topics and concepts for reading in particular subject areas. Teachers of biology, chemistry, physics, mathematics and social studies often assist students in developing the knowledge required for understanding the technical and specialized vocabulary of their fields.

Another type of schema is general world knowledge having to do with understanding social relationships, activities, and causes that are germane to many specific situations or cultures. General world knowledge enables readers to engage in appropriate inferences while reading and to relate with persons and situations. Thus some suggest that there are two types of content schemata—one that is specific to knowledge of a discipline; the other to general world knowledge.

The third type of schema concerns knowledge of rhetorical structures, used for organizing and signaling the organization of texts (Meyer, 1975). This type of knowledge is often referred to as formal schemata. Knowledge of how stories and expository discourse are structured is expected to reduce the processing demands of reading, thereby facilitating progress in comprehension. Both content and formal knowledge, therefore, influence reading comprehension. Accordingly, instructional strategies designed to facilitate these kinds of knowledge enhance reading comprehension.

Much of the research literature related to schema theory tends to underscore the significance of content schemata almost to the exclusion of formal schemata (e.g., Chi, 1978; Chiesi, Spilich, & Voss, 1979). Considered from this perspective, background knowledge of content is the dominant factor influencing comprehension during academic pursuits. A more inclusive perspective, however, is that readers bring both formal schemata structures and content schemata to bear on reading.

This discussion makes no attempt to produce a complete up-to-date list of the research findings on schema-theoretic perspectives on reading comprehension. Rather, the aim is to suggest what promises this holds for ESL classroom instruction.

### **Types of Rhetorical Organization of Expository Prose**

Meyer (1975, 1977a), Meyer, Brandt and Bluth (1980), and Meyer and Freedle (1984) have investigated the comprehension and recall of readers whose native language was English, interacting with different types of expository prose. These studies indicated that different rhetorical patterns interact differently with readers' background knowledge and processing strategies. Meyer (1975, 1979) identified five basic expository patterns. These five types she designated as: collection, description, causation, problem/solving, and comparison. Although these five types are not exhaustive or definitive, Meyer's research demonstrated that there is valid support for the view that these patterns represent significantly different types of prose. The conclusions emerging from research on rhetorical patterns carry special significance for ESL pedagogical practice. Two such conclusions are accorded brief mention here. First of all, patterns of organization are representative of the different types of logical connections among the important and less important ideas in expository material. Second, students who are aware of the existence and purpose of these patterns, are very likely to use them to improve comprehension.

### **The Separate Effects of Formal and Content Schemata in Reading Comprehension**

As mentioned earlier, the reader brings both content and formal schemata to the reading act. Research has been conducted to determine the different effects of these two types of knowledge. When investigating the impact of formal schemata, the content of a text is kept constant. The rhetorical organization is then manipulated as comparable groups of subjects read the same information organized in different rhetorical patterns. Any performance differences on dependent measures are then interpreted to show the effects of the different organizational patterns.

One study of this type is mentioned. Operating within Meyer's (1975, 1979) theoretical framework, Carrell (1984) used expository prose to determine the effects of four different English rhetorical patterns on the reading recall of ESL readers of different native languages. Eighty students enrolled in an intensive English program for foreign students participated in the study. The native language groups were: Spanish, Arabic, Oriental (predominantly Korean) and others, predominantly Malaysian. The four types of English rhetorical patterns were causation, problem/solution, comparison, and collection of descriptions.

In Carrell's (1984) view, the most encouraging finding of this study for instruction and learning was that if ESL readers possessed the appropriate formal schema to process expository texts and if they used that knowledge to organize their recall protocols, more information was recalled. An important implication of these findings is that teaching students the need to identify and use different discourse structures may be effective in promoting the comprehension of ESL students (see also Connor, 1984).

It is also quite possible to test for the effects of content schemata on comprehension. In this case, the rhetorical structure of a text is kept constant while content schemata are manipulated. Here the researcher measured performance differences between the groups attributable to readers' background knowledge. A study conducted by Steffensen, Joag-dev, and Anderson (1979) represents the seminal work in the area. They found that the background knowledge of students from different cultures strongly influenced their comprehension.

### **The Simultaneous Effects of Content and Formal Schemata**

Prior to 1987, little progress was made studying the comparative influences of formal and content schemata in relation to each other. Previous investigations had tended to invite the conclusion that reading a text with familiar content written in a familiar rhetorical pattern would be relatively easy and that reading one with unfamiliar content and an unfamiliar rhetorical pattern would be relatively difficult. In 1987 Carrell investigated the simultaneous effects of content and formal schemata on ESL students' comprehension of both culturally specific content and formal schemata, as well as the potential interaction between them. In this study, high-intermediate ESL students read, recalled, and responded to questions based on each of two texts. Students had either Muslim or Catholic Spanish backgrounds. One text contained culturally familiar content and the other culturally unfamiliar content. In each group, half of the students read the texts written in

a familiar clearly signaled rhetorical pattern; the other half read a text with an unfamiliar, altered rhetorical pattern.

The finding of this study suggested that when both content and form were variables in ESL reading comprehension, content was generally more important than form. Where both content and form were familiar, comprehension was relatively easy. Conversely, when both content and form were unfamiliar, comprehension was relatively difficult. Interestingly, when either content or form was unfamiliar, content presented more comprehension difficulties for the reader than form.

Carrell's (1987) study suggests that in the ESL reading classroom content is of primary importance. Carrell argued that teachers of ESL reading "need to be aware of the important role in ESL reading, of background knowledge of text content" (p. 477). The applicability of these observations to classrooms involving subjects with English as their native language was documented in later studies (Beck, McKeown, Sinatra, & Loxterman 1991; Britton 1990). The nature of the relationship between content knowledge and knowledge of text structures was the focus of a research review by Roller (1990). In analyzing findings regarding the role of these two types of knowledge, Roller concluded that the extent of the influence of text structure is contingent on familiarity with text content. Specifically, structure is most facilitative when content is moderately unfamiliar and diminishes in importance if readers have adequate familiarity with the content.

One permissible inference is that sufficient background knowledge of content organized in a familiar structure may result in better comprehension. The assumption here is that, given the conceptual difficulty of a text, familiar structure and content knowledge will yield better comprehension, with neither source dominating the other. This is precisely what was suggested by the results of a later study by McKeown, Beck, Sinatra, and Loxterman (1992).

In the McKeown et al. study, students who read a text revised to create a familiar structure (through clarification and elaboration) were able to apply information they were taught to focus on and comprehend the most important information in the revised text. In contrast, students who read the original text and who were taught the same background information were less able to capitalize on the advantage provided by that information. McKeown et al. (1992) used the concept of coherence to describe the kind of organizational text structure which facilitates a reader's comprehension task. According to them, coherence is the extent to which the sequencing of ideas in a text makes sense and the degree to which the signal words render those ideas and their relation-

ships apparent. McKeown's et al. findings indicated that content knowledge was most useful if the text structure was clear and logical enough (that is, familiar) to allow readers to see the relationships between text information and previous knowledge. This helped readers integrate prior information with new information "to create a meaningful representation" (p. 91).

The results of the study by McKeown et al. (1992) provide general support for Carrell's (1987) finding that when both content and form are familiar comprehension is relatively easy. As pointed out by Roller (1990), background knowledge of content and of text structure interacts. Background knowledge of content in varying quanta can compensate for varying levels of familiarity with text structure.

### Summary and Conclusion

In this article, the discussion of the research literature on the schema-interactive view of reading comprehension underscores the extent to which the more recent perspectives about reading have shifted from that of a simple process of lifting information from a text to that of an active sophisticated process.

In testing for the separate effects of text structure (formal schemata) on reading comprehension, the research indicates that for native English readers (Meyer et al. 1980; Meyer & Freedle, 1984) as well as for non-native ESL readers (Carrell, 1984) expository texts interact with readers' content knowledge and processing strategies differently. More specifically, for both groups of readers more highly organized types of discourse—comparison, causation and problem/solution—facilitate comprehension more than loosely organized descriptive patterns.

Awareness of the implications of such findings for teaching and learning has now become common at different levels of pedagogical practice. Indeed, most teachers are familiar with the notion of building the background knowledge of content required for understanding a forthcoming reading selection. They are aware that prior knowledge about a topic is necessary to establish and confirm expectations that guide reading. However, teachers, particularly ESL teachers, appear to be less familiar with the practice of assessing the readers' knowledge of text structures.

More recent findings, relating to the separate effects of both content and formal schemata on comprehension, suggest at least one simple but useful reminder: Although the principal variable influencing whether readers will comprehend a particular text appears to be background content knowledge, familiarity with an author's organizational pattern

also assists readers. This knowledge helps them interpret a text by enabling them to anticipate the author's purpose.

The research findings on the simultaneous effects of content and formal schemata (Carrell, 1987; McKeown et al., 1992) suggest promises for more informed instructional practice in both native English speaking classes and ESL classes. The promises and possibilities for improved instruction are always the responsibility of teachers who need to take into account the conceptual difficulty and organizational discourse patterns of texts in relation to their students' knowledge of both.

## References

- Adams, M., & Bruce B. (1982). Background knowledge and reading comprehension. In J. Langer & M. Smith-Burke (Eds.), *Reader Meets Author/Bridging the Gap* (pp. 2-25). Newark: DE, International Reading Association.
- Anderson, R. C. (1985). Role of the reader's schema in comprehension, learning and memory. In H. Singer & R. Ruddell, (Eds.), *Theoretical Models and Processes of Reading* (pp. 81-93). Newark, DE: International Reading Association.
- Bartlett, E. C. (1932). *Remembering*. Cambridge: Cambridge University.
- Beck, I. I., McKeown, M. G., Sinatra, G. M., & Loxterman, J. A. (1991). Revising social studies text for a text-processing perspective: Evidence of improved comprehensibility. *Reading Research Quarterly*, 26(3), pp. 251-276.
- Britton, B. K. (1990). *Improving learning from instructional texts by rewriting to induce linking mental operations*. Paper presented at the Meeting of the American Educational Research Association, Boston, MA.
- Carrell, P. L. (1984). The effects of rhetorical organization on ESL readers. *TESOL Quarterly*, 18(4), 441-469.
- Carrell, P. L. (1987). Content and formal schemata in ESL reading. *TESOL Quarterly*, 31(4), 461-481.
- Chafe, W. L. (1976). Givenness, contrastiveness, definiteness, subjects, topics, and point of view. In C. N. Li (Ed.), *Subject and topic* (pp. 79-93). New York: Academic Press.
- Chi, M. T. H. (1978). Knowledge structures and memory development. In R. S. Siegler (Ed.), *Children's thinking: What develops?* (pp. 73-96). Hillsdale, NJ: Erlbaum.
- Chi, M. T. H., Feltovich, P. J., & Glaser, R. (1981). Categorization and representation of physics problems by experts and novices. *Cognitive Science*, 5(2), 121-152.
- Chiesi, H. L., Spilich, G. J., & Voss, J. F. (1979). Acquisition of domain related information in relation to high and low domain knowledge. *Journal of Verbal Learning and Verbal Behavior*, 18(2), 275-290.

- Connor, U. (1984). Recall of text: Differences between first and second language readers. *TESOL Quarterly*, 18(3), 239-256.
- Head, H. (1926). *Aphasia and kindred disorders of speech*. New York: MacMillan.
- Langer, J. A. (1982). Facilitating text processing: The elaboration of prior knowledge. In J. A. Langer and M. J. Burke-Smith (Eds.), *Reader meets author/ Bridging the gap* (pp. 149-162). Newark, DE: International Reading Association.
- McKeown, M. G., Beck, I. I., Sinatra, G. M., & Loxterman, J. A. (1992). The contribution of prior knowledge and coherent text to comprehension. *Reading Research Quarterly*, 27(1), 79-93.
- Meyer, B. J. F. (1975). *The organization of prose and its effect on memory*. Amsterdam: North Holland Publishing Co.
- Meyer, B. J. F. (1979). Organizational patterns in prose and their use in reading. In M. K. Kamil, & A. J. Moe (Eds.), *Reading research: Studies and application* (pp. 109-177). Clemson, South Carolina: National Reading Conference.
- Meyer, B. J. F., Brandt, D. M., & Bluth, G. J. (1980). Use of top-level structure in text: Key for reading comprehension of ninth-grade students. *Reading Research Quarterly*, 16(1), 72-103.
- Meyer, B. J. F., & Freedle, R. O. (1984). Effects of discourse type on recall. *American Educational Research Journal*, 21(1), 121-143.
- Roller, C. M. (1990). Commentary: The interaction of knowledge and structure in the processing of expository prose. *Reading Research Quarterly*, 25(2), 79-89.
- Rumelhart, D. E. (1975). Notes on a schema for stories. In D. G. Bobrow, & A. M. Collins (Eds.), *Representation and understanding: Studies in cognitive science* (pp. 185-207). New York: Academic Press.
- Schank, R. C., & Abelson, R. P. (1975). *Scripts, plans and knowledge*. Advance Papers of the Fourth International Joint Conference on Artificial Intelligence (pp. 151-157). Tbililise Georgia: U.S.S.R.
- Steffenson, M. S., Joag-dev, C., & Anderson, R. C. (1979). A cross-cultural perspective on reading comprehension. *Reading Research Quarterly*, 15(1), 10-29.