

## THE EFFECTS OF THEMATIC ORGANIZERS ON COMPREHENSION AND TRANSFER LEARNING

MARINO C. ALVAREZ

Tennessee State University

VICTORIA J. RISKO

Peabody College of Vanderbilt University

The purpose of this paper is to discuss the results of two experiments designed to study the effect of thematic organizers on activating readers' prior knowledge to facilitate conceptual transfer across texts. The first experiment was conducted with college students enrolled in developmental reading classes and the second with sixth grade good and poor readers.

### Background

A sequence of studies have been conducted to investigate the effect of an instructional strategy (thematic organizer) on activating average and poor readers' (elementary, secondary, and college students) prior knowledge when reading text and verse (Alvarez, 1980, 1983; Alvarez & Risko, 1982, 1984; Risko & Alvarez, 1982, 1983a, 1983b).

Experiments were conducted in classrooms and remedial settings by teachers. Findings indicated a significant difference between experimental and comparison groups on literal and inferential comprehension. The ability to discuss and elaborate upon the implied, thematic concept was enhanced by the relevant framework that was presented prior to and during textual reading.

### Rationale and purpose of studies

While it is important to investigate the effect of instructional strategies on reading comprehension, it is equally important to determine whether such strategies aid students' ability to understand new examples or variations of concepts that they have previously learned when they are presented in novel passages. Few studies have investigated the effects of transfer from one discipline to another. One exception is the set of studies conducted by Royer and Cable (1975, 1976) that found that an explicit passage acts as an organizer when followed by an abstract passage. Royer and Perkins (1977) replicated these studies and found that the same results did not diminish over an extended time interval.

It seems that there are at least several requisites for transfer of learning to occur. First, students need to know that what they have learned previously can help their understanding of information presented in new contexts. Second, depending upon the nature of the task students can rely on identical information or generalized principles to help them perform with novel contexts. Third, there is a need for practice situations that illustrate the relevance among attributes of previously learned concepts and those concepts presented in new and different contexts.

Cognitive psychologists, such as Bransford (1979), recognize the role of prior knowledge in transfer learning. Studies of reading comprehension, however, have not identified how instructional strategies that enhance and activate prior knowledge can encourage students to use what they have learn-

ed to comprehend and recall new, but related information in varied texts. If knowledge acquisition depends on the interplay between present information and currently activated knowledge, then it seems necessary to investigate whether an instructional strategy, such as a thematic organizer, can facilitate this interaction.

The first experiment investigated students' ability to identify and generate novel information about concepts in varied content materials. The second experiment was conducted to determine whether students could comprehend a concept that was discussed in two different passages.

### Thematic Organizer

A thematic organizer was constructed by modifying a procedure developed by Alvarez (1980, 1983). A thematic organizer is a text adjunct designed to: (a) highlight systematically and explicitly the central theme of the text; (b) relate the theme to experiences and/or knowledge believed to be within the knowledge base already possessed by students; and (c) provide cohesion among the ideas to accommodate text structure.

### Method

**Experiment One:** Data were analyzed with a 2 x 2 ANOVA with repeated measures. Forty-eight poor readers enrolled in college developmental studies classes were selected for this experiment. Subjects had a composite score (English, mathematics, social science and natural science) ranging from 2 through 9 on the American College Test (ACT). Natural settings were used and an instructor conducted the experiment. Subjects were identified by randomization with replacement and assigned to each of four groups. Comparison and experimental groups each contained 12 subjects. After analysis for passage effect (no difference) groups were collapsed into two groups with twenty-four subjects in each group. Subjects in the experimental group received the thematic organizer. All subjects were given two passages (one science passage and one literature passage) which presented the concept "scientific method of research." Passages were counterbalanced across groups. Questions following the readings were used to assess student ability to transfer or "generalize" their understandings of concepts across content materials. Data were analyzed descriptively.

**Experiment Two:** Data were analyzed with a one way ANOVA. Sixty-four sixth grade subjects participated in this experiment. Subjects were randomly assigned by their classroom teachers to eight groups by stanine scores based upon the Reading Subtest of the Metropolitan Achievement Test, Form JS (1978). Good readers were grouped according to stanines five through nine; poor readers had stanines of two through four. Comparison and experimental groups each contained eight subjects. After analysis for passage effect (no difference) groups were collapsed into four groups (experimental good readers with thematic organizer and passages, comparison good readers without thematic organizer; experimental poor readers with thematic organizer and passages, comparison poor readers without thematic organizer). Each of the four groups contained sixteen subjects. Subjects in the experimental group received the thematic organizer. All subjects received two social studies passages, one defined the concept

"immigrants" while the other provided details about "immigrants" but did not contain an explicit definition. Passages were counterbalanced across groups. Questions following the readings were used to assess student ability to transfer or "generalize" their understanding of concepts across both passages. Data were also analyzed descriptively.

### Results

#### Experiment One:

Subjects with the thematic organizer performed significantly different from the comparison group on literal comprehension questions ( $F = 5.54$ ,  $df = 2/46$ ,  $p < .05$ ), inferential comprehension questions ( $F = 9.30$ ,  $df = 2/46$ ,  $p < .01$ ), and transfer questions ( $F = 5.61$ ,  $df = 2/46$ ,  $p < .02$ ). The means and standard deviations are reported in Table 1.

Table 1  
Means and standard deviations for responses to literal, inferential, and transfer questions

	Experimental	Comparison
Literal		
M	3.20	2.33
SD	1.32	1.40
Inferential		
M	5.29	3.20
SD	2.36	2.55
Transfer		
M	4.08	2.62
SD	2.22	2.14

The subjects in the comparison group had significantly more *incorrect response* ( $F = 23.39$ ,  $df = 2/46$ ,  $p < .001$ ) than subjects in the experimental group. The means and standard deviations for the Experimental Group were 1.20 and 1.25 respectively; and for the Comparison Group 3.75 and 2.25 respectively.

#### Experiment Two:

Both good and poor readers who received the thematic organizer treatment performed significantly different from subjects in the respective comparison groups on literal and inferential transfer comprehension questions.

**Experiment Group — Poor Readers = Literal Comprehension Questions**  $F = 6.77$ ,  $df = 1/30$ ,  $p < .025$ ;  
**Inferential Transfer Comprehensive Questions**  $F = 9.38$ ,  $df = 1/30$ ,  $p < .005$ .

**Experimental Group — Good Readers = Literal Comprehension Questions**  $F = 6.87$ ,  $df = 1/30$ ,  $p < .001$ .  
The means and standard deviations are reported in Table 2.

**Table 1**  
Means and standard deviations for responses to literal,  
inferential, and transfer questions

	Experimental		Comparison	
	Good Readers	Poor Readers	Good Readers	Poor Readers
Literal				
M	11.63	6.89	8.5	4.25
SD	1.53	2.63	4.51	2.70
Inferential Transfer				
M	11.94	7.43	9.38	3.75
SD	1.48	3.33	2.19	3.47

### Discussion

Activating and expanding knowledge of thematic concepts prior to reading (through the use of a thematic organizer) facilitated subjects' ability to generate explanations for "new" information that were plausible and meaningful. Subjects with a thematic organizer could create integrated and meaningful interpretations of concepts across contexts. The ordering of passage presentation according to structure did not affect comprehension differentially. The analysis of means of incorrect answers revealed that significantly more incorrect responses occurred when the older subjects read the passages alone (regardless of text structure) than when they received the thematic organizer and passage.

The results of these experiments provide support for the use of a thematic organizer to enhance recall and transfer of learning. Providing explicit examples of how attributes of a concept can be generalized to varied situations in a context relevant to subjects' prior knowledge aided reading comprehension. The thematic organizer may enable readers to "fill-in" the gaps left void by an ill-defined concept (experiment one) and supplement the text by organizing its structure (experiment two).

This investigation suggests that the role of prior knowledge cannot be underestimated in its effect on transfer learning. Alerting students to common elements between their prior knowledge and concepts presented in varied contexts can reduce confusion and encourage generalizability of knowledge.

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