

NOT TO LEAVE
ROESCH LIBRARY
UNIVERSITY OF DAYTON

A HANDBOOK OF SCHEMA-ACTIVATING
COGNITIVE MAPPING STRATEGIES TO FACILITATE
COMPREHENSION IN THE AREA OF LANGUAGE ARTS
IN ELEMENTARY-LEVEL STUDENTS,

MASTERS PROJECT

Submitted to the School of Education
University of Dayton, in Partial Fulfillment
of the Requirements for the Degree
Master of Science in Education

by

Kathleen Fleischman
"

The School of Education

UNIVERSITY OF DAYTON

Dayton, Ohio

July, 1991

Approved by:

ACKNOWLEDGEMENTS

It is with gratitude that I acknowledge the support and guidance of my family, Lyn, Ruth, and Paul Fleischman, my advisor, Rose Egnor-Brown, and the University of Dayton School of Education for the graduate assistantship (1988-90) which enabled me to complete a Master of Science in Teaching.

K.F.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	iii
CHAPTER	Page
I. INTRODUCTION.....	1
Statement of the Problem.....	2
Methodology.....	2
Definition of Terms.....	3
Significance of the Handbook.....	3
Limitations and Assumptions.....	4
II. REVIEW OF RELATED LITERATURE.....	5
Reading Comprehension: Constructivist/Schema-Theoretic View.....	6
Role of Inference in Schema Theory and Comprehension.....	9
Utilization of Knowledge/Schemata in Reading Comprehension: Contextual Focus.....	10
Influence of Background, Prior Knowledge on Reading Comprehension.....	11
A Prescriptive Core of Research: Linking Theory with Practice.....	16
Schema-Theoretic View of Cognitive Mapping....	18
Summary.....	20
III. A HANDBOOK OF SCHEMA-ACTIVATING COGNITIVE MAPPING STRATEGIES.....	22
Cognitive Mapping Strategies to Aid Reader in Vocabulary Development.....	25
Semantic Mapping.....	25
Overlapping Diagram (Venn Diagram).....	27
Cognitive Mapping Using a Sensory Approach.....	29
Semantic Feature Analysis.....	30
Word Map.....	32
"Middle Riddle".....	33
Cognitive Mapping Strategies to Aid Reader in Critical Passage Analysis.....	34
Cognitive Mapping: Sequence.....	34
Cognitive Mapping: Comparison/Contrast.....	35
Cognitive Mapping: Main Idea and Supporting Details in Arch Diagram.....	37
Cognitive Mapping: Herringbone Technique.....	39
Cognitive Mapping: Cause/Effect Organizer.....	40
Cognitive Mapping: Graphic Organizer to Depict Character Analysis.....	42

IV. CONCLUSIONS AND RECOMMENDATIONS.....	44
Restatement of the Problem.....	44
Conclusions.....	44
Recommendations.....	45
References.....	46

CHAPTER 1

INTRODUCTION

Introduction

In Becoming a nation of readers: The report of the commission on reading the following prescriptive advice was made: "From the very beginning children should be given all of the elements necessary for constructing meaning. This is important because reading at this early level is a new enterprise, and children must be made aware that reading is always directed toward meaning" (Anderson, Hiebert, Scott, & Wilkinson, 1985, p.44). The teacher plays an indispensable role in facilitating effective reading comprehension in all readers. This notion is commensurate with additional advice made in the Report of the Commission on Reading that "teachers must instruct students in strategies for extracting and organizing critical information from text" (Anderson, Hiebert, Scott, & Wilkinson, 1985, p.71).

The national focus on the value of effective teaching strategies underscores what educators in general are cognizant of -- strategies utilized to aid students in comprehending for meaning must tap background knowledge of the learner to link with new, incoming knowledge. Cognitive mapping has widespread appeal because of this very feature, in addition to the fact that students actively participate in the strategy to positively affect successful knowledge acquisition.

Increased understanding of the utility and purpose of cognitive mapping for practitioners in the field will yield advantages for students in the classroom. Classrooms are composed of students with diverse backgrounds who bring to the teaching enterprise varying needs, as well as myriad talents, learning styles, and skills. Implementation of cognitive mapping as a reading comprehension instruction strategy will have literacy implications for all students in the classroom.

Statement of the Problem

The purpose of this handbook is twofold:

- a) to focus on schema theory and investigate the link between schemata and comprehension, and
- b) to present schema-activated cognitive mapping strategies which may be used by teachers to facilitate reading comprehension in elementary-level students in the area of language arts.

Methodology

The methodology used in the generation of this handbook focused on an investigation of strategies supported by current research. The selection of strategies culled from the literature may be used in a supplementary fashion by teachers of the language arts to effectively enhance reading comprehension in elementary-level students.

Definition of Terms

Schema theory centers on the notion that schemata may be conceptualized as constructs or frameworks of thought which may be formed into networks of meaning by the reader by making connections between prior, background knowledge and new knowledge. Comprehension is facilitated by activating schemata networks to process information.

In a review of current literature, the term "cognitive mapping" is commonly used interchangeably with various terminologies in the lexicon of reading comprehension instruction. These include: clusters, networking, schema mapping, visual mapping, graphic organizers, episodic organizers, and word webbing. A more specific analysis of these terminologies may render nuances of dissimilarity, particularly in function (for example, discerning cause/effect as opposed to discerning story sequence) and application (for example, applicability to various content areas). For the purpose of this handbook, where possible, the term "cognitive mapping" will be an encompassing generic terminology which labels that instructional strategy which provides graphic information for vocabulary development or specific and critical passage analysis to affect both literal and inferential comprehension.

Significance of the Handbook to Education

It is hoped that this handbook will contribute to the knowledge base of teachers concerning the link between comprehension and schema theory as well as provide specific ways

to implement instruction based upon the constructivist/
schema-theoretic perspective.

Limitations and Assumptions

A basic assumption in developing this handbook was that the literature upon which it is based was valid and reported accurately. Therefore, this handbook might be limited if deficient and inaccurate research was incorporated as supporting evidence for recommended use of cognitive mapping as an effective strategy to facilitate comprehension in students.

CHAPTER II

REVIEW OF RELATED LITERATURE

Reading instruction, an integral component of all curricular language arts programs, is deemed effective if it facilitates successful reading comprehension by students. Reading comprehension is the goal of the reading process, for it indicates that the reader has derived meaning from reading textual passages. Reading strategies (selecting, predicting, confirming, correcting, comprehending) play a significant role as the reader processes text.

Reading is governed by a process whereby meaning is ascribed to or derived from a configuration of symbols. The significance of reading instruction depends in part on appropriate selection of text by virtue of its interactional impact on the reader, i.e., activating background knowledge of reader to establish links/connections with incoming knowledge. Equally important is the employment of effective teaching strategies to assist the reader in comprehending and learning. Although there are myriad factors which influence and shape the reading process, the immediate thrust of any reading activity should be to effectively aid the reader in linking new/old schemata to enhance comprehension.

Reading Comprehension: Constructivist/Schema-Theoretic View

Within the constructivist/schema-theoretic perspective, specific emphasis is placed on the interaction between the reader and the text. Language structure/syntax present interpretive meaning to the reader, who relies on syntactic cues to derive meaning (comprehension). As such, a model of comprehension employed by students may be characterized as active-constructive (Pearson, 1985).

Tierney (1990) noted that

In the 1970's, a kind of zeitgeist, or cognitive revolution, occurred, which brought to prominence what has been termed a constructivist or schema-theoretic view of reading comprehension. At that time, researchers and theorists gravitated to the view that readers' use of their background knowledge to "construct" meanings is the fuel by which they navigate their way through texts, using a repertoire of behaviors to create, refine, and rethink meanings.

(Tierney, 1990, p. 37)

Essentially, for a reader to be effective in terms of reading comprehension, the overt or covert manipulation of existing schema plays a pivotal role in the reading process. Au and Mason (1990) extrapolated on the reading process as an active and constructive process which by necessity includes various

layers and kinds of strategies by which the reader is successful in comprehending. Au and Mason (1990) graphed the reading process from a schema-theoretic slant as follows:

Aspects of the Reading Process

An active search for meaning	----	The reader uses reasoning.
A constructive process	----	The reader integrates information.
An application of different kinds of knowledge	----	The reader applies knowledge.
A strategic process	----	The reader adjusts to meet different purposes.

(Au & Mason, 1990, p. 8)

McNeil (1987) expanded on a constructivist or schema-theoretic perspective by explaining that schemata are essentially frameworks with which a reader makes connections between prior, background knowledge and new knowledge. It involves assimilation between schemata constructs previously found and those schemata being perceived by the individual. McNeil conceptualized schema theory as a creation of psychological meaning influenced by reader background knowledge and the interpretation of text. Knowledge structure, schemata, frames, or scripts indicate reference to prior knowledge. The ultimate purpose of connecting schemata is to derive meaning. Comprehension is facilitated by activating schemata networks to process

information.

A key element in schema theory is that it is characterized as concept-driven and data-driven. McNeil (1987) described the concept-driven process as one determined by reader's expectations and goals, thereby yielding a top-down strategy. Essentially, the reader's schemata determines the selection and exploration of textual significance and meaning. Conversely, the data-driven process is determined by the individual reading text and then exploring schemata to bond with the incoming information, thereby yielding a bottom-up strategy. Initial reader expectations are substituted with new expectations prompted by attending to the text.

McNeil (1987) posited that in the processing of new schemata, the depth of the processing closely parallels the depth of understanding by the reader. He identified two specific strategies which aid in deeper processing by the reader: 1) elaboration of text and 2) understanding of textual framework (e.g. organizational focus of text specific to expository and narrative prose).

Elsewhere, McNeil (1987) identified purpose and perspective in reading context as being primary influences on reader recall. He stressed the dynamic interaction between the personal experience of the reader and the use of the text as a springboard to generate meaning.

McNeil cited several functions of schemata, among which are merging new and old information, discerning comprehension strategy, making inferences, forming summaries (pertinent

information only), and enabling memorization to occur in terms of recalling interpretation. As such, schemata may be conceptualized as constructs which may be formed into networks of meaning for the reader.

Role of Inference in Schema Theory and Comprehension

In the Handbook of reading research (1984), Anderson and Pearson explained that vital to reading comprehension and schema theory is the role of inferences made by the reader. They differentiated between the following four kinds of inferences and discussed their corresponding functions:

- a) Inferences are made in the selection of schema which the reader discerns in order to understand text.
- b) Inferences are made when the reader is engaged in the process of "instantiation," that is, when schema "slots" are filled by schema chosen by the reader.
- c) Readers make inferences based upon "default values" which signal the most plausible explanation conducive for comprehension. Filling slots by default is a common and customary event in the continuous process of comprehension.
- d) Inferences are based on what the reader does not know; the reader deducts a conclusion based on lack of schema available.

Utilization of Knowledge/Schemata in Reading Comprehension:

Contextual Focus

Despite the ubiquitous focus accorded to reading comprehension and inclusive information-processing factors, research has been necessary to aid in extracting significant data regarding how good/poor comprehenders utilize knowledge/schemata in learning from a contextual framework.

A study implemented by Barnes, Ginther, and Cochran (1989) focused on how readers (with high/low skills) used knowledge, schemata, and purpose in learning vocabulary. Four basic hypotheses were made by the researchers. First, poor readers would not perform as well as good readers in understanding new words in reading context. Second, select subjects exposed and taught schemata relevant to reading tasks would perform better in learning new words than select subjects who were not exposed to said schemata. Third, select subjects who had an identified "purpose" for reading would perform better than those who did not. Fourth, select subjects who a) were good comprehenders, b) exposed to relevant schemata, and c) had an identified reading purpose would perform better than those who did not have this combination.

The subjects were eighth grade social studies students in a lower to upper-middle class community in eastern Texas. A cloze comprehension test determined differentiation between good and poor readers. Sixty percent and above correct on the cloze test denoted a good comprehender; while forty percent and below correct denoted a poor comprehender. The subjects of the study included forty-six good comprehenders and thirty-seven poor comprehenders;

further gender description included forty-two girls/forty-one boys. The experimental research involved use of: a cloze reading comprehension test, two concept mastery tests, two versions of the learning-from-context passage, and a word definition test. Of the two schema mastery tests given in multiple choice format, one test was administered to a taught group and the second test was given to the non-taught group. The tests determined concept mastery by subjects, each of whom had to score eighty percent on the test before being further involved in study. The model included eight schemata and eight representative nonsense words. A written learning-from-context test was administered which used nonsense words; subjects had to define words recalled from prior reading.

Several conclusions were made based on the findings of this study. Good comprehenders supplied better definitions of nonsense words based on implications in text better than poor comprehenders. Those subjects who had been taught relevant schema did not do significantly better. The device of identifying purpose was statistically significant; subjects with purpose made better inferences from text than did those without a purpose. In general, good readers performed better than poor readers in understanding new words from text. With the different variables present in the various sub-groups, the study concluded that the elements of purpose and schemata were employed differently by good and poor readers (Barnes, Ginther, & Cochran, 1989).

Influence of Background, Prior Knowledge on Reading Comprehension

The reading process, multi-dimensional in nature, reveals a

multiplicity of factors which affect reading comprehension. Focusing a study on the interplay between background knowledge and comprehension, Mudd (1987) hypothesized that adult participants' background, general and linguistic knowledge, and fixedness of ideas would possibly distort comprehension of an author's message. Mudd also hypothesized that less-able child readers may tap prior knowledge to aid in understanding difficult passages.

The study sample was comprised of one hundred and sixty-eight novice readers (ninety-six children; seventy-two adults). Two passages were orally read by subjects: the first passage being a narrative with adult appeal and the second passage being a narrative with child appeal. Following a reading of the passage, study participants answered five comprehension questions.

Results showed that novice readers, both children and adult, exploit background knowledge more so than textual linguistic knowledge when answering questions based on specified text and that this occurrence is more probable if background knowledge relates to textual information.

Mudd also noted that subjects' inferences may be based on background schemata if textual information is inconsistent with background knowledge; thus, readers may not have accommodated incoming information. Mudd further asserted that incorrect responses may be due to the reader misreading the text. Finally, Mudd suggested that relative merit may be acquired by teachers through analysis of incorrect responses made by students so that intervention of effective teaching strategies may be implemented.

Current literature undergirds the hypothesis that capitalizing on student prior knowledge and individual schema networks by establishing links with new knowledge is an effective instructional strategy. This hypothesis was acknowledged by Eeds and Cockrum (1985) in their two-week study of three fifth grade teachers and their respective classes located in a suburban school in the southwestern United States. Specifically, these researchers hypothesized that linking student's prior knowledge with new knowledge would be more efficacious and more lasting than conventional methods.

On random assignment, students were designated to one of three treatment groups; each treatment group taught by one teacher with the three teachers rotated on a daily basis. Two-week teaching units were extracted from a novel. Using eighty-five words from this book, eighty-eight students were pretested. Based upon test results, students were further divided into two groups (high versus low achievers as related to word meaning). From these divisions, students were randomly assigned to one of three groups: a) Teacher Interaction Group (in which teachers used instructional strategies linking new knowledge to prior knowledge), b) Dictionary Group (in which students located and copied word definitions from dictionary), and c) Control Group (in which teachers supervised students who attempted to discern word meaning from context).

Upon completion of the two-week unit (in which a total of forty words were introduced), the three groups took a posttest in multiple choice format. Results indicated that between the

Dictionary and Control Groups there was no statistically significant difference, yet there were significant differences between the Teacher Interaction Group and these two groups.

In general, the Teacher Interaction Group proved to be most effective in that the link-up between new and prior knowledge improved performance. Those students designated as low ability in the Teacher Interaction group still performed better than high and/or low ability students in both Dictionary and Control Groups. The authors also noted that students who read the novel and actively responded through discussion, writing, drama or art seemed to recall almost as many words as those students who used the dictionary to look them up "and they certainly had more fun" (Eeds & Cockrum, 1985, p. 497). Authors of this study concluded that innovative teaching methods which utilize schema theory need to be implemented for more effective training in vocabulary.

Such a report is corroborated by findings discussed by McNeil (1987) regarding a study conducted by Gipe in which tapping student experiences facilitated successful acquisition of vocabulary. Elsewhere, Duffelmeyer (1985) posited the notion that drawing on student experience enables the student to link and relate experience with word meaning.

Although students may display with sufficient success the ability to decode textual passages, this does not necessarily indicate in-depth comprehension. Graves, Cooke, and Laberge (1983) sought to prove the existing problem of reader comprehension specific to narrative passages (as opposed to expository prose). They hypothesized that previewing short stories with junior high

students will positively affect reading comprehension.

They designed and implemented an empirical study that was comprised of two experimental phases. In the first experiment, the subjects were thirty-two eighth grade students categorized as the poorest readers in an inner city junior high school. In the second experiment, the subjects were forty seventh grade students categorized as the poorest readers in an inner city junior high school.

In the first experiment, the thirty-two students read a total of four short stories and completed a multiple choice test per story. The study spanned two weeks, requiring four class periods, one per story. Students were previewed on two of these four stories. The results from the first experiment showed that positive effects of previewing can be found using factual and inferential questions.

In the second experiment, the forty students read two short stories, took an attitude survey, gave oral re-tellings of story or answered comprehension questions, and finally, answered orally to several attitude questions. The following results were indicated from experiment two: 1) students recalled approximately twice as much when provided with a preview, 2) students scored higher on short-answer questions when provided with a preview, 3) on the attitude survey, there were more positive than negative responses to stories in general, and 4) overall, students preferred assistance (e.g. provision of preview prior to reading) to aid in reading comprehension process.

As a result of this experimental study, it was concluded

that previewing of short stories positively affects reading comprehension in junior-high students, yet further exploration of what factors successfully shape an effective preview are needed, and in what setting and under what circumstances are they productive.

A Prescriptive Core of Research: Linking Theory with Practice

A prescriptive core of research enables theory to be linked with practice. This body of research indicates that meaningful interaction between reader and text is increased when the child's background experience is activated. Providing reading experiences which foster the connection between past/new experiences and past/new schemata facilitates comprehension in readers.

Various instructional strategies have been recognized as beneficial to reading comprehension. Schema-theoretic notions are central to most theories which support these instructional strategies. McNeil (1987) noted that "a main distinction of effective teachers of comprehension is the ability to link word meaning to prior knowledge" (McNeil, 1987, p. 16). Exploring schema theory, McNeil supplied the following noteworthy collection of instructional strategies conducive for reading comprehension:

- a) DRTA (Group-Directed Reading-Thinking Activity):
Students are encouraged to reflect and support perspectives before, during, and after the reading task.
- b) ReQuest: In a "reciprocal questioning procedure," the teacher and student alternate in a question/answer

role to explore the reading task.

- c) Pupil-Initiated Questions: Such questions are considered more purposeful for readers than questions solely initiated by the teacher.
- d) ETR (Experience-Text-Relationship): This method developed by Au (1990) is comprised of an experience sequence to prompt background of student, a text sequence to ascertain student's understanding of text, and a relationship sequence to assist student in contrasting and comparing text with personal experience.
- e) Mind's Eye: A focus of student images is used to facilitate improved reading performance. The three-fold procedure is one which links key words, discussion of images, and oral reading.
- f) Semantic Mapping: Concepts are graphically displayed about a topic going from general to specific with established terms. The procedure can be used for setting purposes for reading, working with organizational patterns of text, assessing prior knowledge, and building bridges between new and known information.

Pearson and Gallagher (1979) identify the following four key elements of strategy implementation which significantly affect success of outcomes:

- 1) teacher modeling of a specific strategy,
- 2) teacher assistance provided during student practice,

- 3) inclusion of independent practice time for students, and
- 4) constant feedback provided to students as needed in prior three steps.

Pearson (1985) conceptualized the process of training students on tasks as a relationship between teacher and student which varies in degree of task responsibility. After completing instruction of task strategy, the responsibility of teacher over task execution diminishes. The student in turn increases in the responsibility of task strategy and execution. To sum, the effectiveness of strategy implementation is provisional. Students cannot be merely exposed to a strategy such as cognitive mapping. They must receive ample instruction and modeling, as well as guidance and practice for effective implementation.

The remainder of this handbook will focus on one strategy, namely cognitive mapping, describing research and theory undergirding the strategy and following with specific practices that can be implemented with students.

Schema-theoretic View of Cognitive Mapping

Semantic mapping is an instructional activity which is firmly grounded in a schema-theoretic perspective of the reading process. McNeil (1987) noted that semantic mapping activities may be utilized "to both assess prior knowledge and to link the knowledge to terms that are crucial to understanding what is to be read. The linking of text and learner entails recognizing key words in the text that are unfamiliar to the learner and finding

experiences in the learner's background involving the concepts that underlie the new terms" (McNeil, 1987, p. 16).

Schema activation may be bracketed as an efficacious teaching strategy which prompts connections between prior and incoming knowledge. Several authors (Robinson, Faraone, Hittleman, & Unruh, 1990) have noted that the technique of mapping appears to work best with poor readers, difficult materials, or poorly organized material.

Mapping may be used as a teaching strategy which assists the student in creating meaning through understanding the inter-related properties pertaining to a concept under study. Tierney, Readence, and Dishner (1985) have suggested that "the mapping technique incorporates the visual-spatial conventions for diagramming ideas and the nature of relationships between ideas: concept and example, concept and properties, concept and definition, temporal succession, cause and effect, conditional and comparison" (Tierney, Readence, & Dishner, 1985, p. 137).

Nagy (1988) elaborated on mapping as an instructional strategy to assist in vocabulary acquisition and development, asserting that mapping taps existing background knowledge and provides a structural framework to which new knowledge can be linked. Often students do not spontaneously use their background knowledge when learning new information or when reading. Vocabulary mapping helps to activate appropriate background knowledge, enabling students to think about their own life experiences that relate to a particular topic.

Mapping can be characterized as a graphic representation of

a word, a concept, or a textual passage. Central to the mapping strategy is that it can be used as an organizational approach to learning and/or comprehending. According to Pehrsson and Denner (1989), recalling information and using it appropriately in new situations is an important indicator that learning has occurred. Memory retrieval is greatly enhanced if the information to be retrieved is appropriately organized during the learning process. Similarly, the semantic map is a strategy that is beneficial for teaching organizational strategies. Engaging in semantic mapping can aid students in categorizing information to be linked with their existing schemata and in retrieving information to be understood in an organized fashion.

Mapping, by necessity, prompts the student to interact in the learning process, thereby eliminating any static approach to comprehending. On the contrary, mapping prompts the learner to be active in the thought-getting process. The cognitive mapping process forces readers to become active by causing the brain to retrieve information known about a word, a concept, or a topic, and to utilize this knowledge in reading. The activation of prior knowledge is essential to reading comprehension (Heimlich & Pittelman, 1986).

Summary

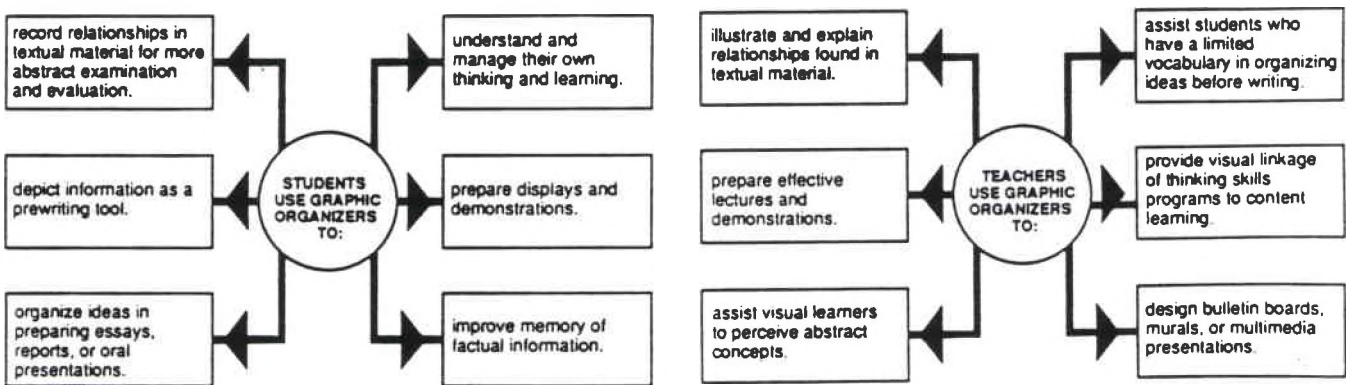
To summarize, the literature is extensive in support of those strategies that actively engage students in the comprehension process. Such strategies need to be incorporated by teachers and educators into their instructional reading programs.

Providing an example of this type of strategy integration would facilitate this work. Toward that end, one such strategy, cognitive mapping, has been chosen for elaboration and practical application. These descriptions have been compiled into a handbook format and are presented in Chapter III.

CHAPTER III

A HANDBOOK OF SCHEMA-ACTIVATING COGNITIVE MAPPING STRATEGIES

This handbook presents various instructional applications of cognitive mapping in the area of reading-language arts. The use of graphic organizers or a cognitive mapping strategy has been discussed within the context of student-specific and teacher-specific goals. These goals are depicted in the following figure as devised by Black and Black (1990) to convey the broad spectrum of benefits to be gleaned from employing mapping strategies:



(Black & Black, 1990, p. 2)

Cognitive mapping has proved to be very flexible in terms of implementing various instructional purposes as well as extremely effective in producing strong improvement in the reading

comprehension and writing performance of students.

The effectiveness of any teaching strategy, cognitive mapping or otherwise, is made possible only through careful implementation under direct guidance and instruction of the teacher. The systematic teaching of cognitive mapping directly affects the positive impact of implementation. Of primary importance is effective modeling of each of the following strategies by the teacher.

Equally important is the factor of learner needs. The success of any teaching strategy is contingent upon adaptations made to meet the needs of the learner. Since every student processes incoming information differently, adequate assessment of the learners taking part must be made. Specific attention must be addressed to assess the perceptual learning styles of the students (e.g. visual, auditory, kinesthetic) as well as the overall learning styles of the students (e.g. dependent, independent, collaborative, sequential, global). Awareness of the unique individuality of all learners will affect cognitive mapping strategy implementation.

Cognitive mapping is one basic theme among many variations. The mapping technique is malleable in that it can be fashioned to adapt to many kinds of literature genres and themes. Teachers may expand instructional materials to include transparencies of maps as well as individual, laminated maps for each student. Finally, the mapping technique is useful for before, during, and after language arts activities and is ideal as a pre-writing tool. The repertoire of cognitive maps provided in this handbook are basic

templates which may be adapted to a variety of instructional tasks.

Cognitive Mapping Strategies to Aid Readers
in Vocabulary Development

Semantic Mapping

General Description:

Semantic Mapping may be used in a vocabulary development activity in which the students and teacher select a word or topic and map student associations relative to the word category.

Cognitive Skill:

The students tap background knowledge to enhance understanding of vocabulary and identify relationship of vocabulary word to existing vocabulary.

Procedure:

- 1) A vocabulary word or topic is selected and listed on a large pad of paper, transparency, or chalkboard.
- 2) Based on cooperative student group input, words, attributes, and features which can be associated with the vocabulary word are listed.
- 3) The words are classified into specified areas on map, based on student input.
- 4) The semantic map is discussed in terms of word relationships and meanings.

(Heimlich & Pittelman, 1986, p. 7)

Application:



Note: Words with an asterisk are vocabulary words introduced by the teacher.

(Heimlich & Pittleman, 1986, p. 7)

Overlapping Diagram (Venn Diagram)

General Description:

The Overlapping Diagram or Venn Diagram is comprised of two or three circles which intersect to indicate an area of common ground or similarity between two or three words or topics.

Cognitive Skill:

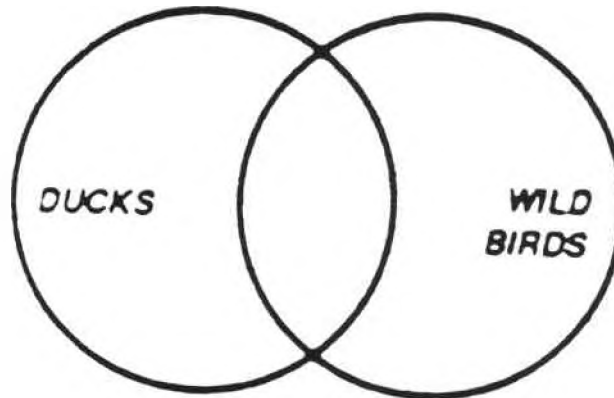
Students compare and contrast words and concepts to fully understand the specific definition of each word in addition to understanding similarities and dissimilarities of each.

Procedure:

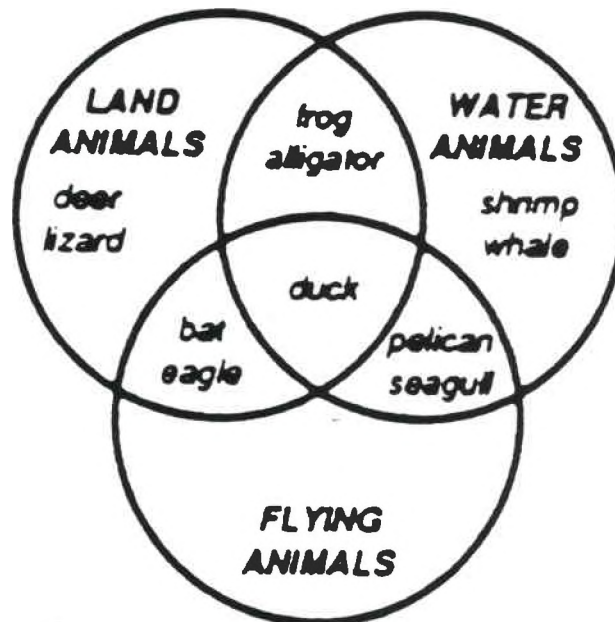
- 1) Two or three circles are drawn corresponding to the number of words being examined.
- 2) A word is listed in each circle.
- 3) Based on cooperative group dynamics, the class generates and brainstorms characteristics pertinent to each word and lists characteristics in appropriate circle. If the identified characteristics accurately pertain to the other vocabulary words, the class lists them in the intersecting area common to the group of circles.

Application:

Overlapping Diagram



Three-set Overlapping Diagram



(Black & Black, 1990, pps. 40-41)

Cognitive Mapping Using a Sensory Approach

General Description:

In using a sensory approach to develop vocabulary, a cognitive map revolves around a vocabulary word. Surrounding areas are divided into five categories, each depicting a sense (sight, hearing, touch, smell, taste).

Cognitive Skill:

Students tap their perceptual and experiential knowledge base by associating prior background knowledge associated with a vocabulary word in order to refine an understanding of the word meaning.

Procedure:

- 1) A word is listed in the center of the map.
- 2) Five areas surrounding the central word are labeled with the following descriptors:
taste, smell, hear, touch, and see.
- 3) Students collaborate on their various perceptual associations which can be related to the vocabulary word.

Application:

taste

smell

Vocabulary Word

hear

touch

see

Semantic Feature Analysis

General Description:

Students use a chart to differentiate between similarities and differences in word meanings as related to a concept or category.

Cognitive Skill:

Students refine and clarify word meanings through establishing analogous relationships between words as well as distinguishing exclusive characteristics by applying comparison and/or contrast thinking skills.

Procedure:

- 1) A concept or category is chosen.
- 2) In a column beneath the concept or category, students list words associated with the concept.
- 3) In a row, features/attributes common to some or all of the words are listed.
- 4) Students assess the features or attributes to determine which are applicable to specific words relating to the concept.
- 5) Students may generate and append additional words and features to the grid.

(McNeil, 1987, p. 115)

Kinds of Shelter	Description of Shelters										Cost of Shelters			Things you find in Shelters						
	Large	Small	Exquisite	Lovely	Rustic	Simple	Spooky	Dilapidated	Open			Cheap	Expensive	Reasonable			Freezer	Bed	Wine cellar	Tools
Cabin			-	+			-													
Villa	+	-	+	+	-	-	-	-				-	+	-			+	+	+	?
Palace			+		-			-												
Shed			-	+			-													
Hovel	-	+	-	-	+	+	-	-	+			+	-	?			-	-	-	+
Barn			-	+			-													
Tent			-	+			-													
An old abandoned house			-	-			+													

Source: Dale D. Johnson, Susan Toms-Bronowski, and Susan D. Pittleman, *An Investigation of the Trends in Vocabulary Research and the Effects of Prior Knowledge on Instructional Strategies for Vocabulary Acquisition* (Madison: Wisconsin Center for Educational Research, University of Wisconsin, November 1981), p. 40.

(cited in McNeil, 1987, p. 115)

Word Map

General Description:

Students create a word map based on inquiry into the properties of a vocabulary word and examine examples of the word.

Cognitive Skill:

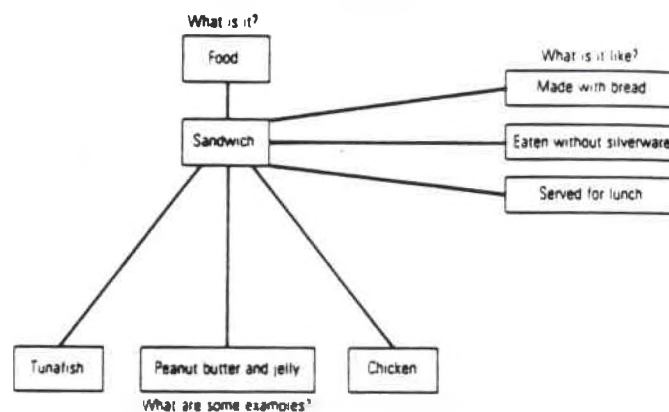
Students apply organizational skills in charting information to establish specific criteria which represent word meaning.

Procedure:

- 1) Students identify what the word is in terms of class, category, or group designation.
- 2) Students establish properties inherent to the identified word.
- 3) Students generate examples of the word or concept.

Application:

Completed Word Map for *Sandwich*



(Au & Mason, 1990, p. 194)

"Middle Riddle"

General Description:

A "Middle Riddle" is a semantic mapping technique which leaves the central circle of a map vacant of the main vocabulary word. However, pertinent information characteristic of the missing vocabulary word is mapped out around the empty word.

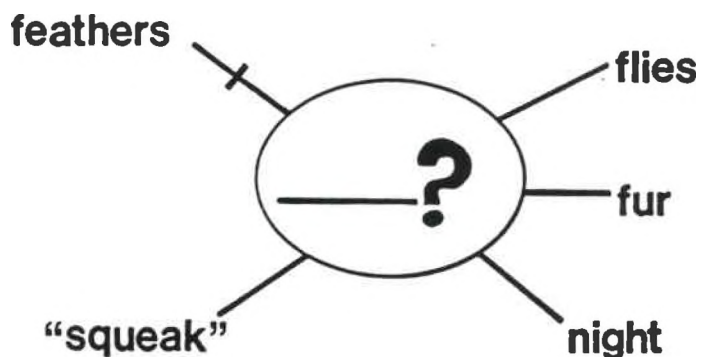
Cognitive Skill:

Students must ascertain correct vocabulary word through making inferences and predictions, recalling details, and determining word meaning based upon the mapped profile of information.

Procedure:

- 1) Students identify and discuss information present in semantic map.
- 2) Based on conjectures, students must correctly fill in empty word circle with correct vocabulary word.

Application:



(Denner & Pehrsson, 1989, p. 97)

Cognitive Mapping Strategies to Aid
Reader in Critical Passage Analysis

Cognitive Mapping: Sequence

General Description:

Students graph chronological order of a passage or story by delineating sequence episodes on a cognitive map.

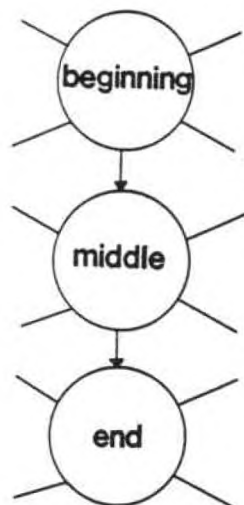
Cognitive Skill:

Students apply thinking skills to determine sequence or chronological order of passage to enhance comprehension.

Procedure:

- 1) After reading story, students graph each episode of story in sequential order (one episode per circled slot in graph).
- 2) Completed map is discussed with class.

Application:



(Denner & Pehrsson, 1989, p. 75)

Cognitive Mapping: Comparison/Contrast

General Description:

Students graph specific evidence of comparison or contrast as it relates to a passage or concept.

Cognitive Skill:

Students use critical thinking skills to compare or contrast two concepts, therefore refining and clarifying conceptual meaning to increase comprehension.

(Black & Black, 1990, p. 11)

Procedure:





- 1) Using a flow chart format, two different concepts are listed in boxes on the first line.
- 2) All of the boxes in the flow chart are connected with arrows pointing downward.
- 3) The box in the second line is labeled with the term "How alike?"
- 4) A box is made in the third line which includes space for four lines of writing.
- 5) In the following line, a box is labeled with the phrase "How different?"
- 6) Two separate long boxes, each containing ten lined spaces for writing, flow from the last box. The two boxes are connected to the previous with arrows, and labeled "with regard to."

- 7) Students complete and discuss the map through a comparison and contrast of the two concepts.

(Black & Black, 1990, p. 11)

Application:

COMPARE AND CONTRAST DIAGRAM

CONCEPT 1 _____	CONCEPT 2 _____
<div style="display: flex; justify-content: center; align-items: center; gap: 20px;"> <div style="text-align: center;">  </div> <div style="border: 1px solid black; padding: 5px; text-align: center;">HOW ALIKE?</div> <div style="text-align: center;">  </div> </div>	
<div style="border: 1px solid black; padding: 10px; min-height: 100px;"> <hr/><hr/><hr/><hr/><hr/><hr/><hr/><hr/> </div>	
<div style="display: flex; justify-content: center; align-items: center; gap: 20px;"> <div style="text-align: center;">  </div> <div style="border: 1px solid black; padding: 5px; text-align: center;">HOW DIFFERENT?</div> <div style="text-align: center;">  </div> </div>	
WITH REGARD TO	
<div style="border: 1px solid black; padding: 5px; min-height: 150px;"> <hr/><hr/><hr/><hr/><hr/><hr/><hr/><hr/><hr/><hr/> </div>	<div style="border: 1px solid black; padding: 5px; min-height: 150px;"> <hr/><hr/><hr/><hr/><hr/><hr/><hr/><hr/><hr/><hr/> </div>

(Black & Black, 1990, p. 11)

Cognitive Mapping: Main Idea and Supporting Details in an Arch Diagram

General Description:

Students extract evidence from textual passage which may be used in support of the main idea. Students discern interconnections between details as they relate to a main concept.

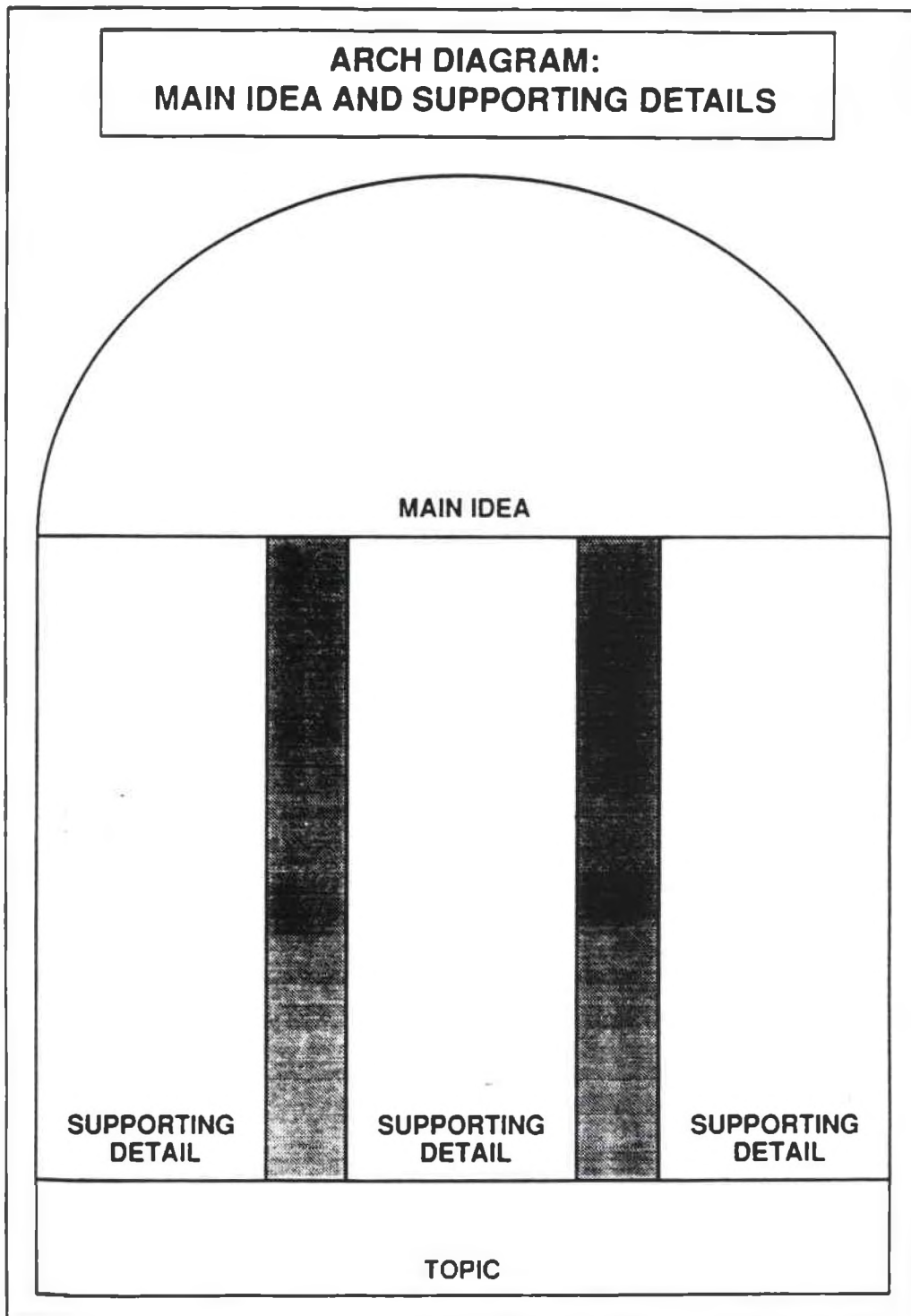
Cognitive Skill:

Students employ critical thinking skills to distill the main idea and the supporting details pertinent to a textual passage.

Procedure:

- 1) A square is divided into three sections vertically and each section is labeled "supporting detail."
- 2) A semi-circle is drawn over the squares to depict an arch and is labeled "main idea."
- 3) The square is extended at the bottom of the graph to include a rectangle and is labeled "topic."
- 4) The students complete the Arch Diagram.

Application:



(Black & Black, 1990, p. 33)

Cognitive Mapping: Herringbone Technique

General Description:

Students outline specific story elements (Who, What, When, Where, How, Why) and determine main idea by filling in a mapped herringbone outline.

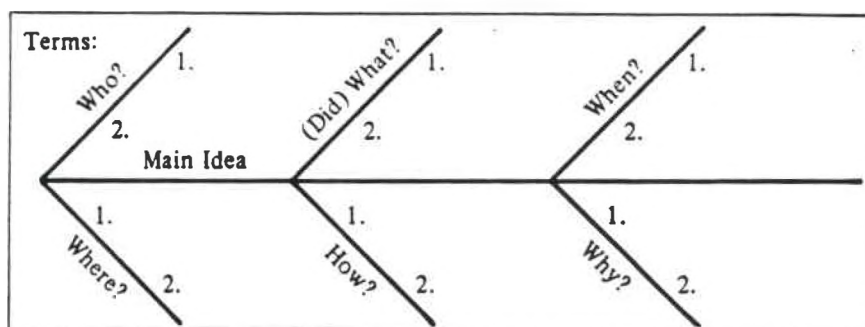
Cognitive Skill:

Students develop an awareness of story structure and the ability to organize pertinent information and to eliminate extraneous details (Tierney, Readence, & Dishner, 1985).

Procedure:

- 1) A herringbone design is graphed and labeled with the following descriptors: Who, What, When, Where, How, and Why.
- 2) The students fill in the map with the requisite information and discuss.

Application:



(Dishner, Readence, & Tierney, 1985, p. 205)

Cognitive Mapping: Cause/Effect Organizer

General Description:

Students fill in a cluster of circles structured and labeled to depict event, cause, and effect.

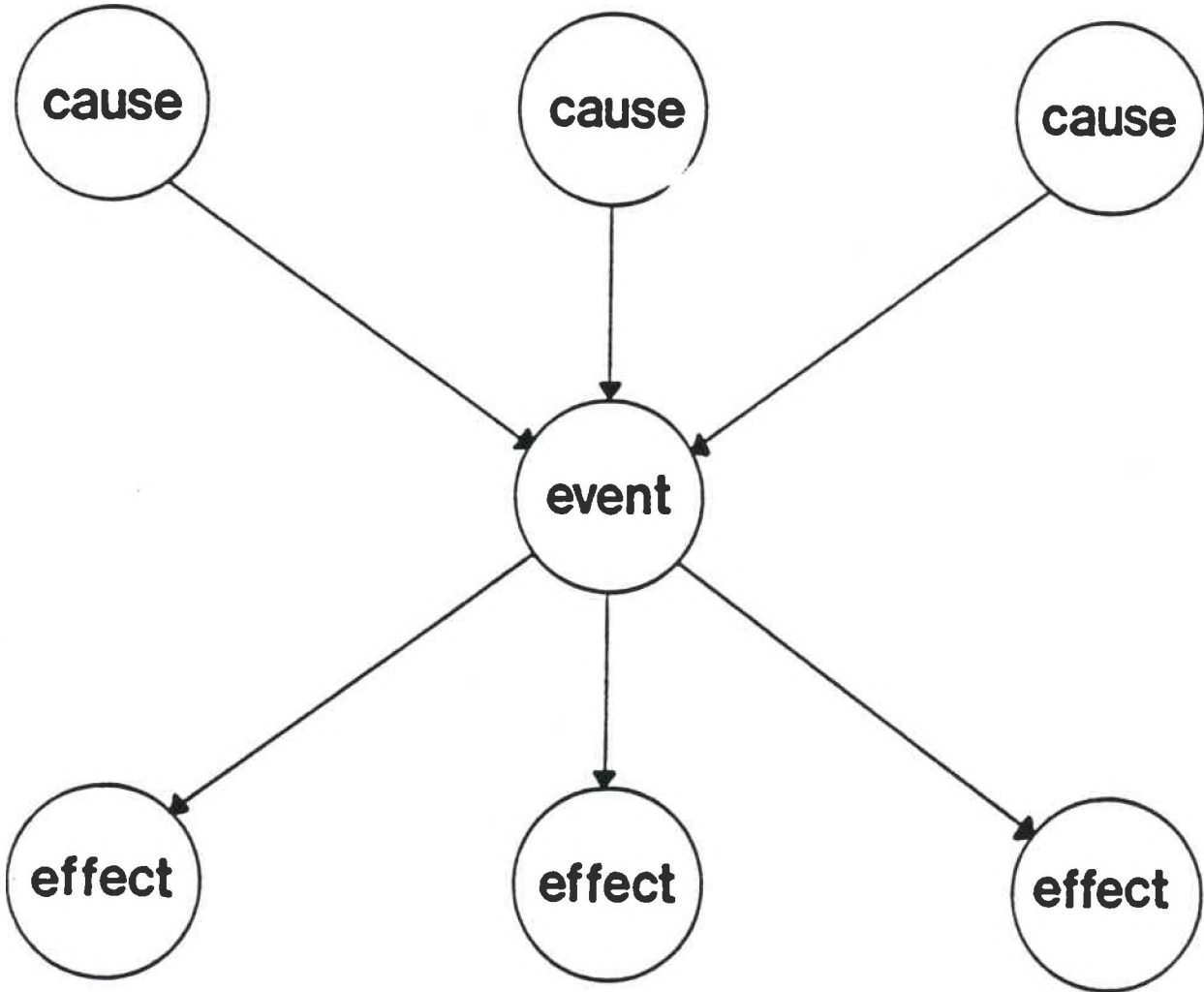
Cognitive Skill:

Students determine contributing factors of an event in relation to corresponding effects. Students discuss critical information specific to cause/effect circumstances to increase an understanding of passage analysis.

Procedure:

- 1) Seven circles are graphed in the following order:
 - a) Three separate circles are labeled "cause," each with an arrow pointing to the second row.
 - b) In the second row, one circle is labeled "event" with an arrow pointing to the third row.
 - c) In the third row, three circles are labeled "effect."
- 2) Students read a textual passage and complete cause/effect organizer with pertinent and accurate information.
- 3) Students discuss organizers.

Application:



(Denner & Pehrsson, 1989, p. 76)

Cognitive Mapping: Graphic Organizer to Depict Character Analysis

General Description:

Students fill in a graphic organizer which depicts a character by identifying corresponding character traits and characteristics, and providing examples.

Cognitive Skill:

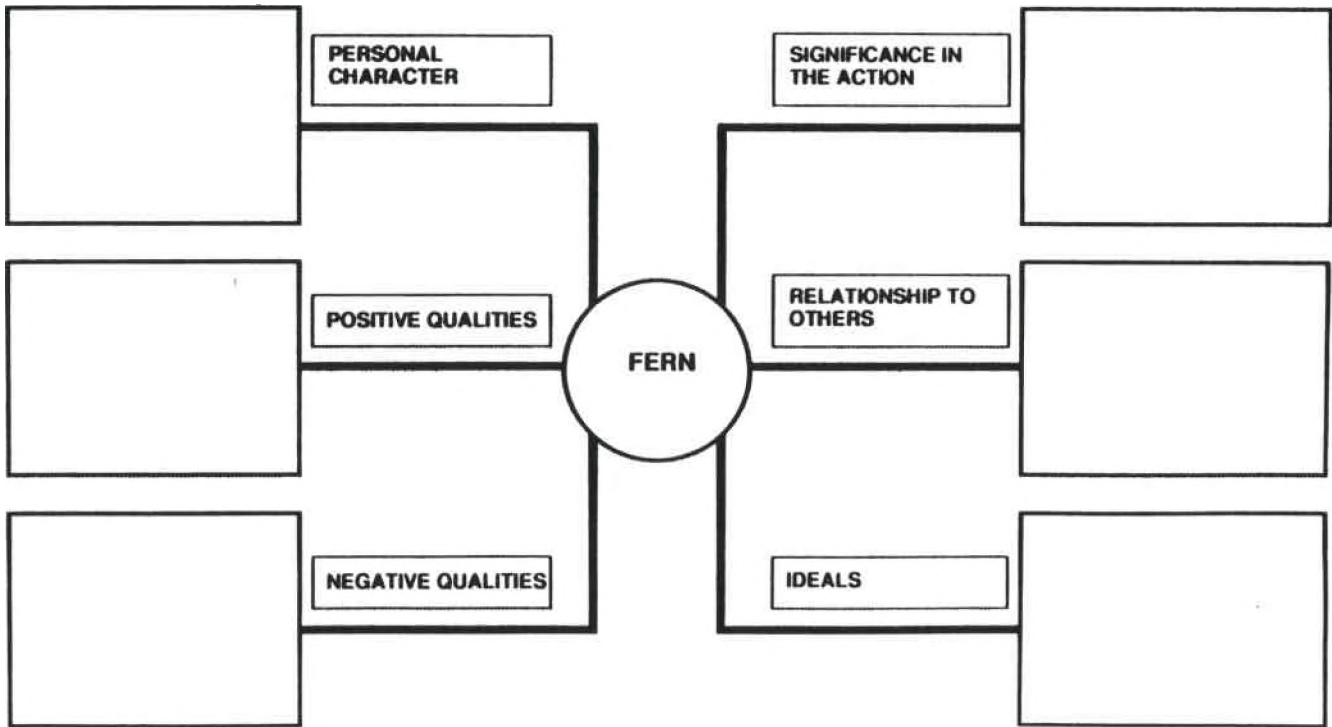
Students investigate character analysis through extracting information about character, finding supporting evidence, and organizing the information in order to accurately depict character portrayal.

Procedure:

- 1) In the central circle, students label the character being studied.
- 2) Students draw a bracket off to the right and left of the circle (three arms per side) and label each one "characteristic."
- 3) Students attach an empty square off of each arm and fill in with supporting evidence of the character trait.
- 4) Students complete map and discuss.

CHARLOTTE'S WEB: CHARACTER ANALYSIS

DIRECTIONS: Review the passage on page 75. Identify the characteristic written on each "arm" of the diagram. Write a quotation or action to illustrate that characteristic in each box.



CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

Restatement of the Problem

The purpose of this handbook was twofold:

- a) to focus on schema theory and investigate the link between schemata and comprehension, and
- b) to present schema-activated cognitive mapping strategies which may be used to facilitate reading comprehension in elementary-level students in the area of language arts.

Conclusions

The literature is extensive in support of strategies that actively engage students in the process of literacy. Research also confirms the utility and effectiveness of schema-activating cognitive mapping as an effective instructional strategy to positively enhance comprehension in the area of the language arts in elementary-level students. In addition, critical thinking skills, such as organizing pertinent information to be learned, defining analogous relationships, discerning sequence, cause/effect, main idea, and recalling details are enhanced.

Recommendations

Current research has confirmed the effectiveness of vocabulary development and passage analysis in improving the level of student comprehension in the reading task. The literature also supports the use of active strategy implementation such as cognitive mapping. Therefore, it is recommended that teachers and educators pursue the integration of such strategies into their reading-language arts programs. The use of this handbook can facilitate this goal for those teachers who wish to incorporate activities that involve students actively in the process of reading and learning.

References

- Anderson, R.C., Hiebert, E.H., Scott, J.A. & Wilkinson, I.A. (1985). Becoming a nation of readers: The report of the commission on reading. Washington, DC: The National Institute of Education.
- Anderson, R.C., & Pearson, D.P. (1984). A schema-theoretic view of basic processes in reading comprehension. In P. David Pearson (Ed.), Handbook of reading research (pp. 255-291). New York: Longman.
- Au, K.H., & Mason, J.M. (1990). Reading instruction for today (2nd ed.). Glenview, IL: Scott, Foresman.
- Barnes, J.A., Ginther, D.W., & Cochran, S.W. (1989). Schema and purpose in reading comprehension and learning vocabulary from context. Reading Research and Instruction, 28(2), 16-28.
- Black, H., & Black, S. (1990). Book II, Organizing thinking, Graphic organizers. Pacific Grove, CA: Midwest.
- Denner, P.R., & Pehrsson, R.S. (1989). Semantic organizers, A strategy for special needs learners. Rockville, MD: Aspen.
- Dishner, E.K., Readence, J.E., & Tierney, R.J. (1985). Reading strategies and practices, A compendium. (2nd ed.). Boston, MA: Allyn and Bacon.
- Duffelmeyer, F.A. (1985). Teaching word meaning from an experience base. The Reading Teacher, 39, 6-9.

- Eeds, M., & Cockrum, W.A. (1985, March). Teaching word meanings by expanding schemata vs. dictionary work vs. reading in context. Journal of Reading, 28, 492-497.
- Faraone, V., Hittleman, D.R., Robinson, H.A., & Unruh, E. (1990). Reading comprehension instruction 1783-1987, A review of trends and research. Newark, DE: International Reading Association.
- Graves, M.F., Cook, C.L., & Laberge, M.J. (1983). Effects of previewing difficult short stories on low ability junior high school students' comprehension, recall and attitudes. Reading Research Quarterly, 18, 262-276.
- Heimlich, J.E., & Pittleman, S.D. (1986). Semantic mapping: Classroom applications. Newark, DE: International Reading Association.
- McNeil, J.D. (1987). Reading comprehension -- new directions for classroom practice (2nd ed.). Glenview, IL: Scott Foresman.
- Mudd, N. (1987). Influences of the text and the reader's background knowledge upon responses to comprehension questions. Reading, 21(2), 125-134.
- Nagy, W. (1988). Teaching vocabulary to improve reading comprehension. Urbana, IL: National Council of Teachers of English.

- Pearson, P.D. (1985). Changing the face of reading comprehension instruction. The Reading Teacher, 38, 724-738.
- Pearson, P.D. & Gallagher, M.C. (1983). The instruction of reading comprehension. Contemporary Educational Psychology, 8, 317-344.
- Tierney, R.J. (1990). Redefining reading comprehension. Educational Leadership, 47(6), 37-42.