

Applying Schema Theory to the Teaching of Reading

基模理論在閱讀教學上的應用

Bih-Chu Hwang*

(黃碧珠)

Abstract

The schema perspective for EFL reading has been generally recognized, particularly the significant roles that content as well as formal schemata play during the process of reading. However, successful reading comprehension depends not only on ones' ability to employ adequate content and formal schemata, but also on awareness of the monitoring process and thereby taking appropriate strategic actions. The strategy schema serves as a strategy resource and then manipulates the monitoring acts as well as strategy use. That is, strategy schema is also essential to reading comprehension. This paper thus begins with literature review on schema-theory based research in ESL/EFL reading, and then discusses in detail the notion of strategy schema. Based upon the schema theory, a reading instruction model is suggested within which background knowledge activation and comprehension monitoring would be the main concern.

Key words: schema, strategy schema, metacognition

* Lecturer of the Department of English, National Changhua University of Education

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黃碧珠^{*}
(Bih-Chu Hwang)

摘要

基模模式的英文閱讀已被廣泛認同，特別是內容基模與文章結構基模在閱讀理解的過程中扮演著重要的角色。然而，成功的閱讀理解不僅需靠閱讀者適當的應用內容與文章結構基模，更需依賴閱讀者監控以及採取適當的策略。也就是說策略基模在閱讀過程中，也是不可或缺的。本文因此先探討文獻中以基模理論為基礎的英文閱讀教學以及策略基模的寓含，再提出以活用背景知識，以及監控閱讀過程為主要考量的閱讀指導模式。

關鍵字：基模、策略基模、後設認知

* 國立彰化師範大學英語系講師

I. Introduction

Schema, the little picture or association one calls up in one's mind while reading a word or sentence (Pearson & Spiro, 1982), has been recognized as a chief factor that interferes with either first or second language reading comprehension. As in "Reading, Schema Theory and second Language Learners" (1989), Kitao propounds, "in addition to lack of adequate linguistic proficiency, lack of appropriate schemata related to text, or inability to make use of the schema, can be sources of serious problems in comprehension" (p.17).

Schema research on ESL/EFL reading falls into two categories: the role of content schema (including culturally specific schema) as well as the role of formal schema. Content schema embodies the reader's preexisting knowledge or real and imaginary worlds (Anderson et al., 1979) or refers to a reader's knowledge about the topic being read (James, 1987). The other kind of schema, formal schema, includes the reader's knowledge of the rhetorical patterns in which information is unfolded (James, 1987), or knowledge related to the rhetorical organizational structures of different types of texts (Carrell, 1987). Though, empirical research verifies that content schema influences the degree of comprehension in ESL/EFL reading much more than that of formal schema, the same as in first language reading (Johnson, 1982; Carrell, 1987), both content as well as formal schema have been recognized as chief factors that influence reading comprehension to different extents.

However, having needed content or formal schema related to a reading text does not necessarily mean that a reader would appropriately take advantage of his or her prior knowledge to make sense of the reading material. Successful reading comprehension depends not only on ones' ability to apply appropriate content and formal schemata, but also on their awareness of monitoring the reading process, and accordingly, taking appropriate strategic action at the right time, such as taking advantage of relevant prior knowledge to construct meaning for reading selection. Such monitoring behaviors might be viewed as strategy schema. With a more theoretical view, Casanave (1988) suggests that the notion of strategic monitoring may fit into a broad schema-theoretical perspective. That is, a third type of schema, in addition to content and form, would need to be joined to the conceptual framework of schema theory.

It is true that the role that strategy schema plays during the process of reading is neglected, especially in a linguistically-bound ESL/EFL reading class. Thus, the purpose of this study is to explore the significant role that strategy schema plays in reading tasks and so call for more attention it deserves. To attain the goal, this paper begins with literature review on schema-theory based research in ESL/EFL reading, on strategy schema and on the notion of metacognition within which content, formal and strategy schema are all found. Then, accordingly, a reading instruction model focusing on a

schema-theoretical perspective of reading is provided.

II. Review of Literature

A. Schema-Theory Based Research in ESL/EFL Reading

Research conducted by Steffensen, Joag-Dev and Anderson (1979) aimed at examining the influence of cultural content schemata on reading comprehension. Along the same line, Johnson (1981), who investigated content schema while controlling formal schema, concluded that the cultural background of the story had a greater effect on the comprehension of ESL selections than the degree of syntactic and semantic complexity. Similarly, after searching the simultaneous effects of both cultural-specific content schema and formal schema on ESL reading comprehension, Carrell (1987) stated unfamiliar content caused the reader more difficulties in the process of reading than did unfamiliar text organization. The research undertaken by Steffensen et al, Johnson and Carrell indicated that content schema serves as a frame of reference for readers to construct an interpretation of new information about that topic.

Having recognized the significant function that content schema contributes to reading performance, research conducted by Hudson (1982) and Floyd (1987) focused on testing the hypothesis of improving ESL/EFL reading by teaching background information. Results showed that by providing students with relevant background knowledge, reading comprehension was promoted.

In comparison to Floyd, Block (1986) undertook research to observe reading comprehension process of non-native speakers of English by means of think-aloud protocols. Further, Block (1992) used think-aloud protocols again to work on a study which examined the comprehension-monitoring process defined in three phrases. Results confirmed the need of teaching students awareness of the comprehension monitoring process and of their strategic resources.

It is the strategy schema that manipulates the monitoring behaviors and strategy use. Therefore, we need to examine in detail what strategy schema is.

B. Strategy Schema

In addition to content and formal schema, strategy schema also plays a vital role during the process of reading. Casanave (1988) defines strategy schema as the third component (content and formal schemata are the first two components) which consists of the general knowledge we have of the routine monitoring and fix-up strategies available to us as we read.

Rather than simply underlying knowledge about monitoring acts, the strategy schema supervises the progressive activity that evaluates and regulates one's comprehension of written text. Basically, according to Casanave (1988), monitoring behaviors could be separated into two great categories: routine monitoring strategies (e.g. regular predicting, examining the consistency within the other parts of the text and with relevant prior knowledge, and controlling for general comprehension) and repair strategies (e.g. evaluating what the problem is, deciding when and how to resolve it, and examining the results). Casanave views both of these two categories of monitoring behavior as strategies, but states no routine strategic behaviors emerge only when a trigger that signals when a problem has happened. When the problem is resolved, routine monitoring restarts.

Similarly, Bereiter and Bird (1985) propose, trouble free reading does not ask readers to call upon their strategic resources. Only when a "trigger event" (e.g. identifying that comprehension has not been acquired or that unknown vocabulary or phrases appear) interferes with their comprehension beyond the extent that they could tolerate, will efficient readers appropriately take strategic actions which are deliberated (Baker & Brown, 1984a). They may read again or move ahead in the selection, trying to be free from ambiguity; they may make a note of the question, hoping that the answer will become known later; they may consult a dictionary, a reference text or a well-informed person. That is, readers' strategy schemata help them monitor their reading processes, evaluate the degree of comprehension, recognize the emergence of problems, and plan for solving these problems.

In addition to the strategies identified by Casanave, we might also attribute the routine text processing strategies to the domain of strategy schema. As Johnson (1983) identifies, one type of strategy would aid the reader in constructing meaning of text. These strategies range from the traditional skills of skimming, scanning, skipping unknown words, contextual guessing, predicting the content, making inferences, identifying main ideas, to the more cognitive skills such as activating or developing adequate prior knowledge and identifying text structure.

Undoubtedly, readers who possess the well-developed strategy resources proceed with their monitoring activities automatically, without giving conscious attention to it. Therefore, for those ESL/EFL readers, comprehension monitoring manipulated by their strategy schema is of special importance. They are more likely to involve themselves in more unfamiliar language and cultural background while reading genuine selections than those English as native/second language readers do. Therefore, they may encounter many more "trigger events" that require them to take strategic actions to solve the problem. Monitoring activities controlled by the readers' strategy schema would help them acquire comprehension of the reading material.

Thus, having recognized the significant role that strategy schema plays during the process of reading, it seems necessary to trace back and to explore the notion of metacognition, which is the theoretical foundation of strategy schema.

C. Metacognition

The knowledge we have of all three kinds of schemata (content, formal and strategy schema) could be deemed to be within the metacognition domain (Casanave 1988).

Metacognition, thinking about thinking (Anderson, 2001) or cognition about cognition, refers to the understanding that we have about our own knowledge (Casanave, 1988). Flavell (1978, cited in Carrell 1988: 6) states that there are two dimensions of metacognitive ability: knowledge of cognition and regulation of cognition. The first dimension, *knowledge of cognition*, comprises the reader's awareness of his or her own cognitive resources, and the consistence between the reader and the reading situation. To give examples, if a reader realizes what is needed to perform effectively, then it is possible for him to take actions to meet the need of a reading situation more properly. On the other hand, if the reader is not aware of his own limitations as a reader or of the difficulty of the task given, then the reader can hardly be expected to take actions for the purpose of solving problems. The second dimension of metacognitive ability, the *regulation of cognition*, contains monitoring and applying compensatory strategies as well. Effective monitoring of reading is indispensable. Also, having compensatory strategies available when needed is essential to promote reading comprehension (Carrell, 1988).

In accordance with Flavell, Carrell (1988) notes three main types of metacognitive skills: "awareness, monitoring, and development of compensatory strategies" (p.7). Such awareness is a prerequisite for one to devote himself to the monitoring activities and to the application of repair strategies.

With respect to the context of reading, metacognition consists of two phrases of cognition: first, readers' knowledge of strategies for reading, and second, the control readers engage in (Brown, Armbruster & Baker, 1986). Thus, if a reader is aware of the strategy resources (including routine and repair strategies) he could call upon, then he may engage in controlling his reading performance accordingly. Further, Baker and Brown (1984 b) state, effective readers are aware of and have a degree of control over their cognitive reading process. These readers possess the following well-developed metacognitive skills:

- (a) clarifying the purpose of reading, that is, understanding both the explicit and implicit task demands;
- (b) identifying the important aspects of a message;
- (c) focusing attention on the major content rather than trivia;
- (d) monitoring ongoing activities to determine whether comprehension is occurring;
- (e) engaging in self-question to determine whether goals are being achieved; and
- (f) taking

corrective action when failures in comprehension are detected. (p. 354)

In addition to the above mentioned ones, there is still one cognitive activity that could be attributed to the domain of metacognitive skills: taking advantage of appropriate prior knowledge to make sense of reading material. That is, a reader with well-developed metacognitive skills, is cognitive of his background knowledge related to a topic given and also, is aware of the strategy resources available for him to call upon. Then, being aware of his own cognitive resources, he might try to process the reading task with the help of available background knowledge and engage in monitoring the ongoing process of reading and taking appropriate strategic actions when necessary. That is, awareness of the cognitive resources (e.g. content, formal and strategy schemata) is a prerequisite for one to engage in the comprehension monitoring activities. Rather, committing oneself to the monitoring acts is a prerequisite for his own reading performance. It is therefore necessary to help students to be aware of their content, formal and strategy schemata.

III. Reading Instruction Model

As mentioned previously, successful reading comprehension relies not only on one's ability to apply appropriate content and formal schemata, but also on one's awareness of monitoring the reading processes and taking appropriate strategic actions. Therefore, reading instruction should adequately take advantage of students' content, formal and strategy schemata to promote reading comprehension. Based upon this principle, the author of this paper provides a reading instruction model within which instruction on being aware of comprehension monitoring, and on activation of background knowledge as well, would be the point of emphasis. It is assumed that students who become aware of activating appropriate background knowledge, and further, of monitoring activities controlled by their strategy schema, would greatly compensate for their lack of linguistic proficiency.

However, there are some limitations we need to take into consideration: (a) This schema-theory based reading instruction is by no means a substitute for the traditional reading guidance. Rather, it provides us with another perspective to view reading as a highly cognitive process; (b) This reading instruction model greatly focuses on the application of content and strategy schemata, with relatively less attention giving to the role of formal schema; and (c) Competent readers are more capable of manipulating their prior knowledge to promote reading comprehension. In comparison, less competent readers are not so successful in controlling the progressive reading task. Thus, these less efficient readers need much more help in learning to control their reading processes.

A. Activation of background knowledge

Background knowledge provides a foundation for the students to process text information, to predict the content of the text, to concentrate on the main aspects within the text, to infer the implied information and to identify the relevant information needed to comprehend the text. In a word, background knowledge related to the reading material triggers students to engage in the cognitive top-down reading process which might compensate for limitation of linguistic deficiency. Thus, successful reading performance would greatly rely on students' appropriately activating their prior knowledge to make sense of the reading material.

Prior knowledge activation involves recalling preexisting schema; or more, developing more elaborate schema relevant to a specific topic and connecting this schema to the reading.

Not a little research (Hudson, 1982; Floyd and Carrell, 1987) has ascertained the significant effect of directly activating appropriate background information through pre-reading activities. In their studies, Hudson used cue picture as stimulus and questioning strategy to activate subjects' schemata, whereas Floyd and Carrell provided subjects with discussion, lectures and slide appreciation as pre-reading activities to activate as well as construct appropriate schemata.

In addition to traditional activities used by Hudson and Carrell, several methods, such as Pre-reading Plan (Langer, 1981), Text Preview (Graves, Prenn & Cooke, 1985) and K-W-L Strategy (Ogle, 1986), have been developed as effective strategies for facilitating reading comprehension. These three well-developed activities, with explicit procedures to be followed, share the basic assumption that, through proper questioning by the teacher-initiated questions or student-generated questions, related background knowledge can be obtained (Anthony and Raphael, 1987)

Since these pre-reading activities do provide students with a way to promote reading comprehension, we might also take advantage of them as media for activating students' background knowledge. While applying these activities in our EFL reading class, the following points should be taken into consideration: (a) Since our students are usually restricted by their lack of specific cultural schema, cultural knowledge could be selected as a key concept to discuss; and (b) Students are taught to utilize prior knowledge to access reading comprehension and to override linguistic limitation.

B. Comprehension Monitoring

Despite the great assistance prior knowledge contributes to the act of reading, there are still some factors that influence students' reading performance. The act of comprehension monitoring provides the foundation to solve the problems.

1. Awareness of monitoring

To guide students in becoming cognitive of the nature of comprehension monitoring as well as the significance of applying strategies to promote understanding, teachers may start the instruction by introducing the notion and language of comprehension monitoring to students. We might follow what Casanave (1988) suggests; to insert, between paragraphs of a text, questions that ask students to reflect on their comprehension of the reading selection.

These comprehension-monitoring questions require students to reflect back on what they have read, to predict what they will read, to bridge the gaps between what they have read to what they know of the world. In a word, these comprehension monitoring questions serve as media for students to supervise the ongoing reading process. In addition, teacher-student discussion contributes to the helping of students in acquiring the language that will be used in class (e.g. monitor, summarize, predict, check for consistency) and in realizing the nature of comprehension monitoring. Consequently, by means of learning to be more aware of how they comprehend and learn from the reading selection, students will promote their metacognitive skills. And also, students will expand elaborated metalanguage for discussion about their reading problems and about their strategies for conquering these problems (casanave 1988).

To generate comprehension monitoring questions, we might refer to Gary Anderson's question Taxonomy:

F - Factual questions: Those that are directly answered in the story. "What was the girl's name?"

I - Inference questions: Those where a guess will have to be made. "What do you think the boys were afraid to go in the cemetery?"

V - Vocabulary questions: Those which reveal knowledge or lack of it about the words in the story. "What does the word cemetery mean?"

E - Experience question: Those that help the student draw on his/her own background with the subject. "Have you ever had a sick friends?"

(Anderson, cited by Cooper 1986:9)

Students are expected to reflect back on what they have read to find answers between the lines, to make inferences beyond the lines or to activate their prior knowledge to construct meaning for answering those experience questions. Further, they are required to take strategic actions to solve the problem caused by the vocabulary questions mentioned above.

More than simply using these comprehension monitoring questions in our class, we should also take advantage of the well-developed method of *Reciprocal Teaching* as a medium through which students may monitor their reading performance.

Reciprocal teaching is a teacher-student dialogue in which the teacher commences as a model and prompter, relinquishing control to the students little by little. In reciprocal teaching, the teacher and the students take turns playing the role of teacher in a discussion of various segments of the assigned text. Miller and Perkins (1989) state that reciprocal teaching has a two-fold purpose: (1) it teaches students how to sustain a balance of rights between individuals, groups, and the teacher and (2) it teaches students to control their own reading and comprehension. That is, reciprocal teaching requires the students to be responsible for reading comprehension rather than asking the teacher to take the responsibility.

Therefore, with the help of these comprehension monitoring questions or/and the application of the Reciprocal Teaching method, our students will be more aware of the nature of comprehension monitoring and thus participate in the act of monitoring actively.

2. Development of strategy resources

In fact, monitoring acts, in themselves, do not result in the comprehending of the reading selection; it is the strategic actions that comprehension monitoring triggers which lead to comprehension. Therefore, it is essential to train students to be aware of, and more than that, to develop their repertoires of comprehension strategies.

a. Strategy Type

In "The Comprehension Strategies of Second Language Readers," Block (1986) categorizes strategies into two levels: general comprehension and local linguistic strategies. The former, general comprehension strategies comprise comprehension gathering and comprehension monitoring strategies, whereas the latter, local linguistic strategies, work on attempts to understand specific linguistic units. Ten kinds of general strategies are:

1. Anticipate content: The reader predicts what content will occur in succeeding portions of text.
2. Recognize text structure: The reader distinguishes between main points and supporting details or discusses the purpose of information.
3. Integrate information: The reader connects new information with previously stated content,
4. Question information in the text: The reader questions the significance or veracity of content.
5. Interpret the text: The reader makes an inference, draws a conclusion, or forms a hypothesis about the content,
6. Use general knowledge and associations: The readers use their knowledge and experience (a) to explain, extend, and clarify content; (b) to evaluate the veracity of content; and (c) to react to content.

7. Comment on behavior or process: The reader describes strategy use, indicates awareness of the components of the process, or expresses a sense of accomplishment or frustration.
8. Monitor comprehension: The reader assesses his or her degree of understanding of the text.
9. Correct behavior: The reader notices that an assumption, interpretation, or paraphrase is incorrect and changes that statement.
10. React to the text: The reader reacts emotionally to information in the text.

Below are the local strategies:

11. Paraphrase: The reader rephrases content using different words, but with the same sense.
12. Reread: The reader rereads a portion of the text either aloud or silently.
13. Question meaning of a clause or sentence: The reader does not understand the meaning of a portion of the text.
14. Question meaning of a word: The reader does not understand a particular word.
15. Solve vocabulary problem: The reader uses context, a synonym, or some other word-solving behavior to understand a particular word (p.472-473).

For the purpose of providing students with strategy-building resources, we might take advantage of Block's strategy as a guide to introduce students to these various types of strategies. To consider how to guide students to be aware of these strategies, we might also follow Vorhaus's suggestion: to teach students to use reading strategies not by telling them how to use them, but by providing them with opportunities in which these strategies will be applied naturally from their interaction with the written text. We assume that, via the interaction with the reading material, students will conceptualize these strategies on their own. In addition, effective students are likely to employ more global reading strategies, while less competent students are usually restricted by local strategies rather than allocating much attention to the local ones.

b. Strategy Instruction

It is quite possible that students' repertoires of strategies may not be rich enough or may need to be developed, especially for those of the less competent students. Thus, step-by-step instruction in some specific strategies is required. As Carrell (198) claims, quite often ESL students fail to use strategies appropriately because they do not understand why such strategies are useful nor do they realize when and where to use them. Instruction in understanding a strategy's rationale, evaluation, and utility is therefore required.

In accordance with Carrell, Shih (1992) proposes a three-phase strategy instruction: "direct explanation and modeling," "guided practice" and "independent application" (p.300). In the first phase, direct explanation and modeling, the teacher

should interpret the strategy to the students. Then the teacher models the strategy by thinking aloud. During the second phase, guided practice, students are required to take on more responsibility to control the strategy. This stage includes repeated practice, feedback, and necessary remodeling or reteaching. In the last phrase of the instructional sequence, independent application, students are required to employ the strategy to the whole reading material on their own

We might follow Shih's three stages of strategy instruction when introducing some specific strategies to our students. But, there are two points which need to be taken into consideration. First, strategies cannot be taught quickly. Just as Garner(1992) maintains, "Strategic processing capacities are taxed until practice produces more automatic sub-routines so that a variety of strategies can be engaged simultaneously without overloading the system" (p.248).

Second, since learning to be master of a strategy takes time and effort, students are likely to avoid engaging in strategy use. It is our responsibility to guide students to be willing to involve in strategy practice. Willing to use strategy is the prerequisite for strategy instruction, especially for our EFL students, who usually frustrate themselves due to their lack of linguistic proficiency, and who need to be helped in developing confidence in the taking of strategic actions and /or utilizing prior knowledge to override linguistic limitation.

IV. Conclusion

Strategy schema, together with the content and formal schemata, is within the metacognition domain which entails three types of skills: awareness, monitoring, and repair strategies. Being aware of the content, formal and strategy schema one has is a prerequisite for one to devote him or herself to the monitoring activities and to engage in the task of taking strategic actions. While content and formal schemata provide the basis for one to initiate the top-down reading process, strategy schema controls the act of reading and prepares the repertoire of comprehension strategies for one to call upon.

Recognizing strategy schema as an equally important role as content or formal schema during the process of reading, we need to provide students with a schema-theory based reading instruction in which background knowledge activation and comprehension monitoring as well, would be the main concern. We assume that this instruction would help students compensate for their lack of linguistic proficiency. Also, students would view reading as a highly interactive process between themselves and their prior knowledge on the one hand, and the text per se, on the other; rather as than a linguistically-bound segment.

Though we put emphasis on taking advantage of background knowledge and on comprehension monitoring activities to access successful reading, it is by no means a sign of devaluing students' linguistic abilities. We still need to help students develop their linguistic proficiency. Just as Block (1986) concluded, "as language proficiency develops, linguistic cues can be used more efficiently and that predictions and other cognitive process will therefore operate more smoothly" (p. 466).

We do hope that, with the help of the schema-theory based reading instruction, students will comprehend their reading through top-down and bottom-up reading processes simultaneously. We further expect that students will control their reading processes automatically and thus become active as well as independent readers.

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