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著者	Amanda, Gaunt
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Amanda Gaunt

INTRODUCTION

This paper looks at the background of schema theory and reading in ESL/EFL. The “knowledge framework” put forward by Mohan (1986, 2001) is explained, and the use of key visuals as a pre-reading strategy is explored. The strategy and procedures for the implementation of key visuals in the classroom are discussed, as well as a study that was undertaken to test the success of key visuals. Mohan’s work is characterized by the use of content as a means to teach ESL.

That content as a context for second language learning is an important concept is generally accepted in second language research. To make curricula more content-centred and task-based has been identified as one of the major themes in English for Speakers of Other Languages (ESOL) teaching and research at the present time (Brown, 1991). Savignon (1991) states that “the full potential of content-based and task-based curricula remains to be exploited. Through the variety of language activities that they can offer, content-based and task-based programs are ideally suited to a focus on communication, to the development of needed language skills through the interpretation, expression, and negotiation of meaning” (p. 274).

Teaching language through content is based on the premise that students will learn the language better if language learning is seen as secondary to the act of communicating about a topic that is of interest

to the learner. In the classroom though, there is a time lag between research and practice, so we still see language and content being taught in isolation from each other. This is changing in English as a Second Language (ESL) classes in the public school systems in Canada and the U.S., but is still usually the case in English as a Foreign Language (EFL) classes in many parts of the world.

According to Krashen's (1982) Input Hypothesis we acquire language by understanding language that is a step beyond our level of comprehension ($i+1$), and by understanding messages and not focusing on the form of the input. We can understand language that contains structures we have not yet acquired by utilizing context and extra-linguistic information (our knowledge of the world).

Traditional approaches are different. They assume the opposite, first teaching structures, then trying to give the students practice in various activities and exercises. The best input should not be grammatically sequenced, it should not aim deliberately at $i + 1$. The input hypothesis claims that deliberate sequencing is not necessary and may even be harmful. If there is successful communication, if the acquirer understands the message contained in the input, and there is enough input, $i + 1$ will automatically be provided in just the right quantities.

The input can be in the form of listening or reading. Krashen and Terrell (1983) state that reading can be a source of comprehensible input and can contribute significantly to competence in a second language. They hypothesize that reading makes a contribution to overall competence and not just written performance. "Comprehensible input gained in reading [however,] may contribute to a general language competence that underlies both spoken and written performance" (p. 131).

Snow, Met, & Genesee (1989) present several theoretical rationales

for integrating language and content teaching in the ESL/EFL classroom: language is learned more effectively for communication in meaningful, purposeful social and academic contexts; integrating language and content teaching provides a substantive basis for language teaching and learning; content can provide motivation if it is interesting and of value to the learner, and a cognitive basis for language learning because it provides real meaning which is an inherent feature of naturalistic language learning; and it also provides a context for language functions and structures. (p. 201-203).

SCHEMA THEORY AND READING IN ESL/EFL

Schema theory is a theory about knowledge; how knowledge is represented; and how the representation facilitates the use of knowledge in particular situations (Rumelhart, 1980). Schemata are “the building blocks of cognition. They are the fundamental elements upon which all information processing depends” (p. 33).

Schema theory holds that reading comprehension is an interactive process between the prior background knowledge of the reader and the text. Comprehension will probably be impossible if the reader does not activate (or possess) the appropriate background knowledge (or schemata) (Early & Tang, 1991).

When looking at the role of background knowledge in reading comprehension, it is possible to make a distinction between formal schemata, that is, background knowledge of the formal, rhetorical organizational structures of different types of texts, and content schemata, background knowledge of the content area of the text. Varying degrees of noncomprehension will result if a reader fails to activate the appropriate content or formal schema while reading

(Carrell & Eisterhold, 1988).

This failure might be due to either the writer not providing enough clues in the text for the reader to effectively utilize a bottom up processing mode that would activate the reader's existing schema, or it might be that the reader does not have the appropriate schema in the first place. So, the appropriate schemata must exist and it must also be activated for comprehension of the text (Carrell & Eisterhold, 1988).

Studies have been carried out to show the effects of formal schemata in ESL/EFL. One done by Carrell (1984, cited in Carrell & Eisterhold, 1988) had two groups of intermediate ESL learners read a different type of simple story. The first type had a good simple story schema structure, and the second deliberately violated the story schema structure. The results showed that in the second type both the quantity of recall and the temporal sequences of recall were affected. So, if the content is held constant, but the rhetorical structure is varied, second language reading comprehension is affected negatively (Carrell, 1984, cited in Carrell & Eisterhold, 1988).

With reference to the general effects of content schemata on ESL reading comprehension, a study by Johnson (1982, cited in Carrell & Eisterhold, 1988) shows that a text on a familiar topic is recalled better by ESL readers than a similar text on an unfamiliar topic. Hudson (1988) reports a study that shows helpful effects on comprehension by inducing content schemata through pre-reading activities, as compared to using vocabulary activities or read-reread activities. Early & Tang (1991) point out that:

Results of schema related research on second language reading comprehension have shown that reading comprehension is a function of the interaction of text structure with the reader's formal schemata.

Other schema-based studies have indicated that the reader's prior knowledge of the content domain significantly affects the comprehension of text; this is particularly true for culture-specific text content. Schema theory, then, appears to help explain why pre-reading activities which activate learners' prior knowledge improve reading comprehension (p. 35).

Pre-reading techniques that have been developed to aid in reading comprehension include: advanced organizers; purpose-setting questions; structured-overview; surveying; mapping; concept-mapping; and pre-teaching vocabulary (p. 35).

The technique for pre-reading explored here is the use of key visuals. This technique is based on the knowledge framework created by Mohan (1986), and lends itself to the use of many of the strategies cited above. First, a look at the knowledge framework, and then the use of key visuals.

THE KNOWLEDGE FRAMEWORK

Mohan (1986,) sees language as the medium of communication and the medium of learning subject matter, so integration leads to language learning and content learning. The "knowledge framework" which Mohan developed is a systematic method of integrating both content and language skills in an attempt to "help students bridge the gap between beginning social acquisition and full social and academic linguistic competency" (Early, Mohan & Hooper, 1989, p. 108). Within it, any topics or content can be broken down into six major structures of knowledge which make up the knowledge framework: description,

sequence, choice, classification, principles, evaluation.

In any story, process or procedure that illustrates a particular case, description, sequence and choice can be found. “A particular case presents specific, practical knowledge. Background information on any topic will usually include classification, principles, and evaluation. Background knowledge is general, theoretical knowledge. It applies to many particular examples” (Mohan, 1986, p. 29).

Basically, the framework integrates language and content. A topic gets broken down into the six slots of the framework and this provides a beginning for the development of tasks to integrate the discourse and the content. Key visuals are used as links between the language and content for the learner (Early, Mohan & Hooper, 1989).

KEY VISUALS

Each structure has distinct linguistic features that set it apart from the others, and each can be represented graphically by “key visuals”. The visuals help the learner understand the content, and can have lowered or no linguistic demands. Key visuals have at least three major applications: (1) generative, to promote language generation (related to content); (2) representative or explanatory, to increase content understanding; and (3) evaluative, to evaluate content and language understanding (Early, Mohan & Hooper, 1989, p. 110).

Key visuals deliberately develop both content and formal schemata into a single graphic, thus providing the shape of structure of the text/knowledge, and an overview of the content. Knowledge structures are built from semantic relations, so they can be expressed across different modes of communication (i.e. written text, oral discourse, graphic form and electronic data-base programs). So, key visuals are knowledge

structures expressed in graphic form (Early & Tang, 1991).

“Key visuals... communicate the shape of the knowledge and make visible the knowledge structure they represent, and in this way provide a schema which can be accessed again and again, thus facilitating comprehension” (p. 37). Key visuals prepare learners to read content text, think through their reading, and reconstruct their knowledge after reading (Early & Tang, 1991).

Early (1990) describes a project for the Vancouver School District, conducted by Mohan, Hooper and Early, which used an approach based on the knowledge framework and an adaption of the Language Experience Approach (LEA). This writing-reading method, organized around the knowledge structures of the framework and the use of key visuals, is used to help learners generate different types of expository text and increase their academic achievement.

The approach Early describes is similar, but not identical to the LEA. It differs in three ways: the LEA focuses on developing language skills, whereas their approach focuses on developing language, content and thinking skills; the LEA tends to focus on the narrative or story structure, their approach systematically and intentionally focuses on a range of knowledge structures; the LEA may use drawings as stimuli or as methods to illustrate a story, their approach uses graphics (i.e. key visuals) as recognized and legitimate representation of meaning (Early, 1990, p. 85).

The eight basic steps in generating experience-based expository texts are:

- 1) The teacher creates an environment conducive to teaching subject-matter knowledge and stimulating language and thought. A three-dimensional model, an experiment, or a key visual provide effective

stimuli.

2) The students learn key words related to the visuals, and the visuals are labeled.

3) The students are provided with ample opportunities to compose oral sentences based on the visuals. This can be done as a whole class or in smaller groups. The teacher needs to monitor each group to ensure that the central concepts are understood, and the critical language to express the concepts is introduced.

4) Written sentences based on the visuals are composed. This can be done in a number of ways.

5) When the text has been satisfactorily generated the students can transcribe the co-produced expository text.

6) The teacher and students read the text. Through teacher questioning techniques the students are lead to make deductions about phonetic analysis, morphology, capitalization, punctuation, sentence and discourse structure.

7) Comprehension activities may be undertaken.

8) The teacher may reinforce the concepts by introducing carefully chosen model texts (p. 85-87).

Early and Tang (1991) present a study that was done to evaluate the technique of using key visuals to prepare students to read content text. The study was based on a pretest-posttest nonequivalent-control-group design. It took place in two Vancouver secondary schools, and was replicated in Grade 8 Social Studies, Grade 11 Social Studies, and Transitional ESL Science.

The aim was to discover if key visuals facilitated secondary ESL student reading of Social Studies and Science texts and writing of expository prose. Key visuals were prepared by the research team for all areas of the texts to be covered in class. The teachers either used

or adapted the key visuals for teaching the experimental group. 24 pretests and post-tests were administered, and at the point of Early and Tang's (1991) article 16 of each had been analyzed.

Results showed that the experimental group improved in performance in all the eight posttests we analyzed. The control group, however, gained in performance in only two of the posttests; the score of the other six posttests either remained unchanged or regressed (p. 41)

Although finer analysis is needed, the positive results in the three different situations give good support to the hypothesis that "using key visuals to present content-area knowledge can increase secondary ESL students' ability to read content text and write academic discourse, and provide tangible evidence of the facilitative effect of key visuals on reading comprehension" (p. 42).

DISCUSSION

The work in the Vancouver School District is with students in K to 12, but there is no reason why this content-based approach should not be easily transferable to an EFL situation outside of the public school system, dealing with adults as well as teenagers and children.

It has already been pointed out by Snow, Met, & Genesee (1989) that content can provide motivation to learn the language if it is interesting and of value to the learner; that integration of language and content teaching also provides a cognitive basis for language learning and a context for the teaching of language functions and structures.

The failure of the control students in the above study could be due to the students not having the appropriate schema or background

structure to comprehend the material presented. Rumelhart (1980) suggests three reasons implicit in schema theory that could account for readers failing to understand written discourse:

- 1) The reader may not have the appropriate schemata.
- 2) The reader may have the appropriate schemata, but the clues provided by the author may be insufficient to suggest them.
- 3) The reader may find a consistent interpretation of the text but may not find the one intended by the author (p. 48).

As Rumelhart (1980) states “our schemata *are* our knowledge (p. 41). So, the appropriate schemata must exist and must also be activated for comprehension of the text.

Although the specific process for the development of new schemata is not known, Rumelhart (1980) gives us three different modes of learning that are possible in a schema-based system. These are:

- 1) Accretion, in which a learner has understood some text, or perceived an event and can retrieve stored information about that text or event. This is somewhat similar to “fact learning”.
- 2) Tuning, in which existing schemata may change or evolve to make them more in tune with experience.
- 3) Restructuring, which is the learning of new schemata. New concepts can be generated in at least two ways; patterned on existing schema, or (in principle) induced from experience (p. 52).

It is common for ESL/EFL students to come from a very different socio-cultural background than the one experienced by North Americans, and therefore very different life experiences. If what Rumelhart (1980) says is true, that “our schemata *are* our knowledge” (p. 41), then it would follow that because of the differences in socio-cultural background the ESL/EFL students schemata would also differ.

The use of key visuals might be a way of triggering one or more of

the three different modes of learning that Rumelhart (1980) suggests are possible in a schema-based system. If this is true, schema theory, then, appears to help explain why pre-reading activities using key visuals based on Mohan's knowledge framework, improve reading comprehension.

SUMMARY

This paper has explored Mohan's "knowledge framework". It has looked at the use of key visuals, as a pre-reading strategy for ESL/EFL students. The study carried out in the Vancouver School District was presented and the implications, from the point of view of schema theory were discussed. More research needs to be undertaken, but in light of the positive preliminary findings, it would appear that key visuals have the potential for easing the struggle faced by ESL/EFL students in their efforts to learn to read.

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