

10-1-1996

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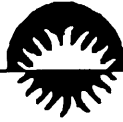
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Williamson, R. A. (1996). Self-Questioning — An Aid to Metacognition. *Reading Horizons: A Journal of Literacy and Language Arts*, 37 (1). Retrieved from https://scholarworks.wmich.edu/reading_horizons/vol37/iss1/3

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Self-Questioning — An Aid to Metacognition

Ruth Ann Williamson

Teachers ask questions for a variety of purposes. It is through questioning that teachers initiate, elaborate, and direct the course of talk in a discussion; additionally they are able to determine whether or not students have read the text and how well they have understood it. Questions are important because they promote thinking, productive learning, and content retention. However, questions can prove to be counter-productive if they are used by teachers simply as a habitual routine, have not been given adequate thought in preparation for class presentations, and do not transfer to self-questioning by students. Since teacher questioning tends to dominate instructional classroom time it is vitally important that quality questioning strategies be employed in order to ensure successful text discussions that ultimately lead students to effectively self-question as they read (Vacca and Vacca, 1993). Questions are tools of teachers' trade, but they are only as effective as the context in which they are used. Effective questions set the course for problem solving, stir the thought process, and stimulate the imagination (Vacca and Vacca, 1993).

The attempt of this article is to present the distinction between teacher questioning that characterizes students' textual understanding (product) and questioning that actively engages students in the meaning-making process (process). It is the author's contention that there must be a proper balance

between product and process questions in classrooms that support students in their efforts to learn from text as they actively interact with text, the teacher, and each other. Said differently, our aim as educators should be to teach students to think. One method we can use is effective questioning, which piques interest, curiosity, and involvement, and ultimately leads to appropriate self-questioning by students as they internalize the strategy through teacher modeling, instruction, and support in a risk-taking environment composed of a community of learners.

Research on questioning

Research points to the enhancement of the comprehension process by having teachers model questions at critical points during reading, then phasing out teacher questioning and phasing in students' self-questioning (Nolte and Swinger, 1985). Self-questioning then is a metacognitive process of reading which enables students to become independent in their understanding of text, because they are actively engaged through goal-directed, organized thinking.

Dolores Durkin's research (1979) found that in classroom observations of reading instruction, teacher-posed questions dominated with the major concern being whether students' answers were right or wrong. Little attention was given to direct instruction of comprehension and the promotion of questioning strategies that leads to the metacognitive development of self-interrogation for the purpose of comprehension.

Upon examination of Benjamin Bloom's cognitive domain contained in his *Taxonomy of Educational Objectives*, teachers are reminded that the classification levels of the cognitive domain, namely knowledge, comprehension, and application, are skills of recall and recognition, whereas analysis, synthesis, and evaluation comprise higher energy intellectual

skills. The definitions of the domains and classification levels within Bloom's Taxonomy are sufficiently logical and precise to label the classification of the content load of teacher questions (Bloom, 1978). If teacher questions are content loaded at the knowledge level of the cognitive domain, then the content load of questions is inadequate. In such instances students' full range of cognitive processing opportunities are not made available to them. Because teachers' questions are used to solicit learner participation, their questions should serve as quality demonstrations that lead to the enhancement of students' ability to self-interrogate at all levels of Bloom's taxonomy. Such opportunities to lead students to become metacognitive readers need to be fostered in all classrooms regardless of the content area.

According to Guszak's (1967) scheme of classifying questions, six question categories were identified. Recognition questions require students to use literal comprehension skills to locate textual information. Questions requiring students to recall factual material are labeled recall questions. When students paraphrase textual information they are required to use translation questions. The answers to conjecture questions require skill in prediction. Inferential ability that requires students to generate main ideas or offer a rationale for their reading are classified as explanation questions. Finally, evaluation questions require students to judge the worthy, acceptability, or probability of text. Guszak's (1967) research revealed an emphasis of teacher-asked literal question types, e.g., recognition and recall. In fact, they accounted for 70% of questions asked by teachers in grades two, four, and six.

O'Flahavan (1988) attempted to replicate Guszak's (1967) research; he found that recognition and recall questions have decreased dramatically, apparently having been replaced to a great extent by explanation and translation types. Conjectural

and evaluative questions have experienced only slight increases. These findings have thus resulted in the adoption by classroom teachers of strategies such as prediction and summarization. For example, before reading a passage, students may ask themselves questions such as the following: 1) Based on what I have previously read, what I already knew about this topic and the heading, what would a plausible prediction be of this section of text I will read? 2) Now I have read the section of text, was my prediction correct or do I need to make modifications? 3) What is my summary of this section of text that includes a main idea statement and three or four supporting details? Additionally students may learn to change a heading to a question they ask themselves prior to reading a section of text, and following their reading, they attempt to answer their self-imposed question. The emphasis, hence, needs to be focused on active involvement with text while reading. The kinds of questions that teachers ask students greatly influence the kinds of questions students internalize and ask themselves (Valencia and Pearson, 1988). The following discussion relates self-questioning to metacognitive, teaching strategies.

Metacognitive teaching strategies

Research in the area of metacognition suggests that variability is an attribute of skilled reading, composed of among other attributes, engaging in self-questioning. When students are asked to select or generate questions that would be helpful in understanding and remembering important information in a selection, they are adding to the repertoire of strategies at their disposal. Knowing how to use these strategies leads to strategic, skilled reading (Paris, 1987).

Metacognition refers to one's ability to understand and control the cognitive processes. It involves thinking about thinking and making necessary changes in how we think during cognitive processing (Brown, 1981). When teachers

engage their students in metacognitive processing they become more productive learners who are more capable of assuming responsibility for their own learning. Even though there are a number of self-help strategies available to students, such as self-planning, self-regulating, self-reflecting, and self-questioning, it is the last of these that will be discussed. Teachers who instruct students to self-question will begin their instruction through modeling of the strategy. Initially teachers provide examples, explanations, support, and suggestions. With practice students become more capable of assuming this responsibility on their own. As an illustration the following article will be used:

There's a Reason Why Your Prescriptions Cost So Much

Drug manufacturers charge American consumers 60 percent more than they charge customers in the United Kingdom for many common prescription drugs, according to a General Accounting Office study released Wednesday. The contraceptive pill Nordette had the biggest differential among the 77 drugs studied, costing 17 times more here than in Britain and Northern Ireland. Valium costs 10 times as much and Inderal, a heart drug, nearly nine times as much. Americans are paying high prices to subsidize "low drug prices in the rest of the world," charged Rep. Henry Waxman, D-Calif., who asked the GAO for the comparison of wholesale prices. With health-care reform the priority issue in Congress, he said, "Congress must find a way to balance profits and price in a way (that is) fairer to the American consumer."

Waxman said President Clinton's health-care reform plan makes a "very modest" start at controlling drug prices by asking to give Medicare officials authority to refuse to pay for high priced drugs, and to set up a panel to review the cost of new drugs. Waxman said his subcommittee on health and the environment would consider other measures at a hearing on drug pricing next week. The pharmaceutical industry challenged the study, saying it failed to include generic drugs. Also, it said the study was based on list price, while about three-fourths of all drugs in the United States are sold at a discounted price. But an official of the GAO, the watchdog agency for Congress, said discounts were considered. Also, she said, when generic drugs were included the price differential dropped from 60 percent to 50 percent.

Robert Allnutt, executive vice president of the Pharmaceutical Manufacturers Association, said prescription drugs and health care in general are regulated much more heavily in Britain than here. "They're paying a lot less for their health care and they're getting a lot less health care," he said, adding that "the British system is not paying its share of the worldwide cost" on research and development. However, the GAO report said British drug manufacturers have been competitive internationally in marketing new drugs.

Allnutt and other industry officials also argued that the market here has become much more competitive in recent years — and the GAO study reflected that. The price difference was greatest for drugs that went on the market before 1980 — 12 percent — compared with 17 percent for those brought to market since 1986, according to the government study. The GAO worked from the 200 drugs most frequently sold in the United States, selecting the 77 that are sold both here and in the United Kingdom in the same dosage and form. (N. Brewer, Houston Post, April 4, 1994. Reprinted with permission of the Associated Press).

Teacher questions could be stated as:

1. Our title is, "There's a reason why your prescriptions cost so much." What do you think this article will be about, based on the title? Why do you think so? (Prediction and activation of prior knowledge)
2. Now that you've read the article, were your predictions correct? If so, what do you think will happen to resolve the problem? (Prediction) If not, how did your predictions differ? (Self-reflection)
3. What would a summary of this article be? Include the main idea and three supporting details. (Summarization)
4. Did you read anything that you found unclear? If so, perhaps we can clarify so that you will understand before you read further. (Scaffolded support and clarification)

The above dialogue presents the modeling that is necessary for students to internalize the self-questioning strategy. The intent is that through direct instruction in questioning, students will actively use the strategy when they are independently studying.

Elements of a study strategy known as reciprocal teaching are evident in the above discussion, designed by Palinscar (1984), to encourage comprehension monitoring. It consists of four activities: prediction, summarization, questioning, and clarification. The activities are aimed at teaching students to self-monitor their comprehension, and one way to do this is through appropriate self-questioning. For example: What is my summary of important information from the passage, information important enough for the teacher to ask me on a test? This ability evolves as the teacher models, praises efforts, asks probing questions, and provides constructive feedback. It requires a great deal of class time before students feel comfortable with the strategy, but it is well worth the effort because by asking themselves appropriate questions of text, students get at the core of the active reading-thinking process.

Pearson and Johnson (1978) proposed a taxonomy of question-answer relations as a means of presenting questions within the context of both learners and the text. They identified three types of questions based on the source of information used by readers to answer questions. Textually explicit questions (TE) are those in which needed information is explicitly stated in the text. The answers to textually implicit (TI) questions are implied rather than explicitly stated in the text. These answers require inferencing. When students infer they read between the lines, consolidating textual information across more than one section of text in order to condense it into their own words. Finally scriptally implicit (SI) questions must be answered using students' store of prior knowledge,

for the answers to such questions are neither explicitly stated nor even implied in the text. Answering scriptally implicit questions implies schema or knowledge structure reliance for responses. We can use the preceding passage to illustrate the three above mentioned question types.

- TE 1. Which drug listed had the biggest differential among those drugs that were studied?

- TE 2. Why are drugs in Britain more expensive than drugs purchased in the United States?

- SI 3. How can Congress balance profits and price in a way that is fairer to the American consumer?

When less inferential processing is required, such as following directions, text explicit questions may be most appropriate. Textually implicit questions may be most helpful when the integration of ideas within the text is required. When reading comprehension questions require activation of learners' existing knowledge, scriptally implicit questions are likely to be the most effective as shown in the previous discussion, as a metacognitive strategy modeled by the teacher through think-alouds, for later independent student use as a self-questioning technique.

Questions that require students to respond to: "What will happen, what do you think, why do you think so, and can you prove it?" are examples of questions that "agitate" thought (Pearson, 1985). Such teacher-posed questions, evident in the Directed Reading-Thinking Activity or DR-TA (Stauffer, 1975), are aimed at aiding students in transferring same to their independent reading in both narrative and expository texts. The DR-TA leads students to activate prior knowledge, to predict prior to reading, read to check their

predictions, and finally to confirm the correctness of their predictions by using the text for verification. Sometimes students will find it necessary to revise or elaborate their predictions based on the reading.

For example, if students were to read an expository passage about caverns, they would be asked to make predictions about the content, based on their prior knowledge and the title, pictures, headings, etc. Following the prediction stage, students would read, their purpose being to check the accuracy of their predictions. After reading a section of text, they would be able to either confirm their predictions, alter them, or realize that their predictions were inaccurate, therefore making new ones. The cycle of predict, read, prove or disprove continues throughout the reading of the entire selection.

Stopping periodically to consciously perform these tasks forces students to become actively involved in the thinking process that accompanies effective reading for comprehension. As students begin to internalize the strategy the teacher is able to gradually withdraw from involvement, the intent being that students will use this metacognitive knowledge in other similar situations.

The K-W-L (Know—Want to Know—Learned) Plus strategy, (Carr and Ogle, 1987) is an additional self-questioning strategy first modeled by the teacher and later internalized by students in independent study. It consists of asking three questions: "What do I already know about this topic, what do I want to learn as a result of this study, and what did I learn?" This information is appropriately labeled in chart form and easily replaces the age-old typical worksheet or study guide which often stressed only literal questions and required no reflection. In the first phase of a KW-L lesson, students

brainstorm and discuss the ideas they have on a topic they will be reading about in their text. They can jot down their own ideas on worksheets or in their learning logs. With teacher guidance and modeling, they categorize the information they have discussed and anticipate other categories of information that they may find as they read.

The accompanying figure shows a K-W-L worksheet filled out by a ninth-grade reader with learning difficulties during a lesson on killer whales (Carr and Ogle, 1987). After discussing and listing things already known about killer whales, the student settled on the categories Description, Food, and Location. Based on questions that arose during the discussion and the predicted categories, the student moved to the next phase by jotting down questions that s/he wanted to have answered. These went into the W (want to know) column of the worksheet. Next, the student read the pertinent text, looking for answers to questions.

Depending on the difficulty of the text and the ability of the students, reading may be done in class or as a homework assignment. When text is particularly challenging teachers may wish to break it into smaller segments and stop to discuss answers to the questions in the W column. As students read, they use the L (learned) column of their worksheets to jot down those answers and new information that they find. Teachers lead them to review their questions and answers, with reference to the text and additional explanations as needed.

The semantic map following the K-W-L worksheet extends the basic K-W-L activities by adding group mapping and summarizing activities. Carr and Ogle (1987) refer to this as K-W-L Plus. The first step in mapping is to categorize the information in the L column. The ninth grader decided that

her original three categories in the K-W-L worksheet were not sufficient to cover all the information she learned, so a fourth category, abilities, was added.

KWL Worksheet

<u>K</u> <u>(Know)</u>	<u>W</u> <u>(Want to know)</u>	<u>L</u> <u>(Learned)</u>
They live in oceans.	Why they attack people?	They are the biggest member of the dolphin family.
They are vicious	How fast can they swim?	
They eat each other.	What kind of fish do they eat?	They weigh 10,000 pounds and get 30 feet long.
They are mammals.	What is their description?	
	How long do they live?	They eat squids, seals, and other dolphins.
	How do they breathe?	They have good vision underwater.
		They are carnivorous (meat eaters).
		They are the second smartest animal on earth.
		They breathe through blow holes.
Categories:		They do not attack unless they are hungry.
Description		Warm-blooded.
Food		They have echo-location (sonar).
Location		They are found in the oceans.

A K-W-L worksheet for a ninth-grade lesson on killer whales (Carr and Ogle, 1987).

From this point on, creating a semantic map was relatively simple. The lesson topic became the center of the map, with lines radiating out to the main categories from the K-W-L worksheet. The items from the L column were then listed under the appropriate categories on the map. If teachers

wish to involve students in writing, such a map can become an outline. Students number the categories on the map in the order that makes the most sense to them, as shown. As they write their summaries, they use each category as the basis for a paragraph. The important details for each paragraph are listed on the map.

When teachers think aloud the process of question generation they are making overt their thought processes to their students. This modeling process enables students to realize that at times all readers, including teachers, find reading difficult. Think alouds lead to greater comprehensibility of text, for students learn various methods of dealing with comprehension breakdowns. One of these methods is to stop and ask themselves questions as they reflect both on textual information and background knowledge. The following example exemplifies a think-aloud (Williamson, 1995) that is appropriate for primary grade students.

Summer House

It was a cold winter day. The north wind was blowing and snowflakes were falling. Soon everything was covered with snow, except one little house. There was not a snowflake on the little house or even in the yard around the house. This made the little house very sad. It has happened every year since the little house was built. The little house wanted to be covered with snow so it could be like the other houses in town, and besides, houses covered with snow were very pretty.

All through the winter as often as it snowed, none ever fell on the little house. With the arrival of spring, the snow started melting, and flowers started growing, and the little house was happy now because it was just like all of the others. Soon there were flowers blooming in the flower beds around the house, and there was a vegetable garden growing in the back yard. How happy the little house would be if it would just stay spring and summer all year. But the little house knew it would be autumn soon and that the leaves on the trees would be changing colors and falling to the ground. The

little house knew when this happened, the north wind would soon be blowing and the snow would soon be falling.

When the snow began falling again it never fell on the little house. The little house became so sad, it just wished it could run away and go some place where it never got cold and snowed. The oldest house in town was just across the street from the little house. It noticed how sad the little house looked without any snow on it. The oldest house thought it would be best to explain to the little house why it never snowed on it.

The little house was surprised to learn it was just a summer house and no one lived there during the winter time. Now the little house knew why the snow never fell on it.

One day, someone came and put a sign in front of the little house. Soon the sign was gone and some strange people came to the little house. These were not the people who came every spring. When winter came the people stayed, and when the weather turned cold, snow fell on the little house for the very first time. Children were in and out the door, building the biggest snowman the little house had ever seen. The little house was very happy now for it was no longer just a summer house.

As I read the title, "Summer House," I asked myself, "Could this passage be about a house that is occupied only in the summer? I'll read to see if I'm correct. Yes, the sixth paragraph tells me that this house is occupied only in the summer."

"The first paragraph tells me that the little house was not covered with snow as all the other houses were; I don't know why this was happening. Is this a fact or fiction story? I think it is a fiction story, because if it is snowing, snow will fall on all the houses, and in this case, it isn't. Will I find out why it doesn't snow on the summer house? I'll continue to read, and I think this is the problem that will be resolved."

"Does anyone know why seasons change? All the seasons are mentioned in the third paragraph. How could I find

out? I don't think I'll learn the answer to that question here, but when I finish reading I'll look up seasons in my science book."

"In paragraph six, I think the little house was relieved to find out why it was different, but the problem has not yet been solved. Will it be solved in the last paragraph? I'll read it to see. Yes, it was solved. When people moved into the house and stayed in it year round, it was covered with snow in the winter!"

"What kind of sign was put in the yard of the little house? The story doesn't say, but it must have been a real estate sign, because after it was placed there, people moved in." The preceding explication of the think-aloud process leads to a brief discussion of its complementary term, scaffolding. The major characteristic of scaffolding is dialogue. The purpose of this dialogue is to enable students to complete a task that they could not complete without adult/teacher guidance. In scaffolding teachers first think-aloud the questions they are asking themselves as they read a passage. Later they invite the students to participate with them in question-generation. Finally, they assume the role of "coaches," ready to provide assistance as needed, for example, if students begin to ask an overabundance of literal recall questions. Scaffolding then is a form of assistance to students when they cannot independently employ a strategy (Irwin, 1991). A great amount of teacher support and guidance is gradually withdrawn.

Vygotsky (1978), a Soviet psychologist, uses the term zone of proximal development to describe this aid in the development of students as they reach for levels of literacy development through teacher support that they could not otherwise attain. This developmental theory is grounded in the belief that the scaffold needs to be temporary so that it may

become internalized and carried on through similar tasks without assistance. Said differently, teachers model, think-aloud, and demonstrate the self-questioning that is necessary for their students to replicate in their quest toward independent self-interrogation of the various levels of Bloom's taxonomy.

Multiple levels of interpretation

Teachers must also be aware of multiple levels of interpretation inherent in texts, depending on students' schemata. Schemata are organizational frameworks that allow us to assign (slots) roles and entities (values) to events that occur in our lives or are perceived in our reading (Anderson, 1994). Because of the distinct and varying backgrounds and prior knowledge of students, teachers must expect and make allowances for various interpretations and their resulting influence on the questions they ask. As an example, the author's son, a fourth grader, served as a subject for someone working toward school counselor certification. One of the requirements for certification was to administer a specified number of IQ tests. One of the questions was, "Where is Chile?" to which the reply was, "Alaska!" Because the person was marking responses in full view of my son, he came home quite upset that his response had been marked incorrect. It seems that Alaska was the chilliest place he could think of! The assigned (slot) to Alaska was a cold one and the value he assigned to Chile (chilly) was cold — a perfect match!

Because of the foregoing discussion, the one right answer to teacher-posed questions seems rather antiquated if we perceive reading to be a constructive process consisting of the interaction among reader, text, and context (situation). Most definitely then, according to current research, the background knowledge and previous experience the reader brings to the

reading act are equally as important as the other two components.

The implications of multiple interpretations focuses on teachers modeling this process as they think aloud the questioning strategy process. Following teacher modeling, students should be encouraged to share their interpretations of text following their self-questioning as they read passages of text. This sharing can take place in whole group discussions, small cooperative/collaborative groups, triads, or peers. Additionally, it can take place in student/teacher conferences where it may serve the dual purpose of assessing background knowledge and text comprehension.

Summary

Because poor readers and young readers tend not to reflect on text after reading (Guetz, Palmer, and Haensley, 1983), appropriate self-questioning following reading is important in order to review text and check comprehension. Questions such as, "Did I meet my goal? What did I learn? Did I predict accurately? Did my reading make sense? Can I summarize the major points of my reading?" can be directly taught and modeled.

When students are directly taught appropriate self-questioning techniques through modeling, followed by scaffolded instruction, and metacognitive strategy employment, students' interaction with text is enhanced, maintained, and transferred to new and novel situations. Self-questioning then, is a process of reading intended to aid students in the process leading towards independence in understanding, the goal of reading. This active comprehension focuses on continuous attention to self-generated questions aimed at relevant aspects of text, shifting from question to answer.

Goal-directed and organized, it places the locus of control on students (Nolte and Swinger, 1985).

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Announcing Spelling in Use

Written by Lester L. Laminack and Katie Wood. Publication Date: September 4, 1996. Audience: elementary and middle school classroom teachers. Available from NCTE, 1111 W. Kenyon Rd., Urbana, IL 61801-1096. Price: \$11.95; NCTE members, \$8.95. ISBN: 0-8141-4663-5.

One of the primary targets for critics of whole language methodologies and the writing process has been the place of spelling instruction in such pedagogies. Practitioners of holistic methods have been long accused, largely inaccurately, of failing to teach children how to spell. In an important new book from the National Council of Teachers of English, Lester L. Laminack and Katie Wood explain in clear and lively prose that learning to spell is part of the overall development of competent writers, one of many resources that will help children to become powerful communicators in writing. They make a clear and compelling case for the teaching of spelling in use rather than as an isolated skill.

Spelling in Use ends with a thoughtful consideration of common questions that teachers have regarding their own spelling instruction. These include, "When do you stop letting children use invented spelling?" and "Should I give grades in spelling?" Laminack and Wood believe questions "keep us growing, keep us thinking." Ultimately, they hope their book will help readers to think and to talk about children as writers, "writers who have many tools at their disposal, spelling being one of them, to write with power in the world."