Techniques to Conduct Research in Metacognition and Reading

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During the last twenty years a great amount of research has been devoted to the area of metacognition and reading comprehension. Taking into account the importance of this type of research for people interested in the teaching and learning of reading, this article describes and analyzes some of the most common techniques used to conduct research in metacognition and reading. First, a general concept of metacognition and a brief explanation of the relationship between metacognition and reading are presented. Second, the article focuses on the description and analysis of five research techniques commonly used in the study of metacognition and reading. Third, some conclusions and recommendations are provided in relation to the strengths and limitations of the research techniques.

Metacognition has been defined by a good number of authorities in the field. Flavell (1978), who appears to be the first in coining the term 'metamemory', defined metacognition as "one's knowledge concerning one's own cognitive processes and products or anything related to them ..." (p. 232). Brown (1978) provided a shorter defintion. Metacognition is "knowing about knowing." A similar definition was given by Garner (1987): "Metacognition is esentially cognition about cognition." Bake and Brown (1984) have argued that it is necessary to distinguish between two types of metacognitive knowledge: knowledge about cognition and regulation of cognition. In general, these definitions coincide on characterizing metacognition as the knowledge, awareness, or beliefs and control that people have over their own cognitive processes, experiences, and strategies.

Metacognition and Reading

Taking into account that the definition of metacognition is broad and refers to cognitive processes in general, one wonders about the relationship between metacognition and reading. Garner (1987) gives us a clue to see this relationship. She states that "If cognition involves perceiving, understanding, remembering, and so forth, then metacognition involves thinking about one's own perceiving, understanding, and the rest" (p.16). In other words, a subprocess of metacognition includes thinking about our way to understand messages either orally or in writing.

Importance of Metacognition Research to Reading

The application of the theory and research in metacognition to the study of reading comprehension has been very fruitful due to its explanatory power for describing the reading process (Garner, 1987). In other words, metacognition has contributed to the development of theories and models of reading.

When metacognition has been used to study readers of different ages and language proficiency levels, it has helped us to identify and explain important differences among these populations. In this way, researchers have been able to identify a number of characteristics of good and poor readers.

As a result of the study of good and poor readers, researchers in the area of metacognition and reading have been able to identify, describe, and analyze a number of reading strategies that are used by readers in order to construct meaning. In addition, asking readers to verbalize what they do while reading has demonstrated that they are aware of a variety of strategies that can be considered either effective or ineffective to comprehend a written text.

Another area where research in metacognition and reading has contributed is in curriculum and instruction. This body of research can be used as a theoretical framework in order to design instructional programs and materials that include and promote the use of effective reading strategies. In addition, it can help us to design remedial interventions for those students who have reading difficulties.

Research Techniques

After reviewing the literature, I have selected five techniques which seem to be the most commonly used to conduct research in metacognition and reading. They are interviews, questionnaires, error detection tasks, miscue analysis, and verbal reports. After describing each technique, I give an example of the items, where it is appropriate. Then, I analyze the strengths and problems of each technique.

Interviews

In this technique, the researchers ask a series of oral questions related to the learners' knowledge and experience about reading. While carefully listening to them, the researchers take notes or tape-record their answers. Some examples of questions used to find out the children's knowledge and purposes of reading are given by Garner and Kraus (1982):

How good a reader would you say you were?

What things does a person have to do to be a good reader?

If I gave you something to read right now, how would you know if you were reading it well?

What makes somethig difficult to read?

Do you understand everything you read?

What do you do if you don't understand everything you read?

Two types of interviews have been frequently used: standardized and unstandardized interviews. In the standardized interview the same questions are asked to the learners in the same way. In the unstandardized one, the questions are not structured in the same way, and additional questions can be added during the interview.

One of the most important strengths of interviews refers to the possibility of collecting complete information directly from the students. This information can reveal the students' perception of reading purposes, their concepts of reading, their comprehension monitoring, their reading strategies, and so forth. Another advantage of interviews includes the opportunity that the researcher has of focusing the questions on a specific topic. In this way, a set of irrelevant information can be eliminated. Additionally, it is possible to ask follow up questions in order to clarify or extend the interviewees' responses. As a result, the data reflects much richer information (Rhodes & Shanklin, 1993).

Some of the concerns that have been expressed in the literature reviewed about interview data include the following ones. First, the report of knowledge, experience, and strategies given by informants cannot be completely accurate. The main reason for this innacuracy lies on the fact that some cognitive processes in general, and some reading processes and skills in particular, have become automatized. Consequently, they are not available for being reported from memory (Garner, 1987). Second, the accuracy of the responses about reading processes can be affected by the interval between what is reported and the processing experience according to Garner (1987).White (1980) indicated that "reports taken at a great distance from processes they are intended to tap may tell us nothing about consciousness at all" (p.63). Third, respondents could not report what they really do. Either they may report things they do not do in reality or they could do more than what they say they do (Rhodes & Shanklin, 1993). Fourth, collecting data through interviews is time consuming, especially when one wants to get the reports from a large number of students. Fifth, young children or poor readers could have difficulties in reporting about their cognitive processing by means of interviews. Their limited language skills and analytical abilities and their difficulty to speculate about hypothetical situations can be the sources of these difficulties (Garner, 1987).

Questionnaires

Questionnaires are composed of a series of questions or statements about knowledge, use, and strategies of reading. They call for short-answer responses or require the selection of appropriate responses from a list of multiple choices. Two items from a published questionnaire, the Metacomprehension Strategy Index, designed by Schmitt (1990) have been selected as examples.

1. Before I begin reading, it is a good idea to:

   A. See how many pages are in the story
   B. Look up all of the big words in the dictionary.
   C. Make some guesses about what I think will happen in the story.
   D. Think about what has happened so far in the story.

2. While I am reading, it is a good idea to:

   A. Read the story very slowly so that I will not miss any important parts.
   B. Read the title to see what the story is about.
   C. Check to see if the pictures have anything missing.
   D. Check to see if the story is making sense by seeing if I can tell what has happened so far.

The main purpose of the previous questionnaire is to identify the students' understanding of comprehension strategies before, during, and after reading.

Some of the strengths of using questionnaires to collect data about metacognition and reading can be summarized as follows. Well designed questionnaires focus data collection on specific questions or issues related to the students' knowledge and control of the reading process. Practicality issues related to administration, facility to answer the questions, and time constitute another strength of questionnaires. They are easy to administer and to answer. Contrary to interviews, they are not time-consuming, since they can be given to an entire class within a limited period of time. In addition, questionnaires facilitate the process of data quantification and comparisons of individuals and groups.

In addition to facing similar problems as those indicated for interviews, questionnaires tend to diminish and limit the learners' capacity to generate their own answers. In Rhodes and Shanklin's (1993) words, "Multiple-choice questionnaires put words into students' mouths" (p. 119). Another concern about questionnaires refers to test preparation. Extensive preparation in order to get clear and relevant questions is needed before designing questionnaires.

Error Detection Tasks

This technique involves reading passages which have been altered by the inclusion of errors. These errors can be of different types: disorganized passages, incomplete instructions, inappropriate transition words, contradictory information, etc. (Winograd & Johnston, 1982). The purpose of Error Detection Tasks (EDT) is to infer "something about learners' sensitivity to comprehension obstacles in both oral and written texts they encounter in school and out" (Garner, 1987, p.85). In EDT the students are given some passages that have been modified or altered previously. Originally, they were asked to read and react to what they had read, but they were not informed about the presence of errors (Garner, 1987). If they did not express anything related to the errors, they were

helped by such probes as: "Any comments?", "Do you have any questions?", Did everything make sense?", Would you change anything in the story?" Does everything sound all right?", "Are there any sentences that don't fit?" (Winograd & Johnston, 1982).

The strengths of EDT can be stated as follows. They can allow the researchers to make inferences about some individual cognitive differences in processes such as comprehension monitoring. Practicality issues related to ease of administration, students' facility to do the task, reduction of time, and facility to give EDT to large groups of students constitute strengths of these tasks. Additionally, EDT like questionnaires share the strength of facilitating data quantification and comparison of individual and group performance.

Despite the fact that EDT have been widely used, they are not without its critics. Gardner (1987) indicates that one of the reasons for the concerns is "the much-replicated result of only moderate demonstration of detection, even among able adults" (p.40). One cannot conclude that the readers' comprehension monitoring abilities are deficient because they could not identify errors (Winograd & Johnston, 1982). Another limitation of EDT involves the difficulty of specifying the type, the degree, and the effect of the target errors. In fact, the literature reports a variety of categories of errors, such as deletions, substitutions, inconsistencies, anomalous sentences, unclear pronominal references, spelling errors, grammatical errors, inappropriate transition words, etc. (Garner, 1987). Still another limitation of EDT lies on the additional effects that can be produced by the use of probes. In other words, these probes can be facilitating the identification of errors. Finally, it could be argued that the researchers' criteria for making the appropriate inferences about the students' cognitive monitoring and for deciding when comprehension is adequate can also become a problem for this research technique.

Miscue Analysis

In this technique the learners are asked to read a passage orally while the researcher pays attention to the miscues or errors made by the readers or students. The term miscues (Goodman, 1973) has a positive connotation over errors to indicate that they belong to a natural process of language learning and language use. The most important objective of Miscue Analysis (MA) is to gain insight into the reading process. In addition, "it provides a view of the knowledge readers bring to their reading and the strategies they use to solve their problems" (Goodman, Watson, & Burke, 1987, p.4).It is because of this second objective that MA can be considered a technique to conduct research in metacognition and reading. However, it is the researcher's task to identify the reader's strategies and processes, since the readers are not required to report about them.

One of the main strengths of MA is that it has allowed us to draw some observations about processing that are widely accepted

now. Beebe (1980) identified three of them: a) miscues have different impacts on comprehension, b) miscues are natural to the reading process, and c) repeated readings are more positive than negative, since they show that the reader has realized that something is wrong in the text. Another strength of MA lies on the possibility of studying the reading process by using uncontrived texts (Garner (1987).

Some of the limitations of MA include the fact that the identification of some metacognitive processes is not done by the learners themselves, but it is the result of the researcher's interpretation. In other words, the researcher's biases can be reflected in the interpretation of the types of miscues. Another limitation lies on the comprehension interference that could be caused by the oral reading. After all, oral reading usually demands attention to pronunciation, intonation, and punctuation. Although in Miscue Analysis these demands are not explicitly stated, the reader could assume that they are required. This could also be the result of teaching practices from primary school. Still another limitation may lie on the making of inferences about such complex cognitive processes based on a limited data source. In other words, miscues may constitute a limited source to make conclusions about the complex metacognitive processes included in reading.

Verbal Reports

In this technique, data about the reading process are collected by means of verbal reports given before, during, or after doing a task. Verbal reports (VR) include retrospection (Garner, 1982) and concurrent reporting (Brown & Day, 1983). In retrospection, the learner gives the report immediately after completing a task. This report can include what learners remember thinking or doing during the task. In addition, one can ask the learners to theorize about their actions on the tasks. Concurrent reporting are VR given while the subjects perform a task. Concurrent reports include thinking-aloud and introspection (Ericsson & Simon, 1980). In thinking-aloud the subjects report what they are thinking while performing a task. In introspection, the subjects not only report on their cognitive processes, but also theorize about them. Consequently, introspection involves an additional burden on the readers' cognitive capacity. For this reason, some reserchers such as Ericsson and Simon do not recommend it.

The strengths of retrospection and think-alouds as types of VR can be stated as follows. The reports about the cognitive processing are given by the students based on a concurrent specific task. In addition, VR provide rich data about immediate cognitive processes. In contrast to interviews and questionnaires, memory failure is not a problem for VR. These reports about the readers' knowledge and use of it are done within seconds or minutes, rather than after weeks, months, or even years (Garner, (1987). Taking into account that the students are giving a "blow by blow description" of the cognitive resources that are being used, discrepancies between knowledge and its use are rather improbable (Garner, 1987).

Although, VR appear to overcome some of the limitations of the other techniques, some problems still remain unsolved. First, Garner (1982) has pointed out that there is skepticism about the learners' access to 'the workings of the mind". In other words, there is uncertainty about what people actually can know about their own thinking processes. This is especially true with those processes or skills that have become automated, since they are not accessible to be reported from memory anymore (Cavanaugh & Perlmutter, 1982). Another concern refers to the possibility of confounding the results due to the readers' limited cognitive or language skills. Especially, young children and poor readers seem to be affected by this serious limitation (Garner, 1987). Still another concern about think-alouds is the serious problem of disruption and distortion of the reading process. Garner (1987) gives two possible reasons for this. First, moving thought to language may require processes that otherwise would not occur in task resolution, and second, the need for additional processing capacities may interfere with normal processing" (p.74). -

Conclusions

The theory and research about the learners' knowledge, use, and regulation of their own cognitive processes is known as metacognition. Due to the close relationship between metacognition and reading, this theory has been used to describe the reading process, to characterize good and poor readers, to identify effective reading strategies, and to design innovative instructional programs.

The techniques most widely used to conduct research in metacognition and reading are interviews, questionnaires, error-detection tasks, miscue analysis, and verbal reports. The description and analysis of these techniques have revealed a number of strengths and limitations for each one. Consequently, on one hand, there is a need to look for ways to take advantage of the strengths of each technique. On the other hand, we need to find alternative solutions to overcome their limitations, obviously, the research questions that one plans to answer by using a specific research design will determine the type of technique or the combination of techniques needed to collect the data.

Some recommendations that I would like to give to teachers and graduate students who plan to conduct research in metacognition and reading are the following ones.

If you are new to the field, it is advisable to use only one technique in your first study, so that you get familiarized and test the effectiveness of the technique. Then you can start combining the techniques based on the types of questions of your research project.

In the next stage, you can attempt to design a procedure that takes advantage of the major strengths of each technique and that facilitates a more accurate study of the metacognitive topic related to the reading process. For this purpose, I would emphasize on the following characteristics:

1. Using research techniques in conjunction

with a task. In other words, to ask the students to do a task and apply the technique either during the performance of the task or immediately after finishing it. As a result of this concurrency of technique and task, one can minimize memory failures due to the reduced interval of time.

2. Aiming at collecting rich information. Taking into account the purpose of research in metacognition and reading, you need to use those techniques that allow you to get rich and abundant data in order to get a better understanding of the students' knowledge and control of their reading processes.

3. Avoiding discrepancies between knowledge and its use. In order to accomplish this, you should make sure that you use an appropriate task in addition to the research tool.

4. Using uncontrived texts. Although there are some advantages in using contrived texts, such as the ones indicated in EDT, it is advisable to collect data through the use of texts without modifications.

5. Using questions appropriately. Two important suggestions can be included here. First, you need to focus the questions on specific topics according to your research questions. Second, it is advisable to be ready to use follow-up questions in order to clarify the ideas and as a result to enrich the data.

6. Providing training to students on the use of the technique. Although this suggestion is applicable to all of the students, it is highly recommended to provide practice opportunities on how to do the tasks to young children and poor readers.

To conclude, it is necessary to remind the readers that trying to uncover "the workings of the mind" is a very complex endeavor. Consequently, the research techniques will not always be perfect. However, we need to continue working in the opening of better windows that allow us to find richer information and to make better inferences and interpretations of the cognitive and metacognitive aspects of the reading process.

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