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The dialogic nature of the think aloud study investigating reading

1. Introduction

The focus of this paper is the think aloud (TA) study, which is part of a more extensive study investigating reading skills of advanced learners of English. I concentrate on the dialogic nature of this study, as revealed in the process of analyzing protocol data.

In the process of conducting the study, a number of interrelations between various factors were observed: e.g. between learners' first language (L1) and their foreign language (FL), reader and text or reader and TA method. This paper investigates the dialogue between research and theory that became evident during conducting the study, especially at the stage of analyzing data. It explores a symbiosis between the methodology applied and the very construct the study investigates – reading. In other words, the paper discusses how the TA method used in this study influenced the conceptualization of reading.

With regard to the relationship between theory and research, protocol analysis can be used both inductively i.e. as an exploratory methodology, and deductively i.e. in order to test hypotheses about reading that emerge from initial explorations (Pressley and Afflerbach, 1995). Erickson and Simon (1980) and Afflerbach (2000) emphasize the role that protocol analysis plays in the exploration of the very construct it is used to investigate. Protocol analysis may be first used to initiate the construction of theories concerning reading; to break ground for new understandings of reading. It can also direct researchers in their attempts to develop existing theories, facilitating their understanding of a variety of factors that constitute reading.

The main aim of this study was to investigate how students approach texts and what strategies they use in order to see whether there is any difference between how learners read an English text and a Polish text. In this study protocol analysis was applied for exploratory purposes, i.e. to observe readers' behaviors during reading expository texts in English and Polish. However, analysis of the data emphasized the importance of drawing on relevant theories in the process of analyzing data and designing a coding system. It showed how different ways of approaching TA data, based on different theoretical

perspectives, contributed to the conceptualization of reading. The next section presents a short history of TA studies, pointing to different conceptualizations of reading that the studies promote.

2. The concept of reading in think aloud studies

Asking people to describe what they think is not a new research method. William James, a famous American psychologist (1890), asked his subjects to introspect in order to develop his theories about human psychic life. Protocol-based research was used to watch how people solve mathematical problems (as carried out by Polya, 1954 cited in Afflerbach, 2000) and how they play chess (as investigated by de Groot, 1965 cited in Afflerbach, 2000). In researching reading, protocol analysis began to be used in the first half of the 20th century, e.g. by Huey (1908). During the cognitive revolution, which followed on from studies investigating human problem solving, e.g. those by Newell and Simon (1972), researchers, e.g. Olshavsky (1976/1977), began to see reading as strategic problem solving.

Nowadays protocol analysis research is burgeoning. It allows researchers to collect details concerning reading and reading-related phenomena. Within cognitive psychology, protocol research focuses on observing single reading-related phenomena, such as generalizing inferences (Collins, Brown and Larkin *et al.*, 1980) or determining main ideas (Afflerbach, 1990 cited in Afflerbach, 2000). Another body of research focuses on what Earthman (1992, cited in Afflerbach, 2000: 167) names “‘the concert’ of readers orchestrating complex strategies of cognition, knowledge construction, response within acts of reading.” Studies focus on acts of reading, as opposed to single aspects of reading within acts of reading (which was the aim of the aforementioned cognitive research). Attempting to describe the totality of the reading task, numerous inquiries investigate more than cognitive strategies; they look at interdependencies of strategies, stances, goals, reader affect and motivation. In other words, they look at the impact of contextual factors on the use of strategy. Studies observe professors and students reading primary source texts in history (Young and Leinhardt, 1998 cited in Afflerbach, 2000) or physicists reading professional journal articles (Bazerman, 1985 cited in Afflerbach, 2000).

A conceptualization of reading as a cognitive process influenced by contextual variables was complemented by studies within the literary tradition. For example, reader response critics (Fish, 1980; Rosenblatt, 1978) view reading as a transaction between reader and text. Studies within this group of research investigate how readers interact and respond to literary texts.

At this point in discussing the impact of think aloud (TA) protocols on the conceptualization of reading, it is worth presenting the synthesis of TA reading research prepared by Pressley and Afflerbach (1995). These researchers examined the theoretical principles that underpin think-aloud studies and aimed to identify aspects of reading that think aloud research investigates. In the conclusion Pressley and Afflerbach (1995: 2) proposed the model of “constructively responsive” reading, according to which good readers are always changing their processing in response to the text they are reading.

The result is complex processing. Pressley and Afflerbach (1995: 117) claim that this complex nature of constructively responsive reading subsumes all processes proposed in the main theories of text processing, namely: reader response and transaction with the text, as conceived by Rosenblatt (1978); monitoring the use of strategies, as described by Baker and Brown (1984); top-down processing as proposed in the schema theory developed by R.C. Anderson and Pearson (1984) as well as bottom-down processing as emphasized by van Dijk and Kintsch (1983); and extensive inferencing, as explored by Graesser and Bower (1990), and an awareness that reading is socially embedded, as investigated by Smagorinsky (1998).

To sum up, think aloud methodology lends itself to investigating a variety of reading aspects: cognitive, affective and social.

3. The think aloud study investigating reading in Polish and English

3.1. Goal of the study

Assuming that students are more skilled readers in their mother tongue than in a foreign language, I was interested to investigate whether there is any particular aspect of reading in Polish whereby students show more skill and which could be transferred to improve their reading skills in English. I considered the think aloud procedure appropriate for this purpose. Gaining insight into subjects' reading processes provides an excellent opportunity to observe how students approach text in both languages, what difficulties they encounter and how they handle these. I believed that applying an on-line method would facilitate a comparison of students' reading in the two languages.

3.2. Subjects of the study

The subjects chosen for the study were five undergraduate students from a foreign language teacher training college: four women and one man – this ratio reflects that of the college population. All the subjects were in their early twenties.

3.3. Texts used in the study

Both texts were authentic news magazine articles: a Polish article taken from *Newsweek Polska* and an English text from *Time*. When selecting these texts no readability formula was used to assess them. Since the study was based on a theory which views reading as a problem solving activity, I assumed that the texts should be somehow challenging for the students. I decided that this challenge should be present not in the topic itself, but in how it is discussed. I therefore looked for texts developing their main topics in an

intricate way. However, I hoped that the topics of the texts would be of general interest and that the subjects would find them interesting enough to continue reading.

3.4. Tasks the subjects completed

My purpose was to elicit a natural way of reading a complete text. In order to slow down the process of attending to text, the think aloud task directed the subjects to read texts paragraph by paragraph. This served to elicit reading for main ideas in order to observe how the students construct their comprehension of texts. After each paragraph, students were asked to summarize it and predict what the next paragraph would be about. The aim was to introduce breaks in the same places in the texts and to impose on subjects a similar manner of reading. This was intended to facilitate comparison of the students' protocols.

4. The process of analyzing the protocols of the study – an interplay between theory and research

Below I report on the process of analyzing the TA data. I look at how the analysis of the protocols evolved, emphasizing the role of theory at this stage in conducting the study. The main aim is to report on the symbiosis between the TA methodology and the construct the study investigates – reading.

4.1. Analysis of actions (strategies) students applied

The first stage of analyzing the data involved distinguishing the actions which the students took while reading the text. An individual strategy was considered as an action taken by a student in order to complete the task of reading and summarize particular paragraphs. Strategies were observed as behaviors, i.e. what students did while reading.

A range of actions was identified in the protocols. These various actions were then grouped and named. Below, a few examples of each type of strategy are listed:

Technical strategies – paraphrasing, re-reading and reading aloud parts of the text;

Emotional strategies – expressing surprise, interest, disappointment;

Rational/logical strategies – comparing different parts of the text, linking different parts of the text, predicting the development of ideas;

Evaluating/critical strategies – stating understanding, stating lack of understanding, looking for confirmation of predictions, stating no confirmation of predictions, commenting on one's way of reading the text, assessing the difficulty of the text, identifying parts of the text important to one's understanding, reflecting on the parts of the text.

Technical strategies were the most frequent actions taken by the subjects. They involved dealing directly with the text. These strategies seemed to be the most basic ac-

tions that the students took in order to talk about their reading. In emotional strategies, the readers showed their emotional reaction and involvement in relation to the text; they expressed their surprise or disappointment concerning both the ideas and organization of the text. Rational/logical strategies were actions which reflected the students' attempts to manipulate the text. Learners compared or linked different parts of the text to construct their comprehension. This group of strategies also contained strategies that involved predicting the development of ideas. Evaluating/critical strategies entailed actions which showed the critical approach of students to both the text and their process of reading. The students were aware of whether they could understand the text or whether their understanding was not right; they evaluated the results of their understanding, and commented and reflected on it by asking themselves questions about the text and their own reading.

4.1.1. Results of the analysis

The analysis of the students' actions indicated differences between reading in English and in Polish. A greater number of emotional strategies were employed by students in reading in Polish. Students were also involved in more of a dialogue with the text while reading a Polish text, i.e. they more often asked themselves questions concerning the ideas of the text, as if arguing with the text and its author. Furthermore, the results of the analysis indicated differences between individual students in their use of strategies.

The analysis appeared to conceptualize reading as a list of actions. However, the actions carried out by the students highlighted a prominent role played by the text in students' readings. It became clear that it was necessary to account for the dialogue between reader and text in more detail. This led me to the next stage of the analysis.

4.2. Problem/solution analysis

To explore the dialogue between reader and text, the concept of reading as a problem solving activity was accepted (cf. the study by Olshavsky, 1976/1977). The purpose of this analysis was to observe how students approached the texts, and how they reacted to signals in the text. In other words, it aimed to reveal how the students took advantage of the text in constructing their mental representations of the texts. The analysis looked at the mental structures (a set of ideas) that students used to build their models of the text (i.e. their comprehension of the texts). The problem/solution analysis focused on "places" in comprehension which students identified as problematic, and solutions they applied, i.e. how they coped in such situations. The main aim was to relate students' problems to the text by observing how learners made use of texts. Reading problems were defined as the points in students' reporting where students paused in the text and commented on the reasons why they had stopped reading. Very often students referred to these reading experiences as "difficulties"; they said that they did not understand something or found something unclear or disappointing. In many cases, the readers asked themselves questions concerning their reading problems, such as "what does it mean?", "how does this relate to that?"

In this analysis, reading emerged as a problem solving process, i.e. a series of problems students experienced, and solutions they applied to solve them. The results suggested that students' reading comprehension was similar to constructing a kind of system. The readers seemed to develop a construction of their understanding. They were very methodical in identifying problems and looking for solutions. It was interesting to observe how different readers approached the same parts of a text. While developing a coding system, I realized that it was necessary to analyze the text in more detail, and to somehow relate it to the particular ways in which students coped with the text.

For this purpose, the expository text grammar model suggested by Britton was used. Britton (1994: 641 citing Gernsbacher, 1990) claims that "expository texts are intended to build a structure in the readers' mind". The author of an expository text guides the reader by providing: a) the instructions that will enable the reader to construct the correct structure of the text; and b) the building materials, i.e. the concepts and propositions that the reader can use to develop the intended structure. The reader's role is to recognize and execute text instructions; to add any structure building instructions not provided by the author; to use the concepts and propositions provided by the text; to recall and draw upon any prior knowledge necessary to build the structure; and to add any building material not provided by the author. Britton suggests that "the mental structures that readers derive from a text often will be incomplete or incorrect, when compared to the structure intended by the author" (1994: 644). An expository text offers a set of sentences, and the reader's task is to assemble the structure of ideas.

To infer how the students constructed their models of the texts (i.e. their comprehension), two steps were taken. Firstly, the texts were "deconstructed" using Britton's grammar, which resulted in the identification of the main concepts and propositions of the texts, as well as the interconnections between them. Then, as was done earlier, the problems and solutions of each student were identified in protocols.

There was an undeniable advantage of applying a text grammar model to this analysis. It enabled me to look at students' comprehension as a process of constructing a model of text. In turn, this model-based theory of comprehension facilitated an exploration of two intertwining factors involved the reading process: text and reader. It helped to combine an analysis of the text with an investigation of how students read this text.

4.2.1. Results of the analysis

The analysis highlighted that vocabulary and key words were the main sources of problems in reading the text. Vocabulary was an obstacle mainly in reading in English. The students asked questions concerning the words they did not understand. It was interesting to observe how consistent the readers were in developing an understanding of difficult words. Similarly, the readers asked questions concerning their understanding of certain concepts. They looked for links between concepts they found unclear and various parts of the article. They expressed disappointment when they could not find information about the concepts that they had identified earlier.

The analysis revealed that the students were sensitive to certain text cues, for example the main paralinguistic devices of the text, such as the title and subtitle. Also, the pictures accompanying the texts seemed to play an important role in how the subjects

constructed their models of the texts. By referring to the pictures, the students developed ideas which had been initiated earlier by means of the text. Additionally, the pictures facilitated an evaluation of student comprehension.

The protocols indicated that the students constructed their models of texts around the key words, i.e. the words that functioned as key concepts in their comprehension. It was important to observe the roles of the first and last sentences of paragraphs in the students' construction of comprehension.

The analysis illustrated how each of the subjects coped with the difficulties he/she encountered, implying that each reader had his/her own "idiosyncratic" way of reading. This finding complemented the similar results obtained in the previous analysis.

With regard to the conceptualization of reading, this analysis implied that in order to obtain a more comprehensive picture of reading, more concern should be devoted to the content of students' comprehension, i.e. students' models of the texts. This led to further analysis of the ideas (propositions) that students formed while constructing their models of the text.

4.3. Analysis of students' propositions

In this analysis, Britton's grammar was applied to analyze students' protocols. For each reader the results of the two analyses, that of the protocol and that of the text, were compared. The results revealed how each reader constructed his/her model of the text (i.e. what ideas they developed in their comprehension) drawing upon clues within the texts.

4.3.1. Results of the analysis

The analysis enriched the conclusions obtained from the earlier analyses. The combination of the analysis of think aloud protocols with the analysis of the text provided valuable information about how the students approached the text, emphasizing the role of text in the process of reading.

The analysis showed how the students constructed their comprehension by interacting with clues in the text. The students appeared to follow some of the clues. However, there were some concepts and propositions provided in the text that almost all the students ignored. The findings raised a question concerning the source of difficulty for readers i.e. which factor is to blame – the author/text, or the reader who is unable to understand the text.

Furthermore, the analysis revealed the students' individual patterns of developing comprehension, i.e. the sequences of their actions. This again confirmed and enriched the results obtained in the earlier analyses. It seemed that each student followed a very similar pattern while reading in both Polish and in English. This implies that there is a transfer between reading in the two languages, probably from Polish into English.

5. Conclusion

In the process of analyzing the data a variety of factors came into play. The findings elucidated the relationship between reader and text. The analysis showed that in a dialogue between reader and text, the subjects were very active, strategically solving problems they encountered. The results emphasized the role of text in students' reading. To explore the interactive nature of reading, a series of analyses was applied. The analysis of reading strategies was followed by the problem-solution analysis, which was supplemented by analysis of the texts. This resulted in looking at both the content, i.e. concepts and propositions of the texts, as well as the ideas that the students used to construct their comprehension of the texts. Combining the analysis of the texts with the analysis of students' behaviors enabled me to see the subjects' reading not only as a problem-solving activity, but also as a purposeful construction of meaning, based on the cues offered by the texts.

In the analysis of the data, a dialogue between the think aloud methodology and the construct of reading became evident. During the analysis, a number of theoretical perspectives related to reading and text were drawn on. The analysis of reading strategies and the analysis of problems and solutions were conducted within the psycholinguistic theory, which views reading as a cognitive strategic problem-solving process (cf. Olshavsky, 1976/1977). The texts read by the students were analyzed by means of the expository text grammar model suggested by Britton (1994), which emphasized the role of text linguistics in investigating reading. I would like to emphasize the role that this approach played in analyzing the results of the study. The use of Britton's text grammar served two purposes. First of all, it allowed me to analyze the propositions of the texts read by the students. It also inspired me to investigate the ideas comprising the students' mental representations of the texts they read and talked about. The process of comparing the models developed by students against the propositions of the texts provided a more complete picture of the reading that I aimed to investigate.

The development of different stages of data analysis enabled me to look at different angles of the same process, thus allowing triangulation. The use of more than one theoretical perspective to interpret the data created opportunities for noticing and focusing on the roles of different factors in the reading of the subjects. This approach underscores the importance of dialogue among different theoretical perspectives in analyzing and interpreting research data.

With regard to the goal of the study (i.e. to investigate reading in Polish and English), the results of TA protocols revealed the following:

- 1) students demonstrated their own patterns of reading the texts;
- 2) students followed the same reading patterns while reading both in English and in Polish, indicating that there is a transfer of skills probably from Polish into English;
- 3) subjects used emotional strategies more often and dialogued more with the text while reading a Polish text;
- 4) difficulties with vocabulary were more prevalent in reading in English.

To sum up, the study highlighted the complex nature of reading, underlining the interplay of many factors which contribute to this skill such as a L1 and a FL as well as reader and text. In the future it may be interesting to investigate reading from a sociolinguistic perspective, for example by investigating how reading comprehension is developed during a dialogue between readers discussing the same text.

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