READING AND ENVIRONMENTAL EDUCATION

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Abstract. Concept maps have been widely used the fields of Science and Technology. (Abrams, 1999) Though, in other learning fields, such as Human or Environmental Sciences, its use seems not to be much explored. This study presents a proposal for the use of the concept maps in the area of Environment Education and the study of the mother tongue to improve text comprehension by students of High School of a public school in the State of Rio de Janeiro, Brazil. For such, we offered an optional workshop of 18 hours divided in two Saturdays, outside the school context. In order to assess the students' improvement in text comprehension, we analyzed their written summaries of the same text, one written before and other after the intervention with concept maps. The results show that the students were able to understand better the text, among other improvements. So concept maps came out as a powerful tool to text comprehension, particularly the ones related to environmental education.

1 Introduction

Concept Maps are hierarchical diagrams that indicates relations between concepts and try to reflect the logical organization of a topic or part of a subject. (Moreira & Masini, 1982; Novak & Gowin, 1994). We can also define concept maps as "a schematic device for representing a set of concepts embedded in a framework of propositions" (Novak & Gowin, 1994).

Many students don't understand texts because they can't organize ideas hierarchically. They often memorize school subjects and only repeat what is taught. Concept maps as a pedagogical intervention can be a very helpful tool in text comprehension, as one of its purposes is to organize ideas in a hierarchical way. If students become able of such a task, they'll improve their reading, and thus becoming active in the reading process.

1.1 Concept Maps and Meaningful Learning

Knowing that meaningful learning takes place hierarchically, (Moreira & Masini, 1982), such hierarchy through concept maps will generate logical organizations among various concepts. So, the maps collaborate with the organization of ideas (Novak & Gowin1994:15; Lapp 1989:243).

Some of the contributions of the Concept Maps in the teaching-learning field is to help in the metacognition process is to help in the metacognition process and provide a schematic summary of what is being taught (Novak & Gowin 1994:15); another contribution of Concept Maps is to facilitate collaborative learning (Cañas, 1997; Novak & Cañas, 2006). So, Concept Maps will emerge as a powerful means of developing students' meaningful learning.

1.2 Concept Maps and Summary Production

Summary can be defined as a semantic reduction of the text and it can be applied to "reproduce clearly these relations [between the central ideas] exactly as they are in the original text" (Machado, 2004:41)[1] . So, Concept Maps are an essential tool in summary writing (Grabe 1997, *apud* Griffin & Tulbert, 1995).

In order to corroborate Novak's thought (1994), Grabe (1997) suggests that the perception of the organizational structure of the text can give a more satisfactory comprehension and mentions the summary and the semantic map (or concept map) as a tool to reach it. We've inspired ourselves in Novak as well as in Grabe to choose the summary and the Concept Map as a tool to text comprehension, which will be reflected in the students' summaries after the intervention.

Summaries are also discussed by Machado (2004). She suggests that schemes to organize a text globally reproduce and establish relations between the central and secondary ideas of the original text and collaborate to

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[1] "reproduzir claramente essas ralações [entre as idéias centrais] tais como se encontram no texto original"

summary production. Another study about summary, from Thiede & Anderson (2003), shows that summarizing is an important tool to text comprehension, especially in relation to expositive texts.

So, the studies of Grabe (1997; 2002), Machado (2004) and Thiede & Anderson (2003) show that Concept Maps a related to meaningful learning and, as such, help in summary writing and in the comprehension and information retention process (Grabe, 1997; 2002). They can also come out as learning opportunities to the teaching of reading and to the interdisciplinary work. If this really occurs, in this study we will try to verify if the summaries, as well as the concept maps, are relevant to the comprehension of expositive texts and to information retention.

The concept map is a way reach summary which, according to the literature, is seen as this macrostructure which represents the most relevant ideas of the text; in other words, the main ideas of the text that we hope the students perceive.

1.3   Concept Maps and Environmental Education

Concept Maps have been more frequently used in the areas of Science and Technology. (Abrams, 1999). It implies that its use in other areas of the teaching-learning environment – particularly areas which involve Environmental Education – seems not to be a commonplace.

Environmental Education is "a permanent process in which the individuals…get conscious about their environment and acquire knowledge, values...so that they will be able to act upon and solve environmental problems" (Dias, 2000). And the comprehension of such knowledge is attained through interdisciplinary action (op.cit), which justifies the group of teachers of different knowledge fields working together. In this context, the Concept Maps can be connection between Environmental Sciences and the reading process so that it enables better concept organization (Novak & Gowin, 1994) in such a vast field.

2   Methodology

2.1   Nature of the study

The research is ethnographic and follows the orientations of Moita Lopes (2000), i.e., tries to understand what happens in the student's social context. This study is also interdisciplinary, as it articulates many knowledge fields (Biology, Geography and Portuguese); it is also qualitative, as it looks for a deep and detailed understanding of the students' environment, taking into account the student's thinking during the learning process. (Richardson & Wainweight, 1999).

2.2   Context

This study took place in Petrópolis, RJ, Brasil. It was organized as a workshop of eighteen hours, divided into two consecutive Saturdays. The workshop happened outside the school environment. The participants consisted of six High School students from a public school and were about 17 years old and come from the poorest cast of the society. The number of students is justifiable as this research is qualitative. Such research, most of the times, is accomplished in small groups and by independent researchers (Richardson & Wainweight, 1999).

The three teachers (Biology, Geography and Portuguese) worked together interdisciplinarily, i. e., each teacher within their knowledge field talked about the biological, geographical and linguistic aspects of the texts.

The texts were scientific diffusion expositive texts in the environmental area and deals with current issues about Brazilian reality

2.3   Methodological Procedures

We used four texts about environmental education. In all of them there was a pre-reading phase, where we've tried to activate the student's subsumers. (Moreira e Masini, 1982). Each text was read silently and had its micro and macrostructure analyzed (Grabe, 1997). After this procedure there was a debriefing phase

After that the students wrote a summary of the first text (without using Concept Maps). Then the students received a skeleton of its Concept Map of the second text. At the end of discussion about this text, they fulfilled the Concept Map in groups of two. One concept at each level was fulfilled to facilitate the identification of the terms which would allow the concatenation of ideas. We decided to the map with some concepts because it was the first contacts of the students with Concept Maps. The following texts followed the same procedures as the second one. After all these steps, the student fulfilled a skeleton of the first text and then wrote another summary of this text. In order to assess their text comprehension after the intervention with the maps we asked the students to write another summary of the first text.

2.4 Data Analysis

We've compared the pre-intervention and the post-intervention summaries of the first text considering qualitative and quantitavie aspects. Among the qualitative aspects we've considered the presence of the main ideas and the students' own ideas; among the quantitative ones we've measured the number of words in the summaries in relation to the original text.

3 Results

Figures 1, 2 and 3 show the comparison of the students' in the pre and post-intervention summaries. Figure 1 shows the percentage of the number of words in the summaries
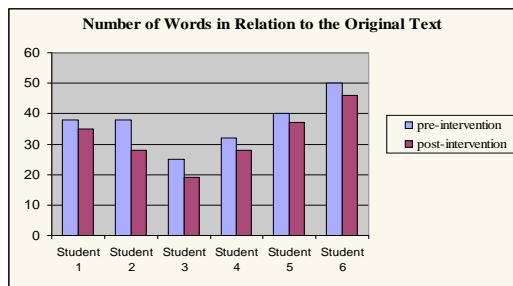

Figure 1: number of words in relation to the original text.

All the students reduced the number of words after the intervention. Figure 2 shows the percentage of student's own ideas on both summaries.
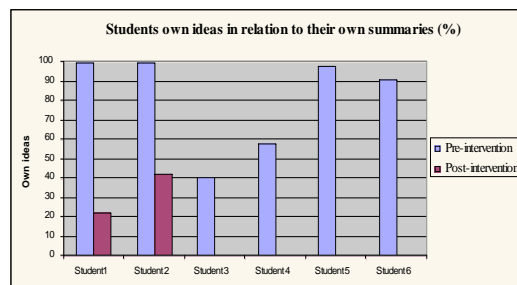

Figure 2: Students' own ideas in the summaries.

Before the intervention the students put their own ideas in the summaries, which didn't occur in the post-intervention summary. Student 5, for instance, presented almost one hundred per cent of his own ideas in the first summary, in contrast with his second summary: there were no student's own ideas at all.
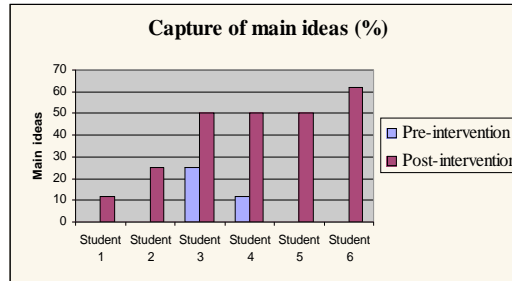Figure 3 shows the percentage of the perception of the main ideas of the text.

Figure 3: Capture of main ideas.

In the pre-intervention summary, only students 3 e 4 noticed the main ideas of the text. After the intervention, all of the students improved. Student 6, for instance, went from 0% to 60% in the capture of the main ideas.

4   Discussion

Considering the Brazilian public teaching – mainly in relation to environmental issues – the workshop on Reading and Environmental Education aimed reading and thinking about texts which try to raise the understanding of our environment.

After the accomplishment of this workshop we can get to the conclusion that the students don't know how to summarize, as they put their own ideas in their summaries. The results point out that the learning process of these students happens mechanically at school. Besides, the difficulty in learning meaningfully seems to show that memorization is predominant since elementary school; these students, consequently, seem to learn by rote during their entire school life. (Freire, 2005). So, when they try to learn meaningfully, they present extreme difficulty in linking ideas and activating their subsumers. Such difficulty is reflected in the pre-intervention summaries, when the students make a great effort to remember whole sentences of the original texts, without understanding them.

However, after the intervention with Concept Maps, the students' conception seem to have changed considerably, as there was more perception of the main ideas of the text (fig. 3).

Figure 1 corroborates the results of figures 2 and 3: appart from reducing the number of words in relation to the pre-intervention summary, there was a greater capture of the main ideas (fig. 3) and reduction and, in some cases, absence of students' own opinions in the summaries (fig. 2), and indicating improvement in the capacity of summarizing.

Base on the results, we can infer that Concept Maps are an efficient tool to text comprehension, specifically texts in the environmental and human teaching-learning context. The students which participate of this study started to learn meaningfully after the intervention. The observation on the students' comments makes it clear the importance of such tool to the improvement of text comprehension reflected also in their summaries. The individual improvement was considerable and points out that Concept Maps improve text comprehension as well as summary writing.

Despite the little time available, the results are very promising. So we hope that such experiment can be spread to other learning-teaching contexts. We also hope that, in the long run, it improves the understanding of our environment through a deep study of texts in the environmental fields using Concept Maps as a tool in order to reach such goal.

5   Summary

The aim of this article was to investigate the relation between Concept Maps and Environment Education. To do so, six High School students from a public school in the State of Rio de Janeiro, Brazil. To do so, we have made a workshop about reading and environmental education. There were three teachers from different areas (Biology

Geography and Portuguese). Four texts were used and they were read considering four steps: pre-reading, reading, structural analysis and debriefing. .After the procedures above, the students fulfills a concept map of each text. These maps were partially completed After all the procedures with three texts, the students then wrote another summary of the first text. The summaries' assessment shows that there was decrease in the number of words and in the presence of their own ideas and better capture of the main ideas. Consequently with a better understanding of the text, mainly with texts which bring, Concept Maps provide better understanding of environmental issues.

6   References

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