CONCEPT MAPPING, READING AND THE PURSUIT OF AUTONOMY: A CHALLENGE FOR THE LOWER SOCIAL CLASS STUDENTS

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Abstract. This study focuses on concept mapping construction and reading techniques to improve autonomous learning for students from the lower social classes. For such, two teachers developed an eight-hour workshop on concept mapping and reading at a preparation course for Brazil's university national exam addressed to people from the lower social classes. Both teachers worked simultaneously throughout the workshop. Students constructed concept maps from loose concepts to an expository text. The results show considerable overall development in concept mapping and reading comprehension. Results also suggest that a more continuous and systematic work on can provide substantial educational changes in these students' academic lives and in their social context.

Keywords*:* Concept Mapping, Reading, Lower Class Students

1 Introduction

Concept Maps are widely used in the educational field, from the first school years (Novak, 1994; Vega, 2006) to university context (Correia et al, 2016). There are also studies showing how concept mapping can enhance reading performance (Freire, 2005; Gregório et al., 2006; Freire e Freire, 2010; Freire et al., 2014). Every study in the in the area is of extremely relevant, as Concept Maps are a strategy for the awakening and the development of meaningful learning. However, there seem to be little research correlating concept mapping, reading and the students from the lower social classes, for whom education is the main way out to diminish the social and knowledge gaps between them and the students from the higher social classes. This study focuses on the teaching-learning of concept mapping and reading techniques addressed to people from the lower social classes. The aim of this study is to enhance meaningful learning through the concept mapping in order empower these students so that they are more able to transform their own lives through a more critical reading.

2 Theoretical Framework

The he theoretical framework for this study comprehends Ausubel's concept of meaningful learning (Moreira & Masini, 1982), Vygotsky's socio-interactionism and the perspective of language as a social construction (Koch, 2003; 2006; Bakhtin, 2003; Freire, 2001; Vygotsky, 1978). Meaningful learning implies that new ideas, pieces of information or concepts must have relation with the students' consolidated relevant knowledge for learning to take place these new ideas, information or concepts are then anchored to the learner's pre-existing relevant concepts. Such hierarchy finds its counterpart in the hierarchical structure of concept maps that "are intended to represent meaningful relationships between concepts." (Novak & Gowin, 1994).In addition to it, Vygotsky's socio-interactionism states that students learn more effectively when they interact among their peers because information and experiences are shared and co-constructed, i.e., the individual overall development is constructed from their internalization of social relations. Within this perspective, language is also a social construction, as it considers that meaning only exists within a context and is socially constructed by the individuals This construction is built through the individuals' own historical moment, environment, previous life experiences and view of the world. As in Vygotsky's socio-interactionism, the student is a social participant who interacts with the text and constructs meaning as they read.

3 Methodology

This study has ethnographic approach and follows the Moita Lopes' (1996) guidelines as it seeks to understand what happens in a classroom as it sees this space as a context that considers the daily life of its social participants. It is also a mixed approach that encompasses quantitative and qualitative instruments (Almalki, 2016). The quantitative tool was used to measure the percentage of right concepts in the semi-filled concept maps as shown in 3.4. Regarding the qualitative tool, our focus was on the process rather than on the product. In addition, there was an attempt to understand the participants' perspectives, *i.e.*, how these students face the issues on focus (Menga., 2004).

3.1 Context, Participants, Material and Procedures

The concept map workshop lasted eight hours distributed within two days. It is part of a broader workshop on study techniques for working students enrolled on a "Pre-Vestibular" (a preparation course for Brazil's educational examination for university and college admissions). This "Pre-Vestibular" specifically (PVNC-Petrópolis - Pre-Vestibular for the Black and the Poor) is associated to CBPF (Brazilian Center of Physics Research). PVNC is addressed to people from the lower social classes in Petrópolis, Rio de Janeiro State, Brazil, who has finished High School or are in the second or third grades. There is no age limit to enroll. The material used for the workshop was card paper and loose concepts written on slips of paper. The data used comprehended field notes, photographs and students' concept maps.

The workshop had a progressive level of difficulty and a didactic sequence was used to plan and organize the concept map activities. Dolz et al (2004) define didactic sequence (henceforth DS) as "a set of activities organized, systematically, around an oral or written textual genre" (Dolz et al., 2004). In this study the DS was used to design a concept mapping workshop. Figure 1 shows the basic structure of a DS.

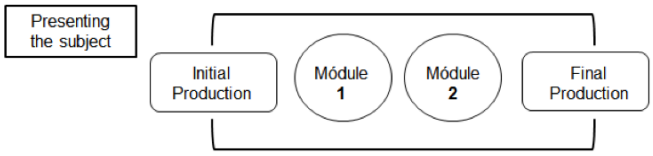

Figure 1. Didactic Sequence Scheme adapted from Dolz et al (2004)

Day 1 was dedicated to time and study management guidelines, followed by reading techniques (with short texts. As this phase did not include concept mapping, it has been suppressed from this study. Day 2 was used for two main activities: the first one was the debriefing on the activities from the previous day. The anchoring ideas about reading strategies were raised in order to introduce students to a brief theoretical explanation about concept mapping. For the next activity, the class was divided into groups of five or six students. Each group were given a different set of loose concepts written in slips of paper. Each concept was related to a specific topic, such as "board games" or "school subjects". Students should make a concept map using the loose concepts, arrange them on a card paper and present it to the class. There was a debriefing after each presentation. From this point onwards all activities were carried out in groups. Afterwards a more challenging activity was carried out: students should read two short texts and complete the corresponding semi-filled concept maps. Day 3 started with a discussion about the construction of the maps from day 2. For the final production, students, in groups, were given a text cut up into paragraphs. They should organize it according their own criteria, build maps based on their arrangement, present it to the class, and present it to the class. A discussion followed each presentation. We concluded the activity with a broader discussion about other possibilities for the organization of the paragraphs of the text and of their maps. Schematically, the workshop has the following configuration:

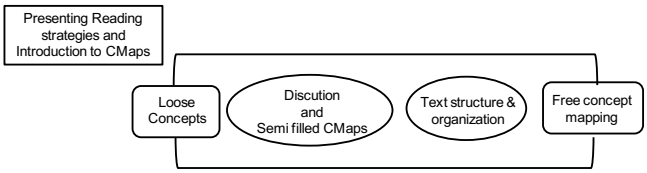

Figure 2. Didactic sequence adopted for this work

3.2 Data Analysis

The concept maps constructed by the teachers have been used as reference to analyze the students' maps. The maps were analyzed according to their accuracy on maps' hierarchy. Other criteria are specific to each activity. The maps on loose concepts were analyzed according to students' encyclopedic knowledge, as it vital to understanding. Koch and Elias (2006) say that encyclopedic knowledge "is essential to the production of meaning" and if "readers do not activate this knowledge, understanding of the text will be impaired". It seems what had happened in this context. The semi-filled concept maps were analyzed considering the similarity and the semantic value. For such, a mixed approach was applied using quantitative and qualitative instruments. As a quantitative instrument, a score has been used to analyze the maps. It was based on how many concepts the maps would have to be filled and how many of them were filled correctly. This data is shown in percentage. As a qualitative tool, field notes have been taken throughout the workshop to register students' perceptions about their learning process. The free concept maps were analyzed considering the accuracy in identification of key concepts and the map spatial organization. The later, specifically, is crucial to the construction of good maps. Such statement is corroborated by

Correia et al. (2016). The authors point out three concept map arrangements that reveal the quality of the concept maps quality: a) maps with radial structure; b) maps with linear structure; c) maps with net structure. Such structures, in this order, are related to the progressive expertise in concept maps construction. The last structure would show more expertise by the concept mapper.

4 Results and Discussion

The maps on loose concept have shown gross mistakes in hierarchy which can be observed in all the maps:

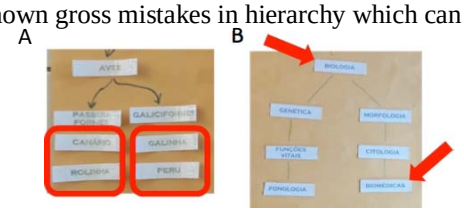

Figure 3. (A) Mistaken subordination of concepts belonging to the same level; (B) General concepts subordinated to specific concepts.

Figure 3A shows linear configuration of concepts. Sometimes, general concepts were subordinated to specific ones (Figure 3B). The "school subjects" set was divided into three great areas: Human Sciences, Exact Sciences and Biomedical Sciences. Each area has their basic sciences. Students' difficulties exemplified in fig.3 reflect linear thinking (Gregório et al., 2006). According to Freire (2005), it can be due to a teaching-learning process focused on memorizing. The results observed in this work show that it still happens. This result shows many aspects of students' difficulties in hierarchical organization. They don't recognize two concepts as hierarchically equivalent. It also shows subordination of equivalent concepts in line. It seems to be hard for them at this stage to notice crossed reference. This ability arises due to hard work on critical reading and concept mapping. In figure 4 it's possible to observe mistakes in hierarchy due to lack encyclopedic knowledge.

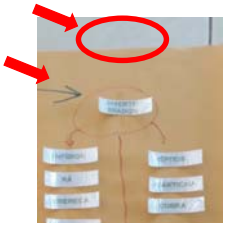

Figure 4. Misplaced concepts due to lack of encyclopedic knowledge.

Students stated that some topics - like animal taxonomy - were harder than others because of their unfamiliarity with the subject. This can be seen in the confusing configuration of their maps. Students' difficulty constructing meaning in this circumstance corroborates Koch and Elias' (2006) statement about the importance of encyclopedic knowledge on students' understanding *i.e,* familiarity with the subject is directly related to text comprehension.

Students constructed two semi-filled concept maps based on two different texts. The first map has had an average of 75% of correct concepts. The second, 82%. The data point to the right identification of key concepts on each text. Besides, students could identify the concepts correctly. There was a lot of interaction between the students during the task. At the same time, It seems that the debriefing after each task helped learners to evolve their reading skills. Qualitatively, there was considerable improvement in reading and organizing thoughts. Concept mapping seemed to be crucial for this process to occur. Figure 5 shows an example of comparison between a net structure compared to maps showing a radial structure.

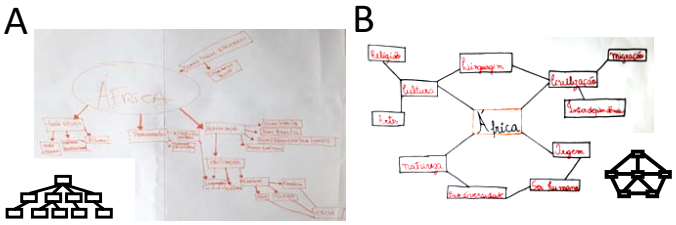

Figure 5 Two types of concept map observed as a final production of the DS. (A) Schematic diagram and example of a radial structure of a concept map. (B) Schematic diagram and example of a net structure of a concept map.

Only two of the six maps show radial structure. There is significant improvement in hierarchization and all concepts have been correctly placed. Four other maps show net structure that, according to Correia et al. (2016), corresponds to more elaborated concept mapping. The increasing level of difficulty during the workshop is in conformity with the DS in the workshop. Students are accustomed to memorizing and thinking linearly. On their first experience with concept mapping, they have faced huge difficulties in thinking hierarchically. After the first debriefing students were able to begin to understand some the principles underlying concept mapping. Their second experience with concept mapping was considerably more fruitful. The difficulty increased on day 3 and students have shown great improvement. The results seem to endorse the effectiveness of the structure of DS, as it made it possible to increase levels of difficulty more efficiently. The study groups were of great importance to students' overall development. Students discussions during the tasks allowed us to observe what they have apprehended from the more skillful peers (Vygotsky, 1978). Reading and the capacity of hierarchical organization provided by concept mapping has been a great step ahead. It can work as a catapult to drive them toward building their own destinies and accomplishing their goals to achieve their dreams. As students from the lower social classes, such changes are vital and a great victory in their lives. Their reality, being as hard as it can be, can only be changed through education.

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