

## CONCEPT MAPS AND THE IHMC CMAPTOOLS PROGRAM AS TOOLS TO FACILITATE CRITICAL REFLECTION

*Erika Chrobak, Universidad Nacional del Comahue, Escuela Superior de Idiomas, General Roca, Argentina*  
*Ricardo Chrobak, Universidad Nacional del Comahue, Facultad de Ingeniería, Dto. de Física, Neuquén, Argentina*

**Abstract.** In the present work we will argue that both concept mapping and the IHMC CmapTools program's search utility are invaluable tools for facilitating the critical reflection (CR) process. On the one hand, concept mapping may be a useful first step to bring to consciousness our knowledge, feelings and assumptions about a topic, as a tool for individual critical reflection. On the second hand, using the IHMC CmapTools program to consult maps done by others worldwide may allow us to add new, alternative perspectives. This, together with exchanging concept maps with other stakeholders, would allow for communal critical reflection at a local and worldwide level. The end result of this CR process would be a new concept map which integrates fresh perspectives and reflects newly gained meaningful learning. By way of example, we present the design and the a glimpse at the first steps of an on-going pilot study of CR facilitation in the proposed fashion, in which participants were asked to construct and exchange maps on the topic of *classroom management or discipline*.

### 1 Introduction

In the preface of their book "Learning How to Learn", Novak and Gowin (1984) pose an interesting question: "How can we help individuals to reflect upon their experience and to construct new, more powerful meanings?" In the following pages, the authors propose concept mapping as a process than can help educators to achieve this ambitious goal. Thus, concept maps are presented precisely as a tool to aid the reflection process, considered a crucial step in learning; i.e., in changing the meaning of experience. Elaborating on this idea, in the present work we will explore the value of both concept mapping and the IHMC CmapTools software<sup>1</sup> (Cañas et al, 2004) in facilitating the critical reflection (CR) process.

In order to be able to explore the possibilities of the process suggested, we are currently conducting a pilot study on facilitating CR about a topic that we regard as a dilemma for educators: discipline. Twenty-five administrators, educators, students and family members from an urban elementary school in Allen, Río Negro, Argentina, are participating in the study. This intentional sampling was supported by the fact that each group represents different stakeholders in the issue at hand, who will add fresh perspectives to the reflective process.

We are at the first stage in our study; that is, we have collected the first participants' concept maps. As a second step, the participants will engage in local communal CR. Then, they will use the IHMC CmapTools program's search tool to look for maps on discipline, so as to consider these maps in their further communal reflection. In the final phase, participants will construct a new map that reflects how this reflection process has enriched their meaning making as regards the topic. To round off the data gathering procedure, we will conduct semi-structured interviews, to learn about their opinion about this process for facilitating CR. Given the fact that we do not have definitive results, we will discuss some of the possibilities for CR that we foresee regarding the concept maps presented, as a way to illustrate the potential of the process suggested.

### 2 Critical Reflection

There is no clear cut definition of what exactly is entailed in the CR process (Brookfield, 2000; Mezirow, 1990). For the purposes of this work, we will adhere to the following definition of CR, which was suggested as the result of synthesizing an important number of works that focus on this process: "**a commitment to consider any proposition, assumption or practice, the reasons that support it and the further consequences to which it tends, in the light of *multiple theoretical and personal lenses*.**" (Chrobak-Muñoz, 2001)

This definition emphasizes a key element which most authors would agree is essential in the critical reflection process: considering multiple lenses or perspectives. In other words, it highlights the importance of being able to take into account numerous viewpoints in order to more fully appreciate the object of reflection. These myriad of possible perspectives includes theoretical productions (such as humanism, feminism, gender studies, etc.), feelings, intuition (Greene, 1973), experiential knowledge (Dewey, 1938; Kolb, 1984) and the points of view of experts and of all stakeholders.

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<sup>1</sup> This software program was downloaded from <http://cmap.ihmc.us/>.

If we come to a renewed interpretation of reality, then meaningful learning (Ausubel, Novak & Hanesian, 1968) has taken place. It's important that this questioning process occurs in a supportive and respectful atmosphere; as Novak (1998) points out, the role of affect is of utmost importance. He explicates that "the complex interaction that takes place between stored info about knowledge, feelings and actions is very important." Moreover, he suggests that integrating these three aspects of learning is an empowering experience: "Knowledge that we have learned meaningfully, that we have constructed from a union of our actions, feelings and conscious thought, is knowledge we control [...] and with which you feel a sense of ownership and power."

### 3 Concept Mapping and Critical Reflection

The process of constructing a map about a given topic, as Novak and Gowin (1984) have shown, implies an individual reflection process that allows us to depict the concepts that we deem important as regards that subject and the links that we see among these concepts. When we construct the map, our conceptions, misconceptions and assumptions come clearly into play and are reflected in the fashion in which we decide to show the relationships among the different concepts. This is why constructing a map is proposed as the first step, which should be followed by an instance of communal reflection.

As a second step, communal CR may be achieved by exchanging and discussing maps with other stakeholders, who can help us question our interpretations and assumptions. Each participant should explicate why they believe certain concepts should or should not be included; where a concept should be placed in the map's hierarchy or how conceptualizations should be linked to others. This collective process has the potential of facilitating CR upon the philosophical matters or differing interpretations regarding the object of reflection.

Let's refer to our study to illustrate this point. In analyzing the concept maps constructed by an Elementary School Teacher (Fig. 1) and the Principal of the same school (fig. 2), we can see how each of them included different concepts in the map, which reflects the fact that they represent different perspectives to the issue. We can only speculate (as we invite the reader to) about the communal reflection process that may occur when they are both asked to consider each other's map, but we believe they will both modify their map to some extent, to reflect the new perspective gained. For instance, we may expect some fruitful discussion around the fact that the teacher has included concepts like *society*, *violence* and *injustice* while the principal has introduced ideas such as *the family's responsibility* as regards the students' behavior, *behavior management strategies* and *consensus*. Both of them, however, have considered *values* to be a central concept, which may mean that, upon CR, this will become a yet more meaningful concept for both.

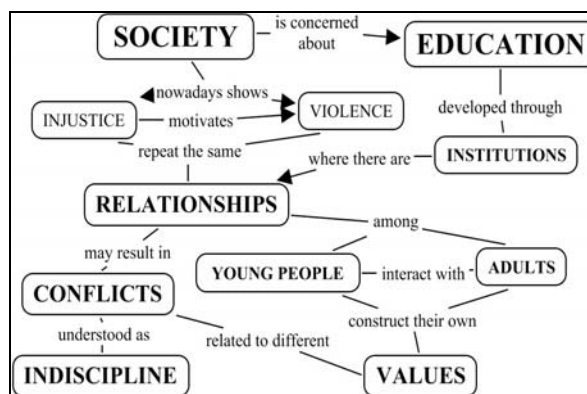


Figure 1. C-map on Discipline by Elementary School Teacher

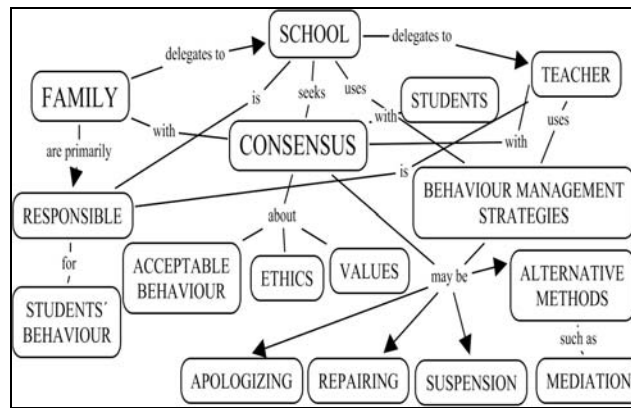


Figure 2. C-map on Discipline by Elementary School Principal

#### 4 The IHMC CmapTools Program and Critical Reflection

The IHMC CmapTools program enables users to construct, navigate, share and criticize knowledge models represented as concept maps, at a worldwide level. Accessing maps constructed by such a diverse group has the potential to help users surface and question their assumptions, since homogeneous groups may actually reinforce shared bias, prejudices or assumptions (Zeichner & Liston, 1996). Analyzing maps that have been done by people from other theoretical backgrounds, beliefs, contexts -or otherwise different from ourselves- is priceless. If, as Dewey (1938) suggests is required, we engage in CR with an open mind, consulting maps through this on-line tool has the potential of becoming a meaningful and transforming experience.

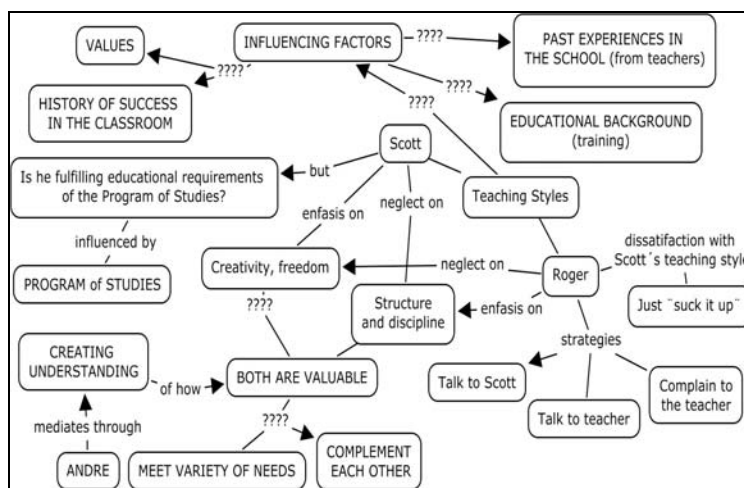


Figure 3. Concept map found on the IHMC Public Cmaps Server

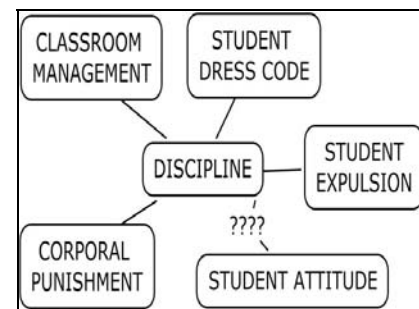


Figure 4. Concept map found on the IHMC Public Cmaps Server, Entitled: "Steve - Boston Public 6-9"

Let us examine one of the maps found through the CmapTools software (figure 3). There are several new perspectives which are introduced by this map. One of them is reflecting upon one's biography as a learner -introduced by concepts like *past experiences in school* and *educational background*- which has been suggested to have a substantial impact in our teaching practices (Brookfield, 1993). It also invites us to reflect about our biography as teachers, since the concept *history of success in classroom* is included. It also introduces concepts like *structure, creativity and freedom*, which might open up fresh perspectives for CR.

It is important to point out that this communal CR process does not necessarily result in our altering our conceptualizations, practices, beliefs or assumptions. Upon reflection, we may confirm with renewed assurance some or all of the concepts in the map we started with. This might perhaps be the case if the participants consider the map on figure 4, which includes a concept like *corporal punishment*. This is a new perspective for the school principal and the teacher who constructed the maps shown above, but they may not find this as a worthwhile perspective. Moreover, they may arrive to the conclusion that building *consensus* and resorting to other *behavior management strategies* are more acceptable or in harmony with their values and ethics. These are some of the possible reflections that may be triggered by the maps found in the IHMC Public Cmaps Server.

## 5 Final words

We have explored different options offered by concept mapping and the IHMC CmapTools program as tools for facilitating critical reflection. We have presented the design of a pilot study aimed at shedding more light into this potential use for these tools. In addition, we have briefly analyzed two of the maps collected in the first stage of this study and anticipated some of their potential for reflection. We have argued that this coming together of concept mapping and critical reflection may result in a rich learning process that allows all stakeholders to negotiate meanings, as they gain multiple novel perspectives as regards the object of reflection. We would like to round off by resorting once again to Joseph Novak's inspiring words when he suggests this type of educational experiences "lead to a constructive change in a person's ability to cope with experience... and become more autonomous and in charge of [their] destiny."

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