Visual Learning, Concept Mapping and Visual Deliberation: Strategies to Improve Knowledge about Argument Development, Critical Thinking, and Writing

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For the suitably skilled person, mapping a complex argument promotes clarity and insight, more rigorous and complete articulation, and more judicious evaluation. Teachers use argument mapping to help students acquire basic concepts, better understand how arguments are constructed, and enhance their reasoning skills. Argument mapping can be an effective way to improve general critical thinking skills. In the workplace, argument mapping can promote rational resolution in complex, fractious debates; improved communication of important arguments; and better decision making. (Tim Van Gelder, forthcoming)

In recent years, with the onset and dramatic growth of online education, a great deal of research interest has been given over to discussion. After all, one of the key arguments made for online education is its ability to offer discussion as a primary way in which learning takes place. It has long been known that most online courses use discussion (Berge, 1997). This focus on online discussion has also had the effect of getting us to review discussion in our face-to-face classes. It is only natural that we would compare the two media. Time and again we are presented with the idea—the claim—that discussion is especially well suited for online environments, that students interact with one another and the teacher. We are told that they debate, they collaborate and offer constructive feedback and engage one another in ideas. We are reminded that online students get more time to think about what is said; they get more time to construct their responses. They write their thoughts which some tell us increases the opportunity to be mindful.

Unfortunately, research does not find real support for the contention that online education produces higher levels of critical thinking. In fact, research into critical thinking online and in the classroom finds a real dearth of critical thinking in discussion. Based on a number of reviews of the literature, it appears that the amount and the quality of online discussion is quite poor (Garrison, Anderson & Archer, 2001; 2003; Hunt, Simonds, & Simonds, 2007; Meyer, 2003; Rourke & Kanuka, 2007). I have encountered few individual teachers or students who take real issue with this claim. Moreover, as we explore further, we begin to see that this claim holds true for much of discussion in the classroom as well.

Research does support the claim that students learn more when they are actively engaged with the material, their instructor, and their classmates (Howard, 2002). Some research suggests that critical thinking is fostered by students’ active participation in learning (Garside, 1996; Smith, 1977). I hasten to add that my own research on critical thinking has generally found that it is extremely difficult to increase the amount of critical thinking (Shedletsky, 2010). Other researchers have reported that it is difficult to improve students’ argumentation and critical thinking skills through short-term instructional methods (Terenzini, 1995; McMillan, 1987). McMillan (1987), reviewed 27 studies on specific instructional methods, and no single instructional method was found to consistently enhance critical thinking in college students. McMillan reasoned that a semester is simply too brief and isolated to have an impact on critical thinking. McMillan concluded that “... it appears from these studies that college students’ critical thinking improves while attending college, but it is not clear what factors affect this change” (p.15). On the other hand, McKeachie. Pintrich, Lin, & Smith, (1986) claim that stressing
student discussion and placing emphasis on problem-solving procedures and methods may enhance critical thinking. Most seem to agree that critical thinking is a worthy goal of higher education and yet it is difficult to define and it is difficult to determine what we can do to improve it. One scholar of critical thinking (Ennis, 1985, p. 45) defined critical thinking as *reflective and reasonable thinking about what to believe and or do*. With this sort of broad definition, it is no wonder that it is difficult to measure critical thinking and difficult to determine what can improve critical thinking. Nevertheless, the growth in online education has made it important to return to questions about critical thinking and discussion. Online courses are growing in number and discussion in these courses substitutes for classroom interaction.

In recent years, with the aid of computer technology, scholars have turned to software to aid in diagramming the structure of argument. Research is showing that Argument Mapping is producing increased levels of critical thinking in students, above and beyond what they get from a semester long course without argument mapping (Van Gelder, 2000).

**What Is Proposed**

One of the essential outcomes of higher education, both undergraduate and professional schools, is for students to become competent, critical thinkers. The purpose of this grant is to develop strategies for teachers to use with students based on research in visual representation (Marzano et al, 2001), visual learning (Hyerle and Williams, 2010), concept mapping (Novak 2005), and visual deliberation (Van Gelder, 2010). The essential question for this project is as follows: Can students improve their understanding and production of arguments by giving them practice in visual representation, visual learning, concept mapping and visual deliberation? We propose to examine this question with a faculty development approach including small-group intensive learning, as well as a campus-wide colloquium and conference about visual learning and visual deliberation. Our purpose will be to develop faculty’s understanding of how to use visual representation for formative assessment (instructor feedback, peer- and self-assessment) and summative assessment (completed assignments such as tests, written papers and presentations) (Beaudry and Wilson, 2010).

Critical thinking should be considered a complex reasoning achievement target consisting of a variety of cognitive processes (Anderson and Krathwohl, 2001). To develop an argument, for example, students should be able to understand, apply, analyze and evaluate arguments. The most basic understanding of arguments involves being able to: 1) summarize and provide examples of the content of the argument, 2) explain the conceptual structure of an argument. We will work with faculty to design visual templates for specific reasoning outcomes based on the specific discipline, and on the cognitive process (Hyerle and Willaims, 2010; Sinatra, 1986). In addition we will develop lesson plans with instructors based on small- and large-group deliberation of these visual products (Van Gelder, 2010). We will develop discussion guidelines and protocols to provide faculty with guidelines for successful deliberation of visual representations.

We propose to evaluate our work by looking formative assessment products and summative assessment scores. Formative assessment, primarily student-constructed maps, and summative at quiz and test results, in-class communications and visual products like argument maps and concept maps.

Faculty involvement will begin with a small group who are interested in the use of visual representation in teaching and learning. Lenny Shedletsky, Jeff Beaudry, Jeremiah Conway, David Pierson, Matt
Killmeier and David Cluchey. Initial faculty development will take place with these faculty and selected faculty.

The outcome of this proposal is twofold: (1) to introduce visual learning such as argument mapping into courses; and (2) to disseminate information on this technology to the faculty at USM.

(1)
It makes good sense to involve faculty from philosophy and the law school in this project, since both philosophy students and law students are centrally involved in developing their critical thinking skills. Of course, all students need to develop these skills. Hence, professor Jeremiah Conway from philosophy and professor David Cluchey from the Law School are involved in this project. Our first task will be to become familiar with literature on argument mapping and critical thinking. We will need to purchase/acquire and learn argument mapping software. I will explore software such as Araucaria, Inspiration, Compendium, XMind, bCisive, Rationale2 and SEAS. We will be able to find an appropriate software that will be affordable by students. We will need to explore how others have used argument mapping in their teaching. And we will need to design ways of including argument mapping software and exercises into courses. Some ideas include have student map some discussions from the class; have students build an argument using mapping; and have students critique an argument using mapping.

(2)
As someone who has a background in doing workshops on computer use (Internet for Educators; Internet for Seniors; Fellow with ITMS, clickers and more), I would enjoy doing workshops to disseminate this information. A paper explaining the project would be made available as well.

Currently, I am teaching a new seminar titled, Discussion, and this would be an appropriate course for me to try out a unit on argument mapping. I am estimating that I would be ready to try it out by fall, 2011 through spring, 2012. At that time, I would like to collect critical thinking data on a pre-test/post-test design. To do this, kind of research, which I have been doing for the past four or so years, I would need to have a research assistant, possibly a workstudy student or an independent study student or a hired assistant.

Resources for this project include Inspiration software, internet access to Webspiration, access to the e-book, Handbook of Collaborative Learning and Concept Mapping, in particular the chapter by Beaudry and Wilson on Visual Learning and Formative Assessment, and computer lab space. Other resources are available online. In addition we propose to bring at least one expert in visual learning and visual tools to the USM campus for a 1 or 1 ½ day conference and workshop. The conference would be planned as a separate but related event through the Professional Development Center in the School of Education and Human Development.

The timeline for this project will be September, 2011 to May, 2012.
REFERENCES


