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ABSTRACT

Teachers of history, introductory chemistry, and literature from Portland State University, Portland Community College, Clark College, Mt. Hood Community College, and Clackamas Community College (Oregon) have been working together to foster critical thinking in their students. Teachers in these disciplines have been meeting at their respective institutions to share course goals and content and compile materials for use by all the institutions involved. All teachers focus on three components of critical thinking: definition, focus, and underlying assumptions. One chemistry instructor, for example, asks students to critique the statement, "Older children are bigger than younger children," to focus on definitions and the meaning of words. This exercise serves as a warm-up for students to begin examining a statement such as "Elements to the right on the periodic table have higher ionization energies than elements to their left on the periodic table." Similarly, technical writing students critique journal articles to recognize the author's definitions, focus or intent, basic assumptions, and biases. In writing courses, sciences courses, and all across the curriculum, teachers are essentially introducing students to the critical thinking process, examining data from experiments or journal articles to determine purposes, assumptions, or omissions. Cooperation, therefore, among teachers to energize their work should not be difficult, and teachers should not be like the cony of Elizabethan literature who thought the trick impossible. (KP)

Critical Thinking or Cony Cozenage

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It is not hard to understand how instructors in the same field can derive energy from each other by cooperating and sharing insights, curriculum, course content, and methodology. When instructors in DIFFERENT disciplines, however, can energize each other by cooperation, then that phenomenon is something to note. Today, therefore, I'd like to zero in on just one area of cooperation--fostering critical thinking in our students. At Clackamas Community College we are discovering that technical writing instructors and chemistry instructors can sharpen their focus in teaching critical thinking in their respective disciplines when they collaborate.

Let me first, then, give you a bit of background on what brought us together and how our collaboration on teaching critical thinking started. During the past year and a half, Portland State University and four community colleges in the metro area (Portland Community College, Clark College in Vancouver, Mt. Hood Community College, and Clackamas Community College) have been working together under the auspices of a FIPSE grant (Fund for the Improvement of Post-Secondary Education). The disciplines chosen were history, introductory chemistry, and British Literature; and teachers from each college in these courses have been meeting in their respective committees according to discipline each month to share course goals and course content in addition to compiling resources and research materials to be shared by all institutions.

Most importantly, however, each group focuses on developing student skills in critical thinking. The teachers in each group (history, chemistry, and British Literature) have found that teaching students to think critically and logically challenges and excites us. This should not be a surprise; nor should it be a surprise if, as I said earlier, we leave each committee meeting energized and thereby relay our enthusiasm to our students.

What, perhaps, is the real surprise of my participation in this FIPSE project is a result of our chemistry and British Literature sections' presentations at the Student Success Strategies Conference held last February in Portland. One might even call it "serendipity." After I had heard the chemistry group's presentation on critical thinking, I immediately knew I could use several of the insights gained in my technical writing classes (and even in my literature classes). The key issue was that teachers in chemistry and English could work together to foster critical thinking in students--and they really want to work together. We can and have started to share materials on our campus (Clackamas Community College) and thereby have begun a process of communication and cooperation between us.

In consideration of time, today I will just focus on a couple of related assignments that one of our chemistry teachers uses and that I use in my technical writing class. We concentrate on three components of critical thinking: DEFINITION, FOCUS, and UNDERLYING

ASSUMPTIONS.

In technical writing, we have to deal with definition. How does one write a definition? First, we have to deal with classification. (What category does this object belong to?) Next, what specific characteristics make it peculiar within that category? And lastly, what means can we use to develop the definition in our readers/listeners' minds (e.g., analogy, example, analysis, comparison/contrast, cause/effect, and the like). For instance, if we are trying to define the term "chemical formula," we might develop our definition by the common-knowledge analogy of baking a birthday cake. (Now there is a chemical formula applied, appraised, and digested!)

Let's now turn the tables. How does a chemistry class grapple with words, their definitions, and their meaning? How does critical thinking about words help chemistry students use logic? One chemistry teacher at Clackamas Community College provokes critical thinking on definition by having the students critique this statement:

Older children are bigger than younger children.

Students are thereby forced into penetrating the MEANING, the definition, of each word in that sentence: What is meant by "older"? They could be identical twins with one being only four minutes older than the other one. Are they children of the same parents? What ages are the children (adult children of the same

parents and therefore the older ones in years may not necessarily be the bigger ones)? What is meant by "bigger"? What is measured? What do we mean by "children"? Are they children of the same species? Are we comparing elephant children and human children? Are the measurements taken at the same time, or is there a time lapse between measuring times of months or years? Is there not a basic assumption that the children in question are in the same state of health?

I am sure you can think of many more ramifications of definition for that one statement in getting to the crux of meaning and subsequent logic. But we need to move on. In the chemistry class, that statement was only a warm-up for critical thinking and definitions necessary for chemistry per se. The statement "Elements to the right on the periodic table have higher ionization energies than elements to their left on the periodic table" is then presented and the students are asked to examine it logically from their perspective of chemistry.

Now, let's move back to the technical writing classroom. As I mentioned earlier, some of the components of critical thinking that we teach are definition, focus, and underlying assumptions. I will use our assignment of evaluating an article from a professional journal or magazine. First, we examine the definitions, or lack of definitions, in the article. Then we look at the focus of the author. And lastly, we try to discern the basic assumptions of the

article, those philosophic foundations upon which the author built his case. Once we can recognize the author's definitions, his focus or intent in writing that piece, and his basic assumptions, we can then test it against what we know to be reality. We can recognize omissions in his definitions. We can see his biases, if any, in his focus. We can discern his philosophy as the foundation upon which he is basing his logic, his presentation, and his argument.

In a writing class, therefore, as well as in a science course, and all across the curriculum, are we not teaching students the critical thinking process? We all deal with definitions. We all deal with focus, too. Do we not look at the purpose of a set of lab instructions or a computer science program before we start to use it? Do we not look at the data of experiments to see if there are glaring omissions in the evidence? Do we not make sure that we are honestly comparing like species, locations, or times? Do we not try to penetrate with our students into the basic principle of operation or scientific theory in order to comprehend just a bit better the scientific laws that are acting?

Are we not all really teaching critical thinking and understanding? Is not my role as the technical writing teacher to essay the genuine metal of a statement in writing while teachers in other disciplines are doing that very thing as well as testing those statements in laboratories by means of tangible elements? Our

roles of teaching critical thinking and writing overlap in all disciplines, and I do not think it is too hard to cooperate with each other to energize our teaching. Let's not be like the cony of Elizabethan literature who said, "I pray you, let's see that trick. . . . Methinks it should be impossible" [Robert Greene, "A Notable Discovery of Cozenage," 1591].

"See, gentlemen, what great logicians these cony-catchers be that have such rhetorical persuasions to induce the poor country man to his confusion and what variety of villainy they have to strip the honest farmer of his money?"

"Thus we see how the generation of these vipers increase, to the confusion of many honest men, whose practices to my poor power I have discovered and set out, with their villainous sleights that they use to entrapping the simple."