LDC *Lately...*

Learning Development Center

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Welcome to the 2003-2004 academic year! For *LDC Lately's* regular readers, as well as new RIT faculty and staff, we wish you an exciting and enriching year. Every quarter, we will continue to offer in-depth, research-based articles on topics that inform your interactions with students, bring you up-to-date on current theory, and challenge your thinking about classroom practices. *LDC Lately* begins its fifth year with a discussion of **content literacy**, a relatively new term to pedagogy in higher education. In the lead article, Jane Munt, chair of the Learning Development Center's Study Skills Department, defines the term and discusses its application. We have asked three award-winning RIT professors for their thoughts on how they incorporate content literacy into teaching their own disciplines. Although our guest writers vary greatly in subject matter and writing style, they all speak eloquently about assisting their students to read, write, and think like philosophers, mathematicians and biologists. We thank them for sharing their insights. We invite you to wrestle with how you might define content literacy in your classes, and how you might guide students to a deeper understanding of your area of study.

Content Literacy

by Jane Munt, Learning Development Center

Within the last ten years, literacy research has introduced the term "content literacy" and expanded its definition. The earliest definitions of content literacy focused on the impact of reading, writing, speaking, and listening on learning. The definition of content literacy continues to evolve to this day. Swafford and Kallus (2002) present the following current definition:

> Content area literacy is exemplified by individuals who use 1) their background knowledge; 2) print and nonprint texts; 3) developing technologies; and 4) the tools of reading, writing, speaking, listening, representing, viewing, and other sign systems to explore, construct, learn, and communicate information within a variety of social and cultural contexts both in and out of school (p.14).

Although text assignments, lecture, and recitation may traditionally be the dominant instructional activities in the college classroom, these strategies do not necessarily promote content literacy--the ability to use reading, writing, speaking, discussion, etc. to construct and retain knowledge. These sources of information must be manipulated to assist students in learning how to use what they read, write, talk about, and view to discover, clarify, and extend meaning in a particular discipline. Content instructors have important roles to play in the development of content literacy. They must model for and guide students in how to read, write, communicate, and think like a scientist, engineer, philosopher, historian, artist, or mathematician.

In addition, the increasing use of technology and alternative sources of content information must be a concern of the content instructor. In particular, the development of "critical literacy" is becoming more important as sources of text information expand to include electronic text, hypermedia, and interactive communication technologies. Even the development of "information literacy" in relationship to research and information gathering has become increasingly important as the accessibility of information has increased. The focus of content literacy must be on developing the different types of literacy skills a student in the 21st century needs to possess.

Alvermann (2001) presents five basic considerations for effective literacy instruction.

- Students' perceptions of their competence as readers and writers will affect their motivation to learn in a discipline. Development of literacy competency (over time) positively impacts student motivation and achievement in content areas.

- The instructor can assist students in meeting the demands of content-specific reading through the development of appropriate background knowledge and the modeling and use of effective strategies for the discipline.

- Instruction must be appropriately modified for developmental, cultural, and linguistic differences, especially if students are struggling.

- "Critical literacy" skills should be developed in accordance with the skills the students will need to effectively manage the course materials and expectations.

- Literacy instruction should be participatory so as to promote the development of higher level thinking skills.

Experts such as Jacobs (2003), Flanagan (2003), NCREL (2003), and Vacca and Vacca (1998) offer the following suggestions for approaching content area reading and learning in stages:

Stage I: Before Reading and Learning

Instruction begins by acknowledging the different contexts, experiences, biases, and background knowledge of students that will influence their learning by using the following strategies:

- Activate prior knowledge through the use of discussions, prompts, brainstorming, making predictions, and asking preliminary questions.

- Use conceptual tools such as analogies, graphic organizers, classifications, charts and grids, and feature analysis activities to assist students in developing a conceptual framework for the information.

- Place a major emphasis on the development of the necessary language and vocabulary to read, discuss, and analyze the content.

Stage II: During Reading and Learning

Instructors should provide guidance and structure for seeing how information ties together and for assisting students in probing for deeper understanding and higher-level thinking. Modeling the type of thinking necessary for the content or discipline, as well as teaching specific strategies or approaches to the content will facilitate this process. The use of study guides, concept guides, or reading guides is particularly effective in shaping students' thinking and learning.

Metacognitive awareness is tied to the use of specific reading and learning strategies that fit a content or content-demand. Because instructors in specific disciplines already have good metacognitive strategies in their particular content area, they are the best models for showing students how to think, read, write, talk, and learn in the content (Vacca, 2002). However, it is not enough to teach just procedures and strategies; they must be taught alongside the reasons why they are used, and when they are most effective or appropriate.

Recent research by Marzano, Pickering, and Pollock (2001, p. 7) identifies the nine most effective instructional strategies (in order by average effect size) for all instructors:

Identifying similarities and differences
Reinforcing effort and providing recognition
Using nonlinguistic representations
Setting objectives and providing feedback
Using questions, cues, and advance organizers
Summarizing and note taking
Providing homework and practice
Emphasizing cooperative learning
Generating and testing hypotheses

These instructional strategies appear to work with students of all ages and across all disciplines.

Stage III: After Reading and Learning

Finally, students must be encouraged and expected to apply what they have read and learned to specific content demands. This can be done with both guided practice and homework assignments that are "framed" so that specific strategies or approaches are necessary to complete the task.

Alternative Information Sources

The internet and its related technologies are beginning to beg the question of "what constitutes text?" Of course the same critical reading and thinking skills are needed to navigate the complexities of electronic text and media as are needed to master traditional content sources. However, using electronic text to either replace or augment the traditional sources of information raises additional concerns such as the need for students to develop competencies in evaluating sources, points of view or biases, intended audiences, and accuracy of information. These skills are particularly important with students who believe that whatever they read or are told must be true.

Helping students develop content literacy is a primary goal, but a daunting challenge for all professors. As instructors face greater and greater pressure to teach large amounts of complex content in short periods of time, it is most effective to deliberately teach literacy skills through the content. The development of the reading, writing, listening, speaking, and thinking skills necessary to truly master the content or discipline will often result in a greater appreciation for and interest in the field. In addition, the enhancement of all students' self-esteem in relationship to their ability to learn will enable our students to meet the challenges of a 21st century education.

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Tim Engström

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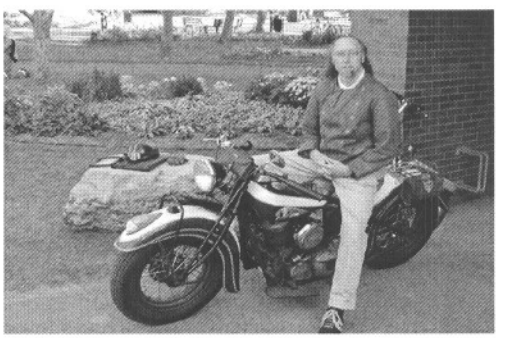

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Prologomenon:
Writing philosophy is not simply the result of bowing before the ideas and writing styles of the great, although sustained attention to the great is a great place to start. Philosophy involves a willingness to brush the pigeon shit off some shoulders and hear real voices: of Socrates about to sip hemlock while cool, still full of instruction, and secure with eternity; of Russell having already had a double whisky, unleashing his candor without compromising his sense of logic – Believers, beware. Such writers have often sought company with the immortal, but their livers might yet have had the final word. Such uncertainties provoke student engagement, sometimes good writing.

Philosophy may very well be technical, and historically nuanced in ways that escape the pursuit of the ten-week quarter, but it is also about the inescapably everyday and personal. It can be intimidating, and it can be about the simplest of experiences before philosophers complicated them. It is about learning the complex genealogy of a word that became an influential concept (*physis*, for example) but is also about finding out how much of one's own mind is already saturated with philosophical ideas waiting to be wrung out and retested – for toxicity, for purity, whatever the case may be. Somewhere or other, students will have access, connection, to what philosophers do, to how philosophers write, in part because it's not just about old language games, or about producing complicated sentences; it's about experience. Many good philosophers are lousy writers, even when they write correct sentences; some great ideas come in linguistic forms that violate grammatical convention (although we keep this quiet in class).

While philosophers often strive to give expression to concerns that have trouble reaching into the puny portal of language, it is language through and through – inventing it, refining it, enjoying it, overcoming it, stumbling back into it, kicking it around as if it weren't stuck to one's shoe. The only way through such dilemmas (and mixed metaphors) is to write, to get about the business of expression: Play off philosophy's sense of grandeur with your sense of the everyday, philosophy's density and layers of history with some ordinary details – a good walk, as Heidegger realized. Play off philosophy's sense of transcendence and ultimate responsibility (honest grandpa Kant) with the art and imagination of an unfettered mind (devious uncle Emerson). We need to help our students go both ways, so to speak.

Without trying to write, students will have a harder time hearing: the voice of Nietzsche – brilliance on the edge of madness, or the voice of Dewey – brilliance camouflaged by humility, a concern for the fulfillments of everyday experience. If students hear a person and not only an argument or a form of analysis, they'll begin to sense their own involvement, their own philosophical search, which is in part the search for ways of writing.

Praxis:
I've been delaying the practical. Creating some desire to write and a connection with what's been written needs cultivation. Thus, my first suggestion is to begin a class with writing – informal though instructive, unthreatened by grading, shared with other students. When students know in advance that some writing is expected, they read more carefully. As a result, I'll often ask them to role play – pretend they've been under an old oak in the court yard (some non-RIT environment), or out to the pub with Hume, Hegel or Carnap (that is, with some claret, beer, or schnapps, respectively). They've had a wonderful evening, full of philosophical conversation. But the evening left them with some unresolved question. Their written responsibility is first, then, to distill an important point that their philosopher-friend made, then pose what is for them a critical concern that needs further discussion. I then have them exchange letters and reverse roles. They're then invited to respond to their student colleague's concern, now as the philosopher-friend who was previously addressed. They take on the role and responsibility of a Hume, a Hegel or a Carnap (sober, of course). It works. It's engaging, enjoyable, instructive. But it's informal. It is directed, it has an objective, it is a serious challenge for the student to be both outside and then inside the thought (and prose) of a thinker. But it is not an assessment tool.

The formal writing activities have more formal expectations. They're handed out in class and the exercise is used as a basis for small group discussion, but the writing and analysis proper is performed out of class. I generally give students at least the appearance of choice: I provide several representative and suggestive quotations from the philosopher in question. These require very close and detailed reading. The instructions are, by reference to one quotation, to distill the theory in question as neutrally and fairly as possible, to explain the concern or problem that animates the theory and to which it is a response, to reveal the primary assumptions – whether explicit or implicit – that are needed to get the theory off the ground; and then they must respond, critically. What kind of evidence was provided to support the theory? What evidence might be adduced to jeopardize the theory? Are the major and/or minor premises true and/or justified and/or plausible assertions (assuming that the writing in question tolerates the conversion to premise-talk)? Are the inferences made and the conclusions drawn logically correct or at least logically plausible? This is the formal stuff, worth learning; and it's a form of analysis that's expected no matter what the quotation or theory.

But there's more. They need to respond for themselves. This might entail developing a counter argument, and capturing their own concerns with a surprising metaphor or image, a sly analogy, something that stretches the constraints of evidence or logic (something that philosophical rhetoric does all the time), that demonstrates, at the very least, their engagement with the responsibilities of thought. Sometimes following the imagery of a thinker can be a more intimate journey than following the explicit argument (as those who've penetrated the truth no longer say).

I evaluate the writing – this is time consuming; I evaluate the accuracy of the distillation and the formal moves of analysis. I comment on the commentary in a way that is conversational – in green not red ink. And I give it all a grade, always with an explanation for the grade – evaluation is not editing; I do the former and they need to learn how to do the latter. After it's handed back and time is given to digest the response, we engage in some follow-up discussion, collectively, as a philosophical community. I wish that I had a justification for avoiding this process, that I had fewer students, that I had a full semester to work with. But I'm convinced that such a process (and there are no doubt many other viable processes) cannot be avoided, if the learning of philosophy is what's at stake.

Learning philosophy is learning about kinds of writing by doing kinds of writing, often informally as well as formally, with liberty as well as with a healthy fear of failure – the kind of fear that all of us teaching them should be able sympathetically to remember (whether or not infinitives get split or splitting headaches result). Standards are necessary; so is a little flattery – Socrates used it brilliantly to cajole the vain into a state of philosophical wonder.

A Promissory Note:
In ten weeks, of course, any meaningful philosophy course that treats writing as an integral part of its pedagogy is a speeding train. Write as they will, the intellectual landscape will remain blurry. But it is often what students themselves wrote that provokes later recollection, that provides a landmark for the future. At the time they might very well leave the depth behind like a candy wrapper, but holding onto the words is holding on to something. And if they're recalled at a later date, it might be a time when the words and the philosophy behind them and their present experience hit home, or so we hope (and often hear, years later . . .).

We don't want English spaniels or German shepherds or French poodles performing established philosophical tricks – this is for graduate school. There are no doubt good things to be said about dogs, but they don't write, they don't suffer the plights of persons (even if bad alliterating can seem like barking and lifting a leg in honor of an old theory might not be a bad thing). We don't want mere imitation. Writing exercises need to be structured and to facilitate liberty and independence. Nietzsche again: As he put it, sort of, metaphors may become frozen into more or less rigorous conceptual shape or melt all over the place (the German is better). Philosophical writing strives for control over (through or because of grammar?) the logical relations among sentences; it also depends upon metaphors that will seldom lie still. Okay, some imitation is okay; but the more students write, the more new and unpredictable sentences will emerge, the better understood and defended their convictions will be. They'll be better students over all.

Students learn a lot of facts and things, and philosophy is likely to stand these things on their heads, to make them available for meaning, for critical reflection, for the kinds of new sentences that facts all on their own can't form, poor things. One of the benefits of writing philosophy is that such texts cannot be given over to someone to test their accuracy by reference to "the world." No suitably well-clad accountant, however keen his eye for detail and profit, will help. To understand a philosophical text is to understand a certain kind of mind, a certain kind of other. And some of the best student writing writes its way toward this mind and finds its own is a bit puny, less subtle; but it also experiences a potential thrill when it's participating in undermining and transforming itself, becoming less puny: No small thing, although it might be.

Of course, many students and many philosophers love facts, love data – a good thing, too; they can be disciplined more easily than metaphors, given a uniform and asked to do their duty. But students who write philosophy will end up realizing that it is sentences and their arguments that do the ordering, and to do this successfully, they need good rich ideas. My colleagues and I hope to provide some of these. They don't always take, of course. Some students will attempt to swallow great philosophers like a hog with a Nick Tahoe's "garbage plate," and their written responses will be little more than an impatient belch – we've all, nose plugged, had to deal with this. But we're here to help. And getting them to write and getting ourselves to read it carefully is one of the best ways to do this. As Nietzsche put it, yet again, the philosopher must learn to dance with the pen, and, except for the odd puritan, students are generally willing to try dancing.

Tim Engström was the 1993-1994 recipient of the Eisenhart Outstanding Teaching Award.

After Thoughts

Please join us for the first LDC *Lately After Thoughts* discussion.
Wednesday November 5, 2003
4:00-5:00 pm
2372 Eastman
Consider the following questions:
What do you think about content literacy?
What do you do to facilitate content literacy in your classes?

Or you may share your thoughts with LDC *Lately* by submitting comments to Susan Donovan at ssdldc@rit.edu.

Carol Marchetti

What is content literacy to a mathematician?

I asked three faculty members in the RIT Department of Mathematics and Statistics this question and got three different responses:

- Knowing a core of appropriate material (as an educated individual)
- Being able to apply course material in a real world setting
- Knowing how to learn new material in a field

I think that all three responses can be considered components of the definition provided by Swafford and Kallus (2002) and referred to in Jane Munt's article.

How did I become literate in mathematics? First, by listening to others (teachers, for example) talk about mathematical concepts and by reading about these topics on my own. Second, by attempting to "do" mathematics myself. Throughout high school and the first year of college, I was able to solve mathematical problems and create proofs without any external assistance. But eventually I reached a point where I couldn't do this anymore. I had to ask questions of my professors and work with the other students in my class, in each case "talking through" concepts and solutions.

So, how do you teach content literacy in mathematics (and statistics)? Start by considering these three questions:

- What prior knowledge must students have to learn mathematics?
- How do students obtain new knowledge – lecture, reading, etc?
- How do they apply their new knowledge?

Teachers have their own method of teaching. It's important to consider adding to your "toolbox" to better reach your students, but also to modify each method to meet your strengths and your personality. So I'll list some of the techniques that I have learned of since I started teaching.

The classic lecture In this format, an instructor can introduce new terms (often "translating" between math and English) and can relate new mathematical concepts to ideas and experiences with which students are already familiar.

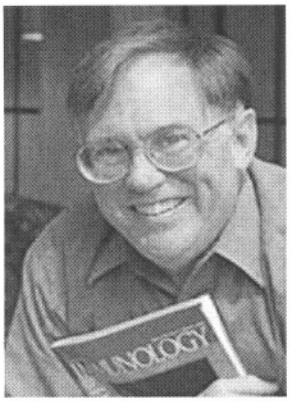
In-class activities This is one way to make students more active in class. Students "discover" mathematical and/or statistical concepts through activities.

Group work Students can work out problems as a team – talking through different approaches to the problem, using each person's strengths to reach a solution.

Out of class assignments Both reading and problem solving homework require the student to work independently of his or her instructor (a gentle push from the nest). Assignments can be used for students to solve problems as well as to write about their solution. Explaining how to reach a solution and what the solution means is just as valuable as the computations.

Each of the various teaching components can assist students in becoming literate in mathematics or statistics. However, there is one more component that must not be overlooked. Students must have constant feedback on how they're doing! This can include students comparing their own in-class work to a solution, the instructor walking around the room, peering over shoulders and giving feedback, one-on-one discussions in office hours, graded homework assignments and exams that are handed back in a timely fashion.

Carol Marchetti was the recipient of the 1998-1999 Richard and Virginia Eisenhart Provost's Award for Excellence in Teaching.



Tom Frederick

Connecting Class Topics to the Real World

In my Immunology course, I challenge students to find layperson articles published on-line and/or in print media that are very relevant to the course, especially articles that take what we discuss in class and "put it to work."

Each student is required to judge the validity of the source of the article, and read it carefully to see if it genuinely applies directly to the course. Then I may ask the student to briefly discuss the article with me or with the class. In this way, we can talk about how the article applies to the topic being covered in class. This assignment is not required; it is offered as an opportunity to earn extra credit.

Often, the students who choose to submit articles state that they find themselves exploring the particular topic presented in the article in much more depth than it may have been covered in class. Also, some articles are "multi-topical," in that several interrelated course topics are presented. Sometimes the relationships among these topics within the article are obvious, sometimes not. When the latter happens, students are particularly challenged to establish the relationship between the entire article and the several course topics included therein.

When needed, I will request that a student provide additional factual information not included in the article to clarify a point and/or expand upon a topic. Sometimes I will direct the students towards the more detailed "hard science" publication to compare to the details in the layperson version. In this case, I usually need to provide some assistance with terminology with which the students are not likely to be familiar. If a student clearly understands the basics of the article, the search for supporting material is quite easy. On the other hand, a student who is having difficulty understanding the basic topic(s) in the article will usually query me as to how to find the supporting information. This latter response often helps me to identify those students who are less than fully cognizant of course content, etc. In this case, I invite the student to meet with me to discuss the article, a "covert" approach to ascertaining the student's grasp of the course content relevant to the article.

In determining the validity of the source, students are encouraged to ask challenging questions. If the article is from a dot.com, then the student must determine if it is a fair and objective report, or if it is skewed or given a "spin" to make it attract more readership. How much ambiguity is in the article? If two different sources provide contradictory reports of the same event, the students submitting these two articles are asked to work together to determine if either (or, perhaps, neither) article is valid. In a few instances, I have suggested that the students contact the author of the article directly and ask questions to clarify a point or, on occasion, to even challenge the author's own perspective. When responses are forthcoming (unfortunately quite rare), the students are quite excited and it is not unusual for a continuing dialogue to result. This interchange quickly immerses the student in a much broader, more in-depth inquiry into the subject matter of the original article.

Tom Frederick was the 2003-2004 recipient of the Eisenhart Outstanding Teaching Award.

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