Critical Thinking and Technology Roundtable

Recently, Academic Technology invited four Tufts faculty to participate in a roundtable discussion on critical thinking and the role of technology. The purpose of the roundtable was to look at how students and faculty at Tufts use technology for different projects in critical thinking. Dan Cogan-Drew, Technology Coordinator in the Education Department and a regular contributor to the newsletter, moderated the discussion. This article was given to the roundtable participants for pre-reading: "How to Improve Critical Thinking Using Educational Technology" by Tim van Gelder, Department of Philosophy, University of Melbourne, Australia. Links to this and other articles and sites related to critical thinking can be found at the AT web site: http://at.tccs.tufts.edu/. The faculty who participated and their projects were the following:

Susan Russinoff, Senior Lecturer, Philosophy Department and Director of the Critical Thinking Program. The Critical Thinking Program, now in its fifth year, holds workshops for faculty interested in exploring strategies for teaching their subject matter in ways that incorporate the explicit teaching of thinking skills.

Astier Almedom, Assistant Professor, Biology Department. Her project involves a web-based application AT is creating which will allow students to work with course documents electronically; access online resources and perform searches according to prescribed critical thinking criteria.

Deborah Pacini Hernandez, Associate Professor, Sociology/Anthropology Department. A "digital story" project for her "Urban Borderlands" class requires students to create a short slide film, composed of still images, sequenced in a narrative that includes a soundtrack or voice-over.

Linda Beardsley, Lecturer, Education Department and Director of the Teacher Education Program. Her videopaper project creates a new narrative research medium for middle and high school Master of Arts in Teaching (MAT) candidates. Students film, edit and annotate digital video of their classrooms, and write self-reflections that appear on a CD.

Dan began the discussion by asking the participants to describe how they perceive critical thinking in their thinking and for their students.

Susan Russinoff

I don't really see that there's a definition of critical thinking particular to philosophers that differs from the way it's used outside of philosophy departments. Philosophers, when they teach courses in critical thinking, will teach students how to recognize when an argument is being presented, how to extract the argument, what are the assumptions, what are the explicit and the implicit assumptions, what is the conclusion, what kind of logical link is there between the premises and the conclusion, and then what are the various standards for evaluating an argument — how does the argument measure up to various standards.

But there are a lot of other thinking skills I think that fall under the umbrella of critical thinking — making good decisions, thinking carefully about causality, approaching problems, how you would solve problems and think about problems.

Astier Almedom

How I came to think about critical thinking is that my students shouldn't just read, accept and repeat what I say in class or take quotes from the text that they read, but interrogate it in similar ways to what Susan was saying. They should read and find out what are assumptions, what are claims, and
what methods are used to convince us that what they write about is worth investigating and are those methods familiar.

Susan: Do you actually provide a list of questions for the students to ask, or do you have the students generate them?

Astier: We called it the “Supported Reading Environment” and what it has is the text itself, which they have to read, and then it has prompts for them to find out what meanings of words might be as they are used in different disciplines.

Dan: And the SRE — the Supported Reading Environment — that’s for annotating?

Astier: That’s only for annotating text. You cannot annotate the visual or audio.

Dan: Which is something that I think of when I think of videopaper, which is basically a way to annotate video and to share and that’s been used in a number of ways. But I think it’s also common to the digital storytelling project in the selective decision-making, the editing process, involves some choices.

Deborah Pacini Hernandez

In this class, the students are constructing the texts, they’re not interpreting the texts, because they’re doing research on a Latino community in Cambridge and now in Somerville, and there are no real existing texts on those communities.

This is based on interviews with folks in the community — either ordinary community members or community leaders — different perspectives, each interview brings a different perspective. They have to put them together and I think that’s where the critical thinking comes in, because they realize first of all that they are doing the job of producing a history and that gives them a real sense of what writing history is all about and how decision-making is so much a part of that.

They also have to evaluate their assumptions — they are outsiders, most of them are not Latinos. They are writing a history of a community that is not their own. And so we spend quite some time talking about the ethics of that, and the problems with an outsider trying to evaluate somebody else’s culture, somebody else’s experiences.

In any case, the first step is the decision-making process of taking a lot of information and trying to figure out what is one important point — something that is worth saying that has to be said very briefly. So there is also some critical thinking there in terms of, what is it that is important to say and how am I going to make this point?

They have to think very carefully about communicating information effectively. How am I going to use images to enhance — not simply to illustrate what’s going on, but to go into another dimension and add information, another kind of information to the text. And then it even goes on into the realm of music, because they realize that, depending on the soundtrack that goes in there, it also changes the tone.

Susan: It’s also an interesting opportunity to get them to think about qualitative research method and the role that anecdote plays in that kind of research. Because of the choices that they’re making, they have to realize that the view is going to be drawing inferences on the basis of these so they have to be responsible in that sense, too.

If we’re teaching critical thinking across the curriculum, which is what my program encourages faculty to do, rather than just have philosophers teaching critical thinking (as the article that you gave us points out) and we’re teaching these things for transfer, it makes sense to have these things taught across the curriculum.

“...BEING ABLE TO SEE YOURSELF THROUGH SOMEONE ELSE’S EYES IS CERTAINLY TRANSFORMATIVE.”

One of the things I try to get faculty to think about is how can you teach these things explicitly — in some sense you’re doing this implicitly, trying to get them to recognize the responsibilities that are involved in the choices that they’re making.

Dan: I want to pick up on is the role of the audience. You had mentioned that these were going to be published and that, as it always does, increases the motivation and focuses the thinking behind it because you know that this is going to be read by others and viewed by others, and thinking about how that relates to the videopaper assignment in Education.

Linda Beardsley

I’d like to go back to the notion of critical thinking, from the education perspective in terms of training teachers for the pre-K-12 community..., I think my favorite definition of critical thinking is a definition by PL Travers, who was the author of Mary Poppins, but also she was a wonderful teacher and scholar and thinker about issues in thinking and she wrote a wonderful essay about critical thinking, called “Only Connect.”

It talked about thinking as linking. And I like to think about that because when you really start talking about the kinds of things, the kinds of connections that are possible through thinking and how we learn to think it’s linking past and present, my experience to your experience, culture to culture, it just goes on and on and on.
Astier: I think of it sort of as “creative thinking” or problem solving, because you have some problems that are approached by different methods or different perspectives from two disciplines, and they can be solved in a new way if you combine the disciplines in class.

Linda: I think the challenge in training people to be teachers, is really how do we incorporate those skills and habits of mind into a curriculum or how do you develop lessons, how do you develop a persona that really allows that kind of thinking to happen.

Susan: On the flip side, we want the students to be more aware of their thinking processes, and I think that's a big piece of it.

Linda: I've found that this videopaper format that we’ve used the past three years in the education department has really been a powerful way to get novices to begin to develop what you hope will be a lifelong way of looking at their craft and inspiring their students. As I heard the three of you describing your own projects, it seems to me that what we're asking them to do is both construct a text — visually, at first — interrogate that text, and actually construct a narrative of that, in order to look very carefully at the classroom, the students, themselves, at what David Hawkins calls “the triangle” in education: the teacher, the student, and the curriculum to be taught.

Susan: Is their analysis written, or is it incorporated into the video?

Linda: It's written. They create a CD and on that CD is both their footage, their video, their practice in the classroom, their students’ discussion of kinetic energy or whatever it is that they're doing and then their analysis of it.

Susan: So they're quoting from the video and discussing it in the text.

Dan: Exactly. Treating it as a text that they're going to quote from as a source.

Linda: It's not just ‘here's my video of my fifty-minute civil war presentation.’ They have to develop an idea of what they want to look at. So just reviewing the video and having to make choices about what it is that I'm going to talk about is really powerful analysis.

Susan: I was just thinking that if you're trying to produce reflective practitioners/teachers, and you think of critical thinking as being transformative in a certain way, being able to see yourself through someone else's eyes is certainly transformative.

Linda: And it picks up the conundrum of teaching as a profession that, on the one hand, it is intensely personal, in many respects, how you understand your own discipline, how you present it, how you relate to students, and so forth. But it also is an incredibly public profession, as well.

Susan: I'm sure if you had five different people view the video they'd come up with five different ways of thinking about how that teacher was interacting with the students.

Astier: I had put in my syllabus the objectives of the course, the learning objectives of the course, and how we were going to achieve this, and I still wasn't sure that the students were necessarily reading the material. Maybe for exams they will read, but I wasn't sure how much was actually being read.

That was one point, to get all this material digitalized, and to be date and time-stamped when people log in. It actually tells me that they came to the site to read, and then when they annotate...I can actually tell what thought process is going on, if the person writes a small note about meaning or defining the term, as opposed to making connections to other things they had read.

Linda: For me, videotaping yourself in the classroom is always something that historically we've always done. And because the students who are coming to us are products of a very different age than I am, in terms of being fascinated by images, manipulating images, really using technology as a learning tool, I really wanted to provide a way for them to refine how we think of video, how we think of analyzing what video captures. "I DON'T WANT MY TEACHING TO BE TOO DISTRACTED BY THE TECHNOLOGY. I WANT THE TECHNOLOGY TO BE THERE TO HELP THE STUDENTS LEARN ABOUT COMMUNICATING RESULTS."

Deborah: But the thing is that you need a lot of support from the university, a lot of support. I started out not realizing that there was support available through Academic Technology, but used grant money to get outside support for this.

I don't want my teaching to be too distracted by the technology. I want the technology to be there to help the students learn about communicating results. That's the balance.
Profiles in Faculty Development, Part 2

By Pauline Stieff

This is the second of a two-part series profiling staff whose unique job responsibilities involve assisting faculty in using technology in teaching, learning and research. For this issue, I interviewed Susan Albright of the School of Medicine and Margot Thompson of the School of Veterinary Medicine.

Susan Albright is the Director of the Tufts University Science Knowledgebase (TUSK), formerly known as the Health Sciences Database (HSDB). TUSK is a password-protected, multimedia database containing full-text syllabi, slides, lecture recordings (audio and video) and notes, exam questions, evaluation forms, bibliographies linked to full-text articles, and other resources made available by faculty. TUSK provides courses materials for the Medical, Dental, Nutrition, Health Communications and Veterinary Schools.

After graduating with a BA in Psychology from Tufts, Susan began her career as a service delivery planner for developmentally disabled persons for the Commonwealth of Massachusetts Department of Mental Health. She held similar positions in the private sector in consulting companies. She has also served as an elected member of the Newton, MA school committee for the past seven years.

A 12-year employee of Tufts, Susan originally came to the university as a planner for the Integrated Advanced Information Management Systems (IAIMS). Tufts had received a planning grant from the National Library of Medicine (NLM) to use technology to integrate the educational, clinical, research and administrative functions of an academic health center. Susan secured follow-up funding from the NLM to use technology to develop and manage educational multimedia resources to foster integration across the courses and schools served by the Health Sciences Library. This grant resulted in the creation of the ISDB. Designed by Susan and Tarik Alkasab in 1995, it allowed around the clock access to course materials. Since then, the ISDB received national and international acclaim, including receiving CIO Magazine’s 2001 Enterprise Value Award for Innovation in IT Application.

Now known as TUSK, the knowledgebase has moved from HTML to an XML format and is used by medical schools in New York and South Africa. Current updates to TUSK include making content more didactic by enabling the use of mark-up tools and allowing toolbars and search information to be interchangeable among different courses. Since many courses in the health sciences disciplines are interchangeable, TUSK permits faculty to literally drag and drop images and information from courses already online with citation material already included.

Susan and her staff continue to train faculty in getting their materials online. Health science faculty are extremely busy and are often unable to be on-campus for technology training during regular working hours, says Susan. The addition of online training modules will make it easier and faster for faculty to train and upload materials 24 hours a day. Susan believes the body of medical information is artificially divided into years and this technology has reintegrated it.

Like the other three Tufts employees in this profile series, Margot Thompson, Library Curricular Support Specialist at the Webster Veterinary Medical Library on the Grafton Campus, came to Tufts from a background unrelated to technology. After earning a both an Associates Degree from Mt. Ida College in Newton and a Bachelor’s degree from University of Massachusetts, Amherst in Interior Design, she worked for fourteen years as an art department supervisor for a retail store. She created artwork and designed signage and displays for multiple store locations.

Always intrigued by computers, Margot went back to school in 1999 to earn a certificate in Graphics and Web Design from Clark University. She supplemented her education by taking additional software courses both in Massachusetts and in California. During this time, she also worked at the Worcester Polytechnic Institute and the Veteran’s Administration in Los Angeles.

Since her arrival at Tufts in the Spring of 2001, Margot has been involved with many veterinary school projects and programs including assisting a number of faculty recipients of AT grants. She is dedicated to helping faculty in any way she can to get their course materials online. This includes acquiring and learning new computer programs to make faculty’s transition to an online environment as smooth as possible.

Due to the cross-disciplinary nature of many health sciences courses, Margot works closely with Susan Albright at the
How to Improve Critical Thinking Using Educational Technology

Tim van Gelder, Department of Philosophy, University of Melbourne, Australia

This paper was presented at the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE) 2001 Conference "Meeting at the Crossroads" at The University of Melbourne.

In this article, Gelder claims that although "critical thinking is one of education's most central goals and one of its most valued outcomes", research shows the success rate of efforts to inculcate such skills has been "pretty slight" or "quite modest."

Because “critical thinking is valuable, rare, and hard to teach”, Gelder and his colleagues in the Reason! project at the University of Melbourne, Australia have developed an approach to critical thinking instruction that they claim “…demonstrably produces substantial gains”.

This approach is based on the Quality Practice Hypothesis (QPH) that “critical thinking skills improve substantially through, and only through, extensive quality practice.” One problem with quality practice, Gelder notes, is that it appears to require close supervision and coaching and this becomes unrealistic for most faculty.

It is in this area that Gelder thinks computers can “assume some of the burden of guidance, scaffolding and feedback.” A new software environment called ReasonAble is instrumental in augmenting the quality practice approach and aiding in students’ "dramatic gains.”

In the Building Mode, “reasoning is articulated.” Students build arguments through the creation of “argument maps or trees”. These maps are flow-chart-like diagrams where “relationships among claims are made visually explicit” through the creation of claim boxes or nodes. Students type text into claim boxes and place the claims on the tree. Other students can then enter other claims that provide supporting or opposing evidence for the original claim.

In the Evaluation Mode, arguments are assessed for quality by having the student double click on any claim box or node and entering his or her evaluative judgment in a dialog box.

Students are provided support in both modes through a “Socrates” character who can either prompt students to think about issues pertinent to the points of the argument or by offering advice in terms of evaluation.

Results from the use of the software have so far shown “the largest gain ever recorded anywhere over a comparable period or for a comparable intervention.” Gelder notes that the design of the evaluation was “to our knowledge, the most intensive and rigorous ever deployed to evaluate the efficacy of an attempt to improve critical thinking.”

Paula Vincini is an instructional designer with over 20 years of teaching and training experience in post-secondary education.
What is Just-in-Time Teaching?

Just-in-Time Teaching (JiTT) http://webphysics.iupui.edu/jitt/jitt.html is a pedagogical strategy pioneered by Physics professors Gregor Novak and Andy Gavrin, Indiana University-Purdue University at Indianapolis; Evelyn Patterson, United States Air Force Academy, Colorado; and Wolfgang Christian, Davidson College.

Now used by over 200 faculty in 25 disciplines at 80 institutions across the US, Canada, Europe, and Israel, it is based on “carefully constructed web-based assignments” that students must respond to a few hours before class. Instructors read student submissions “just-in-time” and adjust the classroom lesson and lecture based on results.

“...the heart of JiTT is the feedback loop” that enables instructors to transform the “traditional lecture/recitation format” to a more interactive, student-centered framework. Many instructors use the web-based quiz tools in course management systems like Blackboard for JiTT questions.

To learn more about this instructional method, visit the AT website: http://at.tccs.tufts.edu/.

2004 APT RFP Available

Academic Technology released the request for proposals (RFP) for A Partnership in Technology (APT) Faculty Grants Program for the 2004-5 funding cycle in November. This program provides AT staff support for faculty experimenting with the use of instructional technology for teaching, learning and research. The intent of the program is to support projects that have a wide curriculum impact serving a large portion of Tufts’ teaching and learning community.

Each spring, four faculty projects are selected that receive 600 hours of AT staff time for the grant year, July 1–June 30. Such grant support will include assisting with project management, design, and development as well as assistance in transitioning the project to become a suitable proposal for larger, external funding sources. The APT grant partnership is intended to attract motivated faculty who are committed to working with AT staff through out the funding period on their educational technology project. The program is designed to provide structure and guidance in the development of technology projects which will serve as models for teaching and learning within and beyond the university.

In accordance with the academic calendar, the deadline schedule has changed. Letters of Intent are due on February 15; full proposals are due on April 15. Grant recipients will be announced in June 2004.

To obtain more information about the APT program and to download the RFP, go to the AT Website at http://at.tccs.tufts.edu. For questions about the grant program, contact Pauline Stieff at pauline.stieff@tufts.edu or 617-627-3369.

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