

Society and Technology: Multimedia Case Studies in Connexions

Project Description

The effects of information technology on society are central concerns in classes Professor Tony Gorry teaches in management and computer science.¹ The complex interaction of the technology with people is a subject rich with possibilities for study and discussion. And although the students come to these classes with different backgrounds, experiences and expectations, there are a number of common subjects they finding engaging and challenging□ situations in which the interaction of people and technology has profound implications for social institutions and businesses.

In these cases, the dynamics of the undergraduate and executive classes are similar: Gorry typically begins with a scenario or a case that places a use of technology in a contemporary social setting□ for example, an invasion of privacy, the theft of intellectual property or an online masquerade. Sometimes the use of technology is controversial. But even when its use seems unremarkable, on careful examination, important issues often emerge. For example, how might the increasing collection and correlation of personal data from online sales affect privacy?

Good classroom discussions of questions such as these begin with what students already know and go on to encourage them to re-assess their opinions, assumptions and attitudes. Students recognize many of the effects of information technology on society, and class readings can extend their understanding. But classroom discussion in which students must come to grips with a story or case in its own right prompts further reflection on their own attitudes and values. The richness of the discussions makes the classes interesting and challenging, and it shows the importance of these matters to both undergraduates and executives.

A similar approach to teaching is common in medical schools and business schools. The general instructional model, called problem-based learning (PBL), encourages students to work cooperatively on "real world" problems (Duch, Groh, & Allen, 2001).

¹ Computer Science 300: Society in the Information Age; MGT830: Information Technology; and MGT860: Managing Knowledge in the Information Age

Project Objectives

We propose to develop modules that promote problem-based learning regarding important effects of information technology on society. The modules will contain: a) multimedia cases that pose situations and questions to which students must respond; and b) teaching points that enrich the cases with guides, documents, and suggestions for further work. We will also create tools to enable students to amend and expand the modules with comments, opinion and criticisms.

Engaging and relevant problems are essential in Problem Based Learning to give the students a context for the central ideas of the course and to help the students develop critical thinking and problem solving skills.

The modules will center on changes in our views of authority, how we assign credibility to information, our attitudes toward intellectual property and our expectations of privacy. Each module will include multimedia components and collections of readings that engage students with the issues of **authority**, **property** or **privacy**. The use of simulations, animations, sound and video will broaden the appeal of cases to students. Each case will pose a situation and require decisions from the students, and their responses may determine the subsequent unfolding of the story. Paths through the case will link to documents or other websites that add richness and complexity to the subject.

In building the cases, we will follow Leslie Miller's CTTL Team's use of Macromedia Flash for sound and animation in her award-winning Reconstructors® web adventure series. The ubiquity of Flash browser plugins will make it easy to distribute modules from Connexions to a wide audience. We will use the Connexions project's Content Commons for our work, because it offers innovative support for the collaborative development of course materials. We want to encourage other faculty to share their perspectives on these issues and to contribute modules or teaching points. By taking advantage of yet-underused features of the Connexions environment, we can let students enrich these materials for future learners. Just as class discussion of a story produces valuable insights from students in both undergraduate and executive classes, we expect the modules to encourage online responses□ personal experiences, stories, comments or other reactions□ to link to the module.

A Sketch of a Module

Here is a description of a potential module, which roughly follows a typical path for one of Gorry's undergraduate or executive classes. The module would include one or more cases to

raise questions about authority in the Information Age and a set of teaching points, questions or pointers that broaden and deepen learning.

A Case

Judy recently graduated from college and is working as a trainee in an investment bank. She loves the fast-paced work and until lately, she hasn't minded the pressure. But over the past month or so, she has not felt well. She is increasingly worn out and has occasional headaches. She also has persistent pain around her elbow and sometimes in her lower back. The pain prevents her from playing as much tennis as she would like. And she thinks her fatigue, aches and pains are interfering with her work.

Several months ago, Judy told her doctor about "not feeling well," but she doesn't remember the doctor making any specific recommendations. One of Judy's friends has told her of a web site where there is "a lot of good information" about vitamins, herbal remedies and nutrition. The friend learned about the site from a television program. Another friend suggests Judy might have "fibromyalgia" or "chronic fatigue syndrome," but Judy doesn't know much about these conditions.

What should Judy do?

We would cast this case not in text alone, as above, but with multimedia and other materials. For example, we might present a conversation between Judy and a friend with characters in an animated sequence with an audio track. Perhaps we will show actual herbal medicine web pages and a clip from the television program. Throughout the case, we can introduce characters to personify certain attitudes or points of view and to serve as "intelligent agents" with differing or supportive points of view. Miller has found the use of characters in the Reconstructors® enhance the teaching of science to adolescents. We will explore different character representations□ from cartoons to more realistic depictions□ for our intended audience. Based on their feedback, the appropriate style will be decided.

While Judy's character□ and the student□ ponder what to do, her friends' characters offer more advice. "Check out the web site I told you about. Use Google to search for your symptoms. My aunt belongs to a discussion group in which women (who often get poor advice from doctors) share their experiences. Try it!"

As the students explore Judy's choices, they get the information she would obtain□ and they have to make sense of it. Students in Gorry's classes find such a case relevant and engaging, and their discussion quickly produces diverse advice and opinions. And they move

from the particulars of Judy's problem to more general questions of what we take to be authoritative in the Information Age.

The Teaching Points

We will use Connexions to assemble teaching points that extend and enrich the module. Here, for example, are several such points regarding changes in our views of authority. The case example suggests some of the ways in which a liberating and stupefying flood of information has affected our reliance on doctors. Who else has lost authority □ business leaders, lawyers, public and even historical figures? But if we don't get advice from doctors, the government, scientists and respected businesses, to whom do we turn? In the new, electronic commons, there are now many claiming authority. Whom do we believe? With the press of life, should we take advice from new, less certain sources? How much should we know or care about our sources of information?

We would frame such teaching points in Connexions as a combination of documents, web links, and more multimedia case □ and with time, we would accumulate student reactions, experiences and opinions.

To determine whether the new modules are engaging, efficient, and preferred over more traditional instructional methods, we will follow the general approach Miller used in her work with middle school students. She enlisted them in focus groups, where she presented ideas for a setting, a story, and rough sketches of characters. These sessions helped the development team shape their computer world and problem-solving scenarios (Miller, 2000). We will use focus groups of undergraduates and executives and a similar prototyping process to involve students from the outset.

Learning from Multimedia Cases

Miller has shown that multimedia modules enrich learning. (Miller, et al., 2003, Miller, et al., 2004). The most recent article in the Microbiology Education Journal (May 2004) reports that a group of over 700 students who used online modules significantly improved their learning about infectious diseases. And the students strongly preferred the innovative format. Problem-based learning frames educational materials on the Internet, helping students avoid 'lazy' learning, "where the student is simply confronted with a vast resource and left unguided" (Weller, 2000). Multimedia narratives in the Reconstructors®, with their combinations of games, text, graphics, animation, voice and music, draw students into interactive problem solving about science.

Undergraduates typically enjoy interactive games and in the classroom they respond well to illustrative stories, particularly regarding complex subjects such as intellectual property and privacy. (Gorry, 2003) And there is a long tradition of case teaching in business schools, where students confront complex and realistic descriptions of business problems. So although these students are more mature than the middle school students who use the Reconstructors®, multimedia modules on authority, intellectual property or privacy should engage them in self-directed, problem-based learning as well. Our focus groups will help us develop story settings and characters that engage undergraduates and adult learners as well.

Project Innovation and Impact

The proposed project is innovative in several respects. First it focuses on behavioral aspects of information technology, an important subject that is overlooked too often in the education of engineers, business students and others. With the proliferation of computing and related technologies, it is increasingly important for both those who develop such tools and those who put them to work to understand their effects on our ways of thinking about the world. When we use tools, we change. By helping students in various disciplines appreciate the importance and subtlety of some of the changes, we can make an important contribution to education at Rice and beyond.

Second, our work will build a sound approach to instructional design that Miller's group has successfully exercised in several projects. In this regard, our effort will go beyond other efforts that offer educational materials on the web, but lack true educational coherence. We will center our work on case development, because pedagogical research has demonstrated that strong narrative "shapes our knowledge and experience and is central to the processes of teaching and learning because it aids reconstruction, retrospection, prediction and memory as well as motivation" (Plowman, 1997).

Another innovation will be our design of characters that appeal to university and executive classes and serve as agents for the multimedia environment. The characters will play an important part in guiding students through the modules, representing different views and adding some entertainment value.

Last, we will adhere to the design aims of the Connexions Project so others can reuse and reconfigure the materials for their own purposes. And Connexions will enable us to incorporate student contributions in our teaching resource. The PBL approach will require the ability for students to follow paths that are "hidden" until they make key decisions about the issues they

are addressing. This project will provide a basis for Connexions to explore the needs of providing multi-path options through a course of materials, rather than a single thread as is currently supported with its Roadmap component. Other institutions (e.g. UC Merced) have expressed an interest in using Connexions in support of PBL courses. Thus, our contribution in helping Connexions become more useful for PBL will benefit future Connexions users trying to achieve the same goals.

Project Management

Tony Gorry and Leslie Miller, from the Center for Technology in Teaching and Learning, will collaboratively manage all aspects of the project. No salary is requested for their time. Two other CTTL staff members, an illustrator and a instructional design specialist, will be part of the development team. In addition, a graduate student who has taken Gorry's course will serve as the Research Assistant for the project.

The project involves the core team from CTTL and our partners in the Connexions Project, our collaborators at InReason Media to produce the graphics and Flash programming, and students. InReason Media is a local private company that has worked successfully with CTTL in the development of the Reconstructors Projects and with Connexions on the development of the Sound Reasoning module that is part of Connexions Content Commons.

The goal is to produce a quality product that is freely available using new technologies and best instructional practices.

Our approach makes effective use of resources by allowing for programming/graphics services on an as-needed basis to gain the greatest level of skill for tasks, without having to maintain a full-time staff of graphic designers and programmers. Our own technical group in collaboration with the Connexions staff will ensure that the multimedia products are properly transferred to

the appropriate Rice University server.

Project Timeline

Fall 2004 to Fall 2005	
DEVELOPMENT AND DESIGN CYCLE: Case Study One	Time Frame
Outline learning objectives and relevant materials	Sept 2004
Construct storyboard. Collaboration with Connexions	Oct-Nov 2004
Recruit focus groups for evaluation	Nov 2004
Set storyboard for development	Dec 2004
Programming and layout of Case One	Jan-Feb 2005
Conduct usability tests	March-April 2005
Rework Case One based on assessment	May 2005
REPEAT DEVELOPMENT AND DESIGN: Case Study Two	Time Frame
Outline learning objectives and relevant materials	Jan 2005
Construct storyboard. Collaboration with Connexions	Feb - April 2005
Recruit focus groups for evaluation	March 2005
Set storyboard for development	June 2005
Programming and layout of Case One	June-August 2005
Conduct usability tests	September 2005
Rework Case One based on assessment	October 2005
Submit proposal for additional funding for other cases	December 2005–January 2006

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