Academic
Technology
at Tufts

February 2003

Innovations in Learning

Academic Technology is a university-wide resource that provides guidance and professional advice on using instructional technology in support of teaching and research initiatives. Through on-site consultations, AT's three groups—Curricular Technologies, Faculty Development and Support, and Research and Scientific Computing—work with the schools and faculty on how to integrate technology to further their educational and research objectives.

The Nature of Situated Learning

By Paula Vincini

In 1929 in *The Aims of Education and Other Essays*, noted British mathematician, logician and philosopher Alfred North Whitehead protested against the way students were taught "inert" knowledge that proved useless to them when they needed to transfer it to real life problem solving. Situated learning theory provides an antidote to this type of education.

The theory behind situated learning or situated cognition arises from the fields of psychology, anthropology, sociology, and cognitive science. The seminal paper "Situated Cognition and the Culture of Learning" (www.ilt.columbia.edu/ilt/papers/JohnBrown.html) by John Seely Brown, Allan Collins, and Paul Duguid brought situated cognition to the forefront as an emerging instruction model. In this paper, the authors criticize public schooling for separating the "knowing and doing" and for treating knowledge "as an integral, self-sufficient substance, theoretically independent of the situations in which it is learned and used."

Other theorists (Jean Lave, Etienne Wenger, Lev Vygotsky, John Dewey, and J. G. Greeno) associated with situated learning theory argue that knowledge must be taught in context and not in the abstract. Learners must use tools as practitioners use them and become "cognitive apprentices" in that discipline's community and its culture.

The social interaction that occurs in communities of practice between experts and novices is crucial to the theory of situated cognition or learning. In *Situated Learning: Legitimate Peripheral Participation*, Lave and Wenger emphasize that novices begin learning by observing members of the community and then slowly move from the periphery of the community to fully participating members.

What does this mean for the design of instruction?

- Learning is driven and best presented through realistic and complex problems that allow learners to learn to think and practice like experts in the field.
- Content is learned through activities that help solve the problems and not from "packages" of information organized by instructors.
- The instructor's role moves from providing and structuring the information and knowledge through lectures and presentations to modeling, coaching, and scaffolding learners as they use information and create knowledge to solve contextual real-life problems.
- Situated learning environments must support active engagement, discussion, evaluation and reflective thinking. Activities and assignments are often collaborative and group-based.

Instructional technologies can assist faculty with implementing situated learning and supporting cognitive apprenticeships. Examples include simulations, online interactive case studies, and Web-based learning environments.

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

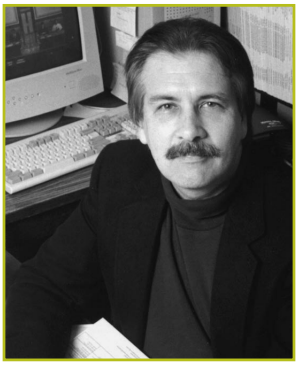
E-Government: A Course in Situated Learning

By Rebecca Sholes

Interview

In situated learning, students learn content through immersion in the activities of their discipline of study. During the fall of 2002, political science and engineering students in the new undergraduate course, "E-Government," examined the content and design of municipal government websites and thereby studied the strengths and weaknesses of online government resources. Co-taught by Political Science Professor Kent Portney and Professor Anselm Blumer of the Electrical Engineering and Computer Science Department, this course used municipal websites as the vehicle for getting students to think more directly about the situational factors municipal officials face. Portney explains, "given all the considerations at work in municipal government, the students will decide how the power of the web can best be brought to bear on making government work better."

Students met twice per week for lecture and discussion with Portney and once per week for a computer lab with Blumer. In the lecture classes, students examined the existing academic literature and research on e-government issues and how well the basic principles and practices of web site design work for the municipal web site genre. Blumer taught students to prepare a detailed design document and to program a website. Students were divided into integrated teams that included both political science and engineering students, ensuring each group had both technical and content expertise for the project. Each team had to choose a web site from a U.S. city with a population of more than 70,000, analyze it, and, finally, build their own improved version of the site. By working on different cities, Portney explains, the students were able to compare and contrast forms of government and to see the variations. "This ability to compare and contrast information is the heart of the social sciences."



This is the first Political Science course to offer students an explicitly practical experience. Experiential learning usually means involving students in research. However, as Portney points out, the interdisciplinary nature of the course was different. By coupling technology with political science content, the course reached students from two very different disciplines, enabling them to work on a common problem, to learn from each other and to draw upon their different areas of expertise. Non-technical students had the opportunity to learn web authoring tools while experiencing a unique public service learning context. Also, technical students who might not otherwise be interested in public affairs or becoming civically engaged learned about public service.

Rebecca Sholes is the Faculty Development Coordinator in Academic Technology and a graduate of the Fletcher School of Law and Diplomacy.

URLs for Situated Learning

The following resources provide extensive coverage of the history of situated learning and how it supports the development of an effective learning environment.

A Tutorial on Situated Learning This tutorial provides a historical perspective of situated learning including the work of Vygotsky Dewey, Ryle, and Lave, along with discussions about facets of Transfer Research and implications of situated learning for organizational learning.	http://cogprints.ecs.soton.ac.uk/archive/00000323/00/139.htm
Situated Cognition and Learning From the book *MITECS: The MIT Encyclopedia of the Cognitive Sciences* that represents the methodological and theoretical diversity of cognitive sciences.	http://cognet.mit.edu/MITECS/Entry/seifert
Situated Cognition and Problem-Based Learning: Implications for Learning and Instruction with Technology The author reviews the connection between situated cognition and problem-based learning and discusses their implications to learning and instruction with technology.	www.aace.org/dl/files/JILR/JILR134393.pdf
Towards a New Tradition of Online Instruction: Using Situated Learning Theory to Develop Web-based Units The article highlights various design guidelines, based on situated learning theory, as a framework for an instructional approach to course units on the web.	www.ascilite.org.au/conferences/coffsoo/papers/jan_herrington.pdf
What Service-Learning Can Learn from Situated Learning Larry Wolfson and John Willinsky discuss why the theory and practice of situated learning forms an appropriate model for focusing attention on the learning claims of service-learning, and for guiding research into its effectiveness.	www.educ.ubc.ca/faculty/ctg/research/service.htm

Instructional Strategies

Compiled by Paula Vincini

These instructional strategies are adapted from *Critical Characteristics of Situated Learning* (www.ascilite.org.au/conferences/melbourne95/smtu/papers/herrington.pdf).

Situated Learning will:

- Provide an authentic context with authentic activities that reflects the way knowledge in your discipline will be used in real-life.
- Provide access to expert performances and the modeling of processes, as well as promoting the articulation of tacit knowledge to be made explicit.
- Provide multiple roles and perspectives.
- Support collaboration in the construction of knowledge.
- Build in reflection opportunities to enable abstractions from specific situations to be formed.
- Provide coaching and scaffolding at critical times and help students.

Following are examples of activities and resources faculty use to implement situated learning instructional strategies:

Case Studies

MyPatient.com
www.mypatient.com/publicsite/home/home.jsp

A library of interactive case studies, written and peer-reviewed by medical professionals that provide an interactive, case-based approach to online continuing medical education.

Problem-Based Learning

A Computer-Enhanced Geology Learning Environment
www.wcer.wisc.edu/cl1/ilt/case/sandiego/sandiego.htm

Student projects use supercomputer data to solve "international problems related to geology."

Simulations

Developing Professional Consultancy Skills for Engineers Using a Web-Based Simulated Consultancy
www.ascilite.org.au/conferences/coffs00/papers/robert_corderoy.pdf

The Virtual Engineering Consultancy Company (VECC) provides engineering students with the opportunity to develop and practice their consultancy skills.

AT offers consultation on other effective instructional strategies using technology.

ATHelp: 617-627-2451 or athelp@tufts.edu

Article Review

"Smart People or Smart Contexts? Cognition, Ability, and Talent Development in an Age of Situated Approaches to Knowing and Learning"

by Sasha Barab, appearing in *Educational Psychologist*, 2002

Traditionally—and universally, according to Sasha Barab, a leading researcher in situated learning—cognition and learning (or "talent") have been regarded as occurring in a vacuum. Learners either are or are not talented, and knowledge is passed from one head to another. In this article, she contends this framework neither accounts for the real ways in which knowledge is acquired nor provides a working model for contextual learning. Rather, learning occurs as an interaction or "transaction" in a culturally organized setting. When classrooms are modeled on these settings—or, the "real world,"—learners can more readily translate that learning to actual problem-solving.

Barab argues that not only does it make *more* sense to view knowledge and talent within the contexts in which they are acquired and applied, but that, in fact, the two are indivisible: that is, "Cognition... is distributed—stretched over, not divided among—mind, body, activity and culturally organized settings." She discusses five areas of interrelated theory, making the case that, in a real-world context, knowledge is more usefully understood as "knowing about" something. Ecological psychology holds that perception depends on the environment, or the "ecosystem," rather than the individual. Given this, cognition is "situated," or viewed in terms of the "relationship between the learners and the specific environment." This leads to the idea that cognition is a collective idea, distributed across individuals and resources, or that "knowing and context are irreducibly co-constituted." As a result, learners are best served by activity theory, in which learners *do* in order to learn, but the *doing* is focused on the process and social context of the activity. The learning is not simply accomplishing the task, but learning about the tools and environment in which it is accomplished. An understandable outgrowth of this theory is legitimate peripheral participation, or apprenticeship learning, in which the learner is motivated to go from being a novice, working at the periphery, to an expert, working at the center, by the authenticity of the task.

Genevieve Haas, a part-time freelance writer, is a media relations specialist for Northeastern University in Boston.

By Genevieve Haas

Q&A

What types of simulation software would support situated learning?

Simulation software for situated learning enables students to have "authentic" experiences that would normally be costly and time-consuming in "realistic" settings. If the software supports the student in "thinking like an expert," then it promotes a type of cognitive apprenticeship that is further guided by the instructor's coaching and support.

One example of this type of software is Mystery Fossil: Physical Anthropology Laboratory Exercises at www.mhhe.com/catalogs/0767411870.mhtml. This combination workbook/CD-ROM, "teaches students to think like a paleoanthropologist." Students select relevant data for fossil classification from a larger set of data and then argue for their choices among competing species designations and phylogenies. Originated at the State University of New York (SUNY) at Potsdam, it is available through McGraw-Hill.

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Academic Technology Receives Grant from Mellon Foundation

TCCS' Academic Technology Department recently received a $470,000 grant from the Andrew W. Mellon Foundation to create a concept mapping tool to enable students and faculty to visually structure digital information. The Visual Understanding Environment (VUE) will be built using technical standards developed as part of MIT's Open Knowledge Initiative (OKI).

VUE is designed to support both instructors and learners. As an instructional tool for faculty, VUE will provide a highly flexible visual interface for assembling and organizing digital assets from the Tufts Digital Library into instructional presentations (learning content maps). From the learner's perspective, VUE will allow students to rearrange instructional content maps or add their own content and relationship nodes to instructor presentations.

VUE accommodates individual teaching and learning styles as well as provides for learning and knowledge assessment by enabling students to literally map their understanding of course materials, before, during, and after an instructional program. "Tufts is a leader in integrating digital resources into teaching, learning and research," says David Kahle, Director of Academic Technology. "VUE represents an exciting approach to knowledge management by allowing students and faculty to visually think with and structure content stored in the Tufts Digital Library."

Pauline Stieff, Grants Specialist in Academic Technology, is a writer with extensive development experience in the non-profit sector.

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March 2003

Austin Lecture Series
Topic: Knowledge Building
Professor Marlene Scardamalia
Wednesday, March 5, 3:30-5:30pm
Burden Lounge, Anderson Hall

Seminar on Transforming Teaching with Technology
Topic: E-Government: An Example of Situated Learning
Professor Anslem Blumer and Professor Kent Portney
Thursday, March 13, 12-1:30 pm
Austin Room, Tisch Library

April 2003

Next Issue of Innovations in Learning
Cognitive Tools