

## Teaching and Learning Laboratory

The Teaching and Learning Laboratory (TLL) was founded in 1997 as a resource for faculty, administrators, and students who share a desire to improve teaching and learning at MIT. Its goals are to strengthen the quality of instruction at the Institute; further an understanding of the learning process, particularly in science and engineering; and provide support for the creation and assessment of innovative educational technologies, curricula, and instructional methods.

One of the major accomplishments of AY2004 was a meta-analysis of the assessment studies undertaken by TLL staff and consultants during the last four years. Lessons Learned: Findings from Ten Formative Assessments of Educational Initiatives at MIT, 2000–2003, can be found at <http://mit.edu/tll/edresearch/reports/lessons.pdf>.

As described above, TLL has three broad and interrelated functions: instructional support, assessment and evaluation, and research. TLL's accomplishments in each of these areas are detailed below.

### **Instructional Support**

TLL staff members worked closely with MIT faculty in AY2004 on projects related to educational innovation while maintaining regularly scheduled programs and services.

### **Educational Innovation**

Projects for which TLL staff members provided expertise in learning, pedagogy, instructional skills, and so on, included the following:

#### ***Tutorials in 6.002x***

Repeating an experiment first introduced in spring semester 2003, Hal Abelson and Gerald Sussman, professors of the Department of Electrical Engineering and Computer Science, included tutorials based on open-ended problems in 6.002x in the spring semester 2004. These tutorials were taught by practicing electrical engineers, most of whom were MIT alumni. Dr. Breslow developed and led teaching workshops for the recitation leaders and coordinated a team of consultants who provided each tutor with feedback on his teaching skills.

#### ***Pedagogical Experimentation in Course 2***

Following findings of the assessment of the Cambridge-MIT Undergraduate Student Exchange, professors Warren Seering (Course 2) and Steven Hall (Course 16) are developing plans to experiment with a variety of pedagogical models in subjects 2.001–2.006. Drs. Breslow and Mitchell are providing expertise in pedagogical innovation and assessment.

## Continuing Programs and Services

TLL continues to offer the services and programs in instructional support that it has since its inception. These include the following:

- The Independent Activities Period series of workshops, Better Teaching @ MIT. Thanks in large measure to Ms. Katy Hurley, who expanded publicity for the series, Better Teaching had the largest audience in its history in 2004.
- The Orientation for New Graduate Teaching Staff, coordinated by Ms. Cindy Tervalon
- Teaching workshops for Minority Introduction to Engineering, Entrepreneurship, and Science teaching assistants (TAs), Interphase TAs, Mission 2007 teaching fellows, and Technology Enabled Active Learning faculty and TAs

## Miscellaneous

TLL staff met with a number of international delegations, including those from South Korea, South Africa, Japan, and Mexico. In addition, a half-day workshop, Faculty Development and Teaching Effectiveness: American Experiences and Implications for Taiwan's Higher Education, was organized for the Cultural Division of Taipei Economic and Cultural Office. We also arranged for the visit of Dr. Keith Trigwell, Oxford University, a leading researcher in higher education, who gave a public lecture and met with several MIT faculty, as well as educational researchers from other area universities.

## Assessment and Evaluation

The following table details the assessment and evaluation efforts that TLL staff members have been engaged in during the year.

Subject/Study	Scope of Investigation	Status	Researcher
1.00	Analysis of student surveys	Complete	A. Lipson
6.002x	Feasibility study	Complete	T. Clay, R. Mitchell
7.14	Survey to provide baseline data on experimental lab	Survey not administered—insufficient number of students	R. Mitchell
18.03	Survey to assess mathlets	Survey to be administered	R. Mitchell
HST 100/527J	Survey to assess computer simulation	Complete	R. Mitchell
HST 527	Assessment of new subject	Complete	R. Mitchell
MetaMedia	Survey to assess effectiveness of MetaMedia in learning about French culture	Complete	R. Mitchell

Mission 200X	Interviews of seniors who took Mission 2004 as freshmen	Analysis of data	A. Lipson
Pass/No Record First Year	Analysis of faculty survey data	Complete	A. Lipson
Peer Review Engineering Process (PREP)	Two surveys to obtain baseline data on use of PREP	Surveys to be administered	R. Mitchell
Terrascope	Focus groups and online survey	Analysis of quantitative and qualitative data	A. Lipson, K. Hurley
Cross-Media Annotation System (XMAS)	Comparison of student papers w/ and w/o XMAS	Complete	T. Clay

---

## Research and Scholarship

### Papers

Breslow, L., et al. (2004). "Intellectual Curiosity: A Catalyst for the Scholarship of Teaching and Learning" In *Conference Proceedings of The University of Cambridge Conference on Academic Development: Engaging Faculty*. In press.

Breslow, L. (2003). "Strengthening Interdisciplinary Education: A Preliminary Study of Health Science and Technology MD and PhD Students." Working Paper.

Lipson, A. (2004). "Questions Raised by Reviewing Some Studies About Educational Computer Simulations." Working Paper.

Lipson, A. (2004). "Wireless Laptops and Active Learning: Developing a Sustainable Curriculum for a JAVA Programming Course," submitted to the *International Journal of Human Computer Studies*.

## **Presentations**

Breslow, L. "Lessons Learned." DUE Visiting Committee and CrossTalk, Cambridge, MA, April 2004.

Breslow, L., et al. "Intellectual Curiosity: The Meeting Ground for Academic Developers and Faculty Interested in the Scholarship of Teaching and Learning." 2004 Carnegie Foundation Colloquium on the Scholarship of Teaching and Learning, San Diego, CA, April 2004.

Breslow, L. "Intercultural Communication in the Professions." Invited talk, Consortium on Global Leadership, Harvard University, Cambridge, MA, February 2003.

Breslow, L. "Taking Stock of Technology: MIT's Effort in EdTech." Invited talk, Worcester Polytechnical Institute, Worcester, MA, April 2003.

Tervalon, C. and Breslow, L. "What They Want: A Survey of MIT's TAs." Poster session at the first annual meeting of the Center for the Integration of Research, Teaching and Learning, University of Wisconsin, Madison, Wisconsin, November 2003.

## **Grants**

Grants include the Class of '51 Fund for Excellence in Education, the Class of '55 Fund for Excellence in Teaching, the Class of '72 Fund for Educational Innovation, and the Class of '99 Fund for Excellence in Student Learning grant to support the development of an interactive website for TAs and novice instructors.

TLL is participating with the Center for the Advancement of the Scholarship of Engineering Education, two professional societies (American Psychological Association and American Sociological Association), and seven other universities (Purdue, Carnegie-Mellon, Georgia Tech, Texas A&M, Colorado School of Mines, Virginia Tech, and Penn State) in a proposal to the Innovation and Organizational Change Program of the National Science Foundation to study the diffusion of pedagogical innovation among faculty in engineering schools.

## **Undergraduate Research Opportunity Programs**

We are sponsoring two Undergraduate Research Opportunity Program students: Mubarik Imam, who is studying the effectiveness of science laboratories for elementary school girls in Pakistan, and Elsa Castillo, who is doing a literature review on science and engineering labs as the first step in an assessment of the iLab projects at MIT.

## **Staff Changes**

In the past year, we successfully completed two searches. Dr. Rudolph Mitchell joined TLL as associate director for assessment and evaluation in January 2004, and Ms. Katherine Hurley became TLL's research assistant in September 2003. In addition, Ms.

Jane Dunphy, director of English language programs and lecturer in foreign languages and literatures, is working on a part-time basis during the 2004 calendar year on the development of TA training programs.

**Lori Breslow**  
**Director**

*More information about the Teaching and Learning Laboratory can be found on the web at <http://web.mit.edu/tll/>.*