

# The Classroom

Center for the  
Enhancement of  
Teaching &  
Learning

The Newsletter For Teaching and Learning at Georgia Tech

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## CETL's 20th Anniversary 1986 - 2006

by Donna C. Llewellyn, Ph.D.  
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Welcome to the birthday issue of The Classroom. CETL was founded in 1986, so we take this opportunity to look back over the past two decades. Our book review looks at one of the seminal books on teaching and how it has changed across 11 editions through the years. We also explore how the theory of good teaching has evolved over time, and how educational technology and its uses has grown and matured. Finally, we have reflections from three faculty who joined the Georgia Tech community the same year that CETL was founded.

For our readers who were not here in 1986 (and those for whom the memories of that era are becoming hazy), here is a brief history lesson on how CETL came to be. [Thanks to the words of former CETL Director, Dr. David McGill, Professor Emeritus from his Tech Topics article in April/May 1987.]

*In 1983 and 1984, there was an Institute committee formed by the Executive Board, called The Committee on the Evaluation of Teaching Effectiveness, chaired by then Chemistry professor Aaron Bertrand. The final report (in late 1984) had 15 recommendations that were aimed at improving the teaching climate, teaching support, teaching assessment, teaching reputation, and teaching itself at Georgia Tech. As a result of these recommendations then Vice President for Academic Affairs, Dr. Henry Bourne, Jr. appointed a faculty/student committee, called The Committee on Development, Support, and Assessment of Teaching Proficiency. This committee became known as the Loveland Committee after the name of its chair, Psychology Professor Dr. Ed Loveland. The charge of this committee was to "design a program which will provide the faculty an opportunity to improve their teaching capabilities."*

There are two outcomes of the Loveland Committee which are still around today, 20 years after the release of its final report: the campus Course/Instructor Opinion Survey (CIOS), and the Center for the Enhancement of Teaching and Learning (CETL). Both of these have evolved over the ensuing time, but both still exist to fulfill the goals set forth by the Committee. The primary thing that I take away from this brief look back at our history is that CETL was created as a result of a need perceived by the faculty – the Center exists solely because the faculty of Georgia Tech want to be excellent teachers and they deserve support in reaching that goal. ■

# In the CETL Library

## A Book Review

*Five Decades of McKeachie's Teaching Tips*

by Steven P. Girardot, Ph.D.  
Teaching Assistant Program Coordinator, CETL

*McKeachie's Teaching Tips: Strategies, Research, and Theory for College and University Teachers*  
Wilbert J. McKeachie

New York: Houghton Mifflin, 2002. xxii + 371 pp.

“What is contained in this discussion will not make you a Great Teacher. It may be that only God can make a Great Teacher.” *Wilbert J. McKeachie, 1950*

“What is contained in this book will not make you a Great Teacher. It may be that Great Teachers are born and not made, but anyone with ability enough to get a job as a college teacher can be a *good* teacher.” *Wilbert J. McKeachie, 2002*

What began as an unpublished “compilation of useful (occasionally mechanical) tricks of the trade” written in 1950 for teaching assistants in the University of Michigan’s Department of Psychology has become one of today’s most popular and renowned handbooks on college teaching. Now in its eleventh edition (with the twelfth on its way), *McKeachie's Teaching Tips: Strategies, Research, and Theory for College and University Teachers* by Wilbert J. McKeachie is relevant for beginning and experienced college teachers alike and probably sits on more teachers’ bookshelves (and desks!) than any other book in publication. Even with this longevity and popularity, however, Dr. McKeachie still considers teaching assistants and graduate students to be his primary audience. In a special preface to the eleventh edition of *Teaching Tips*, he writes “I began teaching as a teaching assistant and have worked with teaching assistants ever since.”

In the spirit of reflecting on how the dynamics of college teaching have changed over time, it is especially relevant to look at how the advice given to future faculty (i.e. TAs and graduate students) has also changed over time. To help CETL examine this issue, Dr. McKeachie shared the first edition of *Teaching Tips* (subtitled *A Guidebook for the Teacher of General Psychology*).

So how do those tips of 1950 compare with today’s tips? On the surface, there may seem to be striking differences. There certainly was no discussion of web-based course management systems, electronic databases, or effective use of PowerPoint in lecturing. Terms like “active learning,” “problem-based learning” and “case methods” were not the buzz words they are today, and a chapter on “how to win friends and influence

janitors” does not appear in today’s advice. The value of diversity in education is not mentioned, and visual aids have advanced considerably from “Hollywood films” and slides.

There are also some topics which have stood the test of time. Chapters on cheating and academic dishonesty, motivation, grading and exams, meeting a class for the first time, and choosing an appropriate text book appear in both editions (although the research and theory on these topics has been updated considerably). Some tips may be even more relevant today than in 1950. For instance, “in most colleges it would be deemed improper for the instructor to convene class in a tavern” and “It takes but a moment to write your name on the blackboard [at the first class period]. Trivial as this may seem it precludes the ego-dissolving experience of having taught a student for a whole year without his even having found out your name.”

However, as interesting as it is to compare and contrast teaching in 1950 with teaching today (espe-

so eloquently states as one of his fundamental beliefs in both 1950 and 2002,

“It is simply a statement of our belief that education is a cooperative enterprise which works best when the student is allowed to contribute to the process.” (1950)

“What is important is learning, not teaching. Teaching effectiveness depends not just on what the teacher does, but rather on what the student does. Teaching involves listening as much as talking. It’s important that both teacher and students are actively thinking, but most important is what goes on in the students’ minds. Those minds are not blank slates. They hold expectations, experiences, and conceptions that will shape their interpretation of the knowledge you present.” (2002)

Even with over fifty years of experience, research, theory, and technological advancements- the best teaching tip given to new and experienced college

teachers is perhaps as simple as that. And, even with another fifty years of new tools added to the teacher’s toolbox, this advice will most likely remain the same.

Finally, there is one last teaching tip that has also stood the test of time and is worth noting: “The instructor can occasionally be wrong. If he is wrong too often, he should not be teaching. If he

is never wrong, he belongs in heaven, not in a college classroom.” So to new TAs (and veteran faculty members)- it is OK to be wrong occasionally! ■

*“ ... one theme has remained firmly ingrained in **Teaching Tips: making student learning the center of teaching.**”*

cially when considering the influences of the time period itself), there is one theme that has remained firmly ingrained in *Teaching Tips: making student learning* the center of teaching. As Dr. McKeachie

# Partnering With Faculty, Learning with Technology

by **Melissa Bachman**  
**Instructional Technology Support Specialist II**  
**CETL**

*My role as Instructional Technology Support Specialist requires a partnership with faculty and other units on campus to support instructional technology initiatives. As I reflect on my ten years at Georgia Tech, I recognize how instructional technologies have evolved and changed, and I look forward to future opportunities. Given that we are celebrating twenty years of CETL, I consider my experience with instructional technology since 1986 as a student and a teacher, and highlight some of the partnerships of the last ten years as well as current initiatives and my hopes for the future.*

In 1986, I was a college freshman, making use of technologies in ways somewhat similar to freshman of today. We didn't have MP3 players or even cell phones, but we did use technology for academics and entertainment. My parents sent me to college with the coolest electronic type writer. It had a little digital screen, and I could scroll up, down, back, and forth, and edit my paper before I printed it. There was a lot of scrolling involved, because the digital display was only about eight inches wide by one inch high, but my roommates and I loved it. As for entertainment, we often hung out at the guys' apartment and watched them play Tetris on an Atari system connected to a TV. I don't recall that any of my peers had personal computers, but we weren't completely without them. The Education department at the liberal arts school I attended had one computer lab. I recall learning a little bit about a program called Logo<sup>1</sup>, a tool developed by Seymour Papert, co-founder of the MIT Artificial Intelligence Laboratory. We learned how to use Logo to direct the "Turtle" (looked like a cursor) to draw shapes and designs. Apparently, we teachers-in-training were to go out into the classroom and allow our students to experiment with the "Turtles" and learn about math. This was my first exposure to educational technology training for teachers, only twenty years ago.

I taught my first year of 6<sup>th</sup> grade without a computer. So much for Logo and the Turtle to teach math. However, thanks to the Georgia Lottery, computers and satellites

started popping up in schools all across Georgia. As soon as our middle school had our its computer lab, I took my 6<sup>th</sup> graders to the lab once a week. We had no software on the computers other than the Windows operating system, and I worked hard just figuring out how to get students to do something other than play Solitaire and Mindsweeper. I realized a serious need for learning more about integrating these new technologies. I saw the potential and a serious lack of support for schools and educators. As a result, I sought a master's degree in computer-based education, and gained an interest in providing faculty support with instructional technology.

By the time I completed my master's degree, I actually owned a computer, and I learned something about the Internet. I began my job at Georgia Tech as Instructional Technology Support Specialist (ITSS) in 1996. The position was created by the Board of Regents in 1995, and each University System of Georgia institution was provided funding for an ITSS. During my first two weeks, Jim Herod (Mathematics) vented to me during a reception how frustrated he was trying to create PowerPoint slides for a class he was teaching in a distance learning studio on his first-ever laptop computer. He struck me as someone who would resist to the end, but I was privileged enough to help him here and there along the way. Even after his retirement, he continued to teach distance learning courses from his home in Alabama. He always surprised me with his innovative ideas and willingness to try new things. I never cease to be amazed by the willingness of instructors like Jim to endure bad software, terrible documentation, bad interfaces, and even a serious lack of time. Despite such obstacles, many Georgia Tech faculty have done great things with technology to improve teaching and learning. Other projects that I assisted with during my first few years include teaching Doug Flamming (History Technology, and Society) how to use a mouse, helping Bill Long (International Affairs) create a PowerPoint presentation, and helping several faculty learn how to use email and listserves to better communicate with an entire class or multiple sections of a class. I also assisted the Office of Information Technology with workshops that helped faculty create their own web pages and post course materials such as a syllabus and lecture notes and scan images and documents. Then along came tools such as

WebCT, Web Course Tools. Instructional technologies began to take on important roles in teaching and learning. In just one decade, I've seen a shift from learning *from* technology to learning *with* technology, and I am hopeful that the trend will continue and will have great benefits for students and instructors alike.

More recent instructional technology initiatives are evidence of a shift towards learning with technology. I've assisted with the development of simulations, visualizations, eLearning environments for distance learning courses, both synchronous with tools such as HorizonWimba, and asynchronous with tools such as Tegrity, and classroom technologies such as Personal Response System that enable student engagement and instructor feedback. Victor Breedveld (Chemical and Biomolecular Engineering) worked with a CETL graduate student assistant to develop a simulation for ChE 3200, Transport Processes I that calculates the temperature profile inside a flat plate as a function of plate material, external temperatures, convective heat-transfer coefficients, thickness of plate, and heat generation. The simulation focuses on students' qualitative understanding of the temperature of distribution. Michael Hunter (Civil and Environmental Engineering) developed a simulation that helps students visualize the effects of signal control on vehicle operations. Meanwhile, in Physics and Chemistry, professors are using wireless Personal Response Systems to engage students in large classes. Students respond to questions via wireless infrared clickers; and a distribution of responses are displayed immediately on the LCD projector. The student responses allow faculty to gauge the learning level for the entire class, and students are able to monitor their own learning. Both Physics and Chemistry classes have implemented Peer Instruction techniques, a method of engaging students in concept questions and peer to peer discussions.<sup>2</sup> Many students have positive reactions to such technologies, and informal assessments in both physics and chemistry have shown improvement in student performance as well as attendance. A chemistry student writes:

I just wanted to let you know that I really enjoyed lecture on Wednesday. I felt as if I learned a lot, and the time flew by. I enjoyed the interactivensess of the class, and getting to discuss answers with other students. I left the room excited about learning and excited about chemistry. I just wanted to thank you for making lecture such an enjoyable experience for the students. I am slowly discovering that an enjoyable lecture is a rarity in college, and it is wonderful that yours is an exception. I love chemistry, and I was afraid that my passion for the subject would die out in college. It hasn't thankfully, and instead of waking up dreading class, I look forward to going to chemistry. I know that many other students feel the same way. Again Thank You.

This student mentioned nothing of the technology involved, and yet it is the technology that better enables the instructor to provide peer to peer instruction as well as gauge student learning and guide discussion to best meet the needs of students. When used well, technology becomes part of the process, or what I like to call learning with technology.

According to David H. Jonassen in his text, *Learning with Computers as Mindtools*, learning with computers is a constructivist approach for using computers to engage learners in representing, manipulating, and reflecting on what they know. The role of computers serves a role of partner and does not reduce the computer to a role of information processing to make the task easier, but rather to make more effective use of the mental efforts of learners, getting students to think harder about the subject domain than they would have to think without the

tool. The technology is used to encourage students to think deeply, to engage in the discipline. When technology supports knowledge construction, it represents learners' ideas, understandings, and beliefs. Technology supports exploration and access to needed information, allowing comparison of perspectives, beliefs, and world views. It simulates meaningful real-

*"In 1986, I was a college freshman, making use of technologies in ways somewhat similar to freshman of today. We didn't have MP3 players or even cell phones, but we did use technology for academics and entertainment."*

*continued on page 15*



# Twenty Years of CETL: Tech Faculty Who Started in 1986 Share Their Perspectives

## 20 Years of Change in Biology Education at Georgia Tech

by Jung H. Choi, Associate Chair, School of Biology  
and Coordinator, MS Bioinformatics Professional  
Science Masters Degree Program

In 1986, the year I arrived as a freshly minted assistant professor, the School of Applied Biology boasted 171 undergraduate majors, and graduated 16 with BS degrees. A PhD degree program had been approved in 1983, and Applied Biology would graduate its first PhD in the spring of 1987. In 2006, the School of Biology has 350 undergraduate majors, will award about 70 BS degrees, and has graduated around 70 PhDs to date. Faculty numbers also increased, from 16 in 1986 to over 30 now. The change in name and the increase in numbers tell only a small part of the changes in biosciences at Georgia Tech.

In 1986, the undergraduate Applied Biology curriculum offered an excellent concentration in applied and industrial microbiology. However, the areas of most rapid advances in biosciences in the next decade were in cellular and molecular biology, and new analytical approaches were invigorating ecology and environmental biology. The Biology curriculum adapted in the 1990s by offering 3 undergraduate tracks, in cellular and molecular biology, ecology, and microbiology. In 2006 the undergraduate Biology curriculum is changing once again, dropping the tracks in favor of a more flexible, more interdisciplinary and more integrated curriculum.

Our challenge is not merely to adapt in response to change, but to anticipate change and offer our graduates the best tools to be the leading agents of change.

In 1986, the leading biologists were reductionists, studying individual genes and proteins in exquisite detail. In this decade, biologists are ready to look at how the parts work together. Behind the leadership of John McDonald, our chair, the School of Biology has committed to focus on Integrative and Systems Biology. This new focus fits perfectly at Georgia Tech, with its pre-eminence in engineering and computer science, and its embrace of interdisciplinary approaches, of which the Petit Institute for Bioengineering and Biosciences and the new Center for the Study of Systems Biology directed by Jeffrey Skolnick are particularly relevant examples.

Systems-level biology will require a reformation in biology education at both the undergraduate and graduate levels. The National Research Council published a discussion of such reform for undergraduate science education in *BIO 2010: Transforming Undergraduate Education for Future Research Biologists*. The future biologist will require more quantitative analysis, more mathematical modeling, more computational skills – in short, more interdisciplinary education than typical biology curricula now offer.

At Georgia Tech, we are already at the forefront, having initiated the first MS Bioinformatics degree program, and being one of still relatively few universities to offer an interdisciplinary PhD Bioinformatics program. But we cannot rest here – we have begun to reform the traditional biology curriculum, from fresh-

man biology to graduate courses. We look forward to partnering with other units, particularly Mathematics, Chemistry and Biochemistry, Physics, Computer Science, and all the Engineering schools that interface with biology, to develop an integrated and interdisciplinary biology curriculum. The planned Undergraduate Learning Center will provide an ideal setting for introductory science courses to exchange and share ideas. And rather than be content to stand and deliver lecture content to the masses of students, as was the prevailing teaching style in 1986, we will experiment with new educational technologies and pedagogies, and develop assessment instruments to measure the learning growth of our students. To rephrase an Applied Biology motto from 1986: we will not fit the mold, we will genetically engineer the mold. ■

## The Evolution of CETL - 20 Years On

By Terry Blum  
Dean  
College of Management

I joined the faculty of Georgia Tech in the fall of 1986. I did not know that the teaching evaluation forms which an assistant distributed to the students along with number two pencils, and the resultant

a drawer. I believe my colleagues did the same. I did not think anyone in a position of power really cared about them. In retrospect, I can pretty much attest that nobody ever said anything about these evaluations

or indicated to me or to anyone I know that teaching quality, or the students' perceptions of their experience in the classroom, mattered. Certainly, nobody ever suggested that CETL was there to help faculty enhance the learning environment, and that professors could find in CETL the potential help and guidance for them to continuously improve as teachers. The prevailing thought, I believe, was that the student opinion reports pro-

*“High quality teaching is expected and rewarded. This is necessary, but not sufficient. I have never seen people promoted on teaching quality alone, but I have seen people fail to be promoted because of poor teaching.”*

*Terry Blum*

reports that I received several weeks later, were part of a new process administered out of the also new Center for the Enhancement of Teaching and Learning (CETL). I assumed they always existed.

In those days, I looked at the output and the student comments that were sent back to me along with the scanned sheets and the reports, and then put them in

vided a potential stick. Over the intervening 20 years, CETL has changed this perception.

I have no doubt that in the 20 years since CETL first opened its doors, the importance of teaching and learning on our campus has become institutionalized. This has been done in a constructive way by redefining

our values and our culture. It is clear that expected high teaching quality is now part of the fabric of what we all believe should be. I know that the values of what “should be” are often different than the practices of “what is,” but there is now agreement among all stakeholders that teaching matters. High quality teaching is expected and rewarded. This is necessary, but not sufficient. I have never seen people promoted on teaching quality alone, but I have seen people fail to be promoted because of poor teaching.

In my experience CETL has coached wonderful scholars to add teaching excellence to their portfolio. They have provided the forums for discussions of best practices, the rewards of the teaching awards, and coaching for improvement. CETL is the first group outside of one’s own immediate colleagues that a new faculty member meets at orientation, and this imprinting makes a difference in creating a community in which learning and caring about students matters. This is a positive change from 20 years ago, and possibly from 15 years ago. Around 10 years ago, I believe, there was a tipping point where CETL passed its adolescence and became an integral player in ongoing and continuous improvement of teaching and learning at Georgia Tech. Now, CETL is integrated and institutionalized and well respected for its goals and for the tools it uses to help so many do better, and do well. ■

## How Technology Has Changed Our Teaching

Joseph L. A. Hughes  
Professor and Associate Chair  
School of Electrical and Computer Engineering

Looking back over the past twenty years, it is easy to see the effects of technology on *how* we teach – email, the web, PowerPoint®, and WebCT™ are just some of the most obvious examples. But I believe the case can be made that technology has just as dramatically affected *what* we teach.

My expertise is in computer and integrated circuit design and testing. In 1979, when I received my BS degree, Intel® introduced the 8088 microprocessor with 29,000 transistors and an 8 MHz clock speed. By 1986, when I received my PhD and joined the Georgia Tech faculty, the state-of-the-art i386™ microprocessor had 275,000 transistors and a 16 MHz clock speed. The 2005 version of the Pentium® has 140 million transistors and a clock speed over 2 GHz. [1] If those numbers don’t mean much, here’s a simpler comparison: the computing power of an Xbox® video game system is roughly equivalent to that of the most powerful commercially-available supercomputer of twenty years ago.

*“It is easy to see the effects of technology on **how** we teach, but technology has just as dramatically affected **what** we teach.”*

*Dr. Joseph L.A. Hughes*



The effects of technology also can be seen in other disciplines: use of pocket calculators and spreadsheets for financial modeling; online distribution and access to books, music, and historic art images; and near-instantaneous worldwide transfers of television images, digital data, and money. The key trends and concerns associated with globalization, such as described in Thomas L. Friedman's best-selling 2005 book *The World is Flat*, are largely the result of – and sustained by – advances in technology.

So what has technology changed in courses and curricula content? Here are three changes that I believe to be most significant and universal.

- **Higher levels of abstraction** – I learned computer architecture by focusing on low-level design and implementation issues and, by the time I graduated, I could explain in detail how the 8088 microprocessor worked. Such an approach is not even conceivable today. Functionality, interactions, and systems – not implementation – dominate computer architecture and design courses today. Similarly, one need not be an expert on international patent law to recognize the implications of globalization on intellectual property issues. Nor is it necessary to understand how to manage an international currency hedge fund to account for currency exchange rates in financial and marketing plans for a global company.
- **Use of tools** – Managing the design complexity of today's computers would be impossible without advanced computer-aided tools. Designing skyscrapers, managing global financial transactions, and reducing power plant emissions all rely on tools to accomplish things that simply were not possible twenty years ago. The challenge is that teaching students to use tools is relatively easy; the difficulty is teaching them to understand and use the results produced by the tools.
- **Focus on transferable skills** – Lifelong learning and continuing education have always been essential for success as a practicing engineer. Similarly, it is usually argued that the true value of a liberal arts education is in the development of analytical, critical thinking, and communication skills that can be applied to new problems and situations. The proportion of curricula devoted to these topics has increased significantly since I was an undergraduate, a trend that appears likely to continue.

Since technology is unlikely to stop advancing, what should we expect for the next twenty years? It has been widely noted that the most common uses of technology in how we teach (e.g., posting syllabi, assignments, and lecture notes online) are simply replacements for existing methods and don't fundamentally improve the quality of education. The major benefits arise when technology enables fundamentally new approaches to teaching and learning.

I believe the same is true concerning technology and the content of our programs. Even in a field like computer engineering over the past twenty years, most changes are incremental (or at least appear to be). Thus, we tend to incrementally revise courses and curricula, updating the same basic concepts and approaches. Substantive changes and new approaches to course and curriculum content require much more time and effort, as well as a willingness to resolve disagreements and give up existing content for which we may feel a strong attachment.

Will we make the fundamental changes in teaching and learning necessary to keep up with the impact of technology on both *how* and *what* we teach? The challenge is clearly laid out before us. Check back in twenty years to find out if we succeeded. ■

[1] <http://www.intel.com/pressroom/kits/quickreffam.htm>

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# Ways of Understanding Good Teaching

by Joyce Weinsheimer, Ed.D.  
Assistant Director for Faculty Development  
Center for the Enhancement of Teaching and Learning

Humorist Dave Barry describes college as a place where students sit in classes for over two thousand hours during a four-year period. During this time students learn about things they will need to know in later life (two

hours) and things they will not need to know in later life (1,998 hours). Students are successful if they can memorize details and write them down in little exam books. Should students fail to forget these details once the test is over, they become professors—and they have to stay in college for the rest of their lives.

*We teach a subject not to produce little living libraries on that subject, but rather to get a student to think mathematically for himself, to consider matters as an historian does, to take part in the process of knowledge-getting.*

*Knowledge is a process, not a product.*

**Jerome S. Bruner**

While Dave Barry's irreverent description of the academic enterprise draws chuckles from teachers and students as well as the general public, it also highlights why a paradigm shift called "teaching for learning" is taking place in higher education. We know that delivering instruction that is

*Most career-long teachers have been lifelong learners. At some point in these journeys, teachers need to develop a personal understanding of what learning and teaching mean.*

**Steve J. Thien**

perceived as useless is risky business—the public balks at funding it, and our society can’t afford it. So, from our perspectives as teachers, what are we doing? What does good teaching look like?

According to Paul Ramsden, an international authority on teaching and learning in higher education and author of *Learning to Teach in Higher Education* (2003), we’ve primarily had three ways of understanding the role of the teacher in higher education and what constitutes good teaching:

(1) **Teaching as Telling.** Teaching is the transmission of authoritative content or the demonstration of procedures. Good teaching requires content expertise and the ability to present knowledge clearly. Improving teaching involves learning to develop dynamic lectures, organize ideas coherently, and master delivery techniques. The focus is on what the teacher does. The theory presumes that learning occurs when the teacher presents the content to the students. Remedies for poor learning typically include

*Researchers have discovered that students learn by constructing knowledge rather than by receiving knowledge from others. This apparently simple theory has profound implications for the way we teach....We may have to learn to ask questions that guide student thinking, to facilitate student discussion in ways that lead to increased understanding, to coach students as they work in pairs or groups, and to coordinate in-class student activities.*

**Mary E. Huba and Jana E. Freed**

*Learning is an active search for meaning by the learner—constructing knowledge rather than passively receiving it, shaping as well as being shaped by experiences.*

**Joint Task Force on Student Learning**

weeding weak students out of the discipline and working to attract better students in the future.

(2) **Teaching as Organizing Student Activity.** The focus in this second theory shifts from the teacher to the student. Good teaching involves engaging students in activities. Authoritative knowledge becomes less important as the teacher's energies are directed toward fostering student motivation, independence, and critical thinking skills. Improving teaching involves expanding one's repertoire of teaching strategies that connect students actively with the topic. If learning doesn't occur, it is because the teacher has not yet determined appropriate techniques for working with particular students.

(3) **Teaching as Making Learning Possible.** This third theory avoids focusing on just the teacher or the student or the content. Teachers sort out what their students do and do not understand about each topic at hand, then they engage them in activi-

*Teachers in our study...believe that students must learn the facts while learning to use them to make decisions about what they understand or what they should do. To them, learning makes little sense unless it has some sustained influence on the way the learner subsequently thinks, acts, or feels. So they teach the "facts" in a rich context of problems, issues, and questions.*

**Ken Bain**

*A good teacher does not teach all that he knows. He teaches all that the learner needs to know at that time, and all that the learners can accountably learn in the time given.*

**Jane Vella**

ties suited to the content and the disciplinary context. Learning is something that students do with a teacher's guidance as they work to construct their understanding of the subject. Faculty view the improvement of teaching as an on-going venture to engage in with colleagues, for there is no one way of teaching that will ever ensure the learning of all students.

As Paul Ramsden points out, these theories have a hierarchical structure, with each new theory building on its predecessor:

Theory 1 assumes that content knowledge and fluent presentation are enough for good teaching.

Theory 2 complements this picture with additional skills focused principally on student activity and the acquisition of extra teaching techniques. Theory 3 presupposes

all these abilities and extends the understanding of teaching so that it becomes embedded in the nature of subject knowledge and the nature of how it is learned (p. 113).

*Effective teaching cannot be limited to the delivery of information; rather, it needs to be based on a model of minds at work.*

**James A. Anderson  
& Maurianne Adams**

So what impact is theory 3 having on what faculty do? In their landmark article "From Teaching to Learning—A New Paradigm for Undergraduate Education," Robert Barr and John Tagg point out that the "Learning Paradigm"... "honors whatever approaches serve to best prompt learning of particular knowledge by particular students." As you'll see from the quotes distributed throughout this news-

letter, this shift from “providing instruction” to “promoting learning” is causing many in higher education to re-think who they are as teachers and what they do in the classroom.

And so our understanding of what constitutes good teaching continues to evolve. As we celebrate the twentieth anniversary of the Center for the Enhancement of Teaching and Learning, we’re reminded that there’s still much to figure out about how to make student learning possible in every course and classroom. But Georgia Tech graduates report that far more than two hours of their education has been worthwhile, and faculty report that good teaching requires much more than just failing to forget exam details and becoming a professor. Even Dave Barry would have to admit that we’ve come a long way! ■

*Good teaching is the creating of those circumstances that lead to significant learning in others.*  
**Donald L. Finkel**

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*It is easy to fall into the “cover the content” trap. But we must ask ourselves whether **we** are covering the content or whether **the students** are covering it... That is, you can “give” lots of information to students. But that doesn’t mean your students are able to use it in any meaningful way. If students are to learn anything well, they must actively bring what they are learning into the structures of their minds. They do this through reading, writing, speaking, thinking and rethinking the ideas into their thinking.*

**Richard Paul and Linda Elder**

*from page 5:*

**Partnering with Faculty, Learning with Technology,**  
*continued*

world problems, situations, and context, represents beliefs, perspectives, and arguments, and provides a safe, controllable problem space for student thinking. Computers support learning by enabling collaboration and discussion, and can enable students to reflect on what they have learned and how they came to know it, supporting mindful thinking.<sup>3</sup>

So what does the future hold? I was privileged to support the Academic Technologies Advisement Committee; their goals included defining the requirements for eLearning tools at Georgia Tech and surveying the campus experience with the use of eLearning tools and learning management systems. I feel the recommendations made by this committee will shape the future direction of educational technologies at Georgia Tech. The ATAC Committee Recommendations state, “In line with Georgia Tech’s goal of *Shaping Futures Through Innovation*,<sup>4</sup> we recommend that eLearning tools... be considered mission critical... [That] exploration and innovation in eLearning is a vital goal for Georgia Tech. eLearning tools have a significant role in education at Georgia Tech.” Given this recommendation, I look forward to new and innovative uses of instructional technology at Georgia Tech. The Center for the Enhancement of Teaching and Learning will continue to partner with faculty as we explore effective uses of instructional technology and shape the future of eLearning. ■

<sup>1</sup> For more information about the LOGO Foundation, visit <http://el.media.mit.edu/Logo-foundation/logo/index.html>.

<sup>2</sup> Mazer, Eric. (1997). *Peer Instruction: A User’s Manual*. Prentice Hall

<sup>3</sup> Johnassen, David H. (2000). *Computers as Mindtools for Schools*. Prentice Hall

<sup>4</sup> 2002 Georgia Tech hallmark video, <http://www.gatech.edu/psa/2002/> ■

# Spring 2006 Events

## Faculty Development Seminars:

- |                      |   |
|----------------------|---|
| <b>January 25-26</b> | <b>Northwestern Gateway Science Faculty Visit to Georgia Tech</b><br>Dr. Cindy Pederson, Dr. Denise Drane, Dr. Franz Geiger, Dr. Martina Bode |
| <b>February 16</b>   | <b>Critical Thinking</b><br>Dr. Joyce Weinsheimer   |

## Other Events:

- |                    |   |
|--------------------|---|
| <b>March 13-14</b> | <b>GTREET (Georgia Tech Retreat Exploring Effective Teaching)</b><br>Callaway Gardens                   |
| <b>March 30</b>    | <b>Teaching Assistant Award Luncheon</b>  |
| <b>April 4</b>     | <b>TA Training Workshop with Dr. Solomon Friedberg</b><br>(Sponsored by School of Mathematics and CETL) |
| <b>April 12</b>    | <b>Faculty/Staff Honors Luncheon</b>  |
| <b>April 14</b>    | <b>Celebrating Teaching Day</b>   |
| <b>April 19</b>    | <b>Student Honors Luncheon</b>  |

**For more information on these events, visit the CETL website  
or call us at 404-894-4474.**

## The Classroom

### CETL

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