Welcome to The Classroom

by Donna C. Llewellyn, Ph.D.
donna.llewellyn@oars.gatech.edu

Welcome to the inaugural issue of The Classroom. This newsletter has been created as a place for the campus community to discuss issues related to teaching and learning at Georgia Tech. Our aim is to provide a first step towards some open conversations about how we can improve as educators, and how we can help our students improve as learners. We will be publishing this newsletter twice a year, in the Fall and the Spring. In each issue, look for the following features:

- An interview with an award-winning teacher
- Book reviews related to pedagogy and the scholarship of teaching
- An opinion piece from a current or past teaching fellow
- An article about an innovative use of instructional technology
- An invited article from a student
- And, of course, a welcome from me.

Feel free to email me with your feedback, and visit our web page to see what else CETL is up to these days.

Over the past several months, we have had several opportunities to hear from students about what they think makes a great teacher, and what they would like to see changed in the teaching and learning environment at Tech. The one thing that has repeatedly struck me is that the contents of these dialogues could have come from 20 years ago as I was graduating from college: There has been no mention of the desire for more technology, for updated facilities or resources or anything else that dates us to the year 2000. Rather, we have heard over and over again that the students crave more interaction with the faculty - especially inside the classroom, that they want us to learn their names and something about what makes them individuals, and that they want to hear more about what makes us fellow human beings. Simple concern, passion for our material, enthusiasm for them to learn the material, and a general understanding of what our students are doing when they are outside of our classrooms is what is being sought. I find this reassuring – these goals are attainable. I look forward to being a part of the transformation and enhancement of Georgia Tech’s teaching and learning environment – please join me!
The Classroom (Q): How long have you been teaching at Georgia Tech? What brought you here?

Dr. Armanios (A): I have been teaching at Georgia Tech since 1986. The reputation of the School of Aerospace Engineering brought me to Tech.

Q: What is the most significant change you have seen since you first came to Tech?

A: While the addition of new academic programs and the physical expansion that started with the 1996 Olympics are good candidates, the increasing volume and areas of research are the most significant changes, in my view.

Q: You have won many awards related to teaching, including the “CETL/Amoco Junior Faculty Teaching Excellence Award” in 1990, and the “Class of 1940 W. Roane Beard Outstanding Teacher Award” last year. This is admirable.

A: Thank you. The true reward is the success of the students I was entrusted to teach and the opportunity I might have provided them to make a difference through their unique contribution. This is the heartening legacy every teacher seeks.

Q: What is your teaching philosophy?

A: Teaching is the art of passing on one’s knowledge to help those who seek learning to better their understanding of the world and to pave the way for each one to make his/her unique contribution. To this end an engineering teacher needs to continuously improve his/her knowledge and delivery of his/her field of expertise; appreciate today’s environment, its opportunities and challenges; and provide purpose and promote critical thinking and the ability for problem solving. Grooming tomorrow’s leaders hinges upon the conviction and care the teacher has for his/her students to excel as lifelong learners.

Q: Good teaching requires many effective techniques. What makes good teaching become great teaching?

A: No matter how talented a storyteller one is, such talent is ineffective at best if one does not have a good story to relate. At the core of good teaching is technical excellence. In engineering, this often requires continuous improvement to bring the subject matter to life, showing its relevance and purpose. The opportunity to conduct research in one’s field of expertise is a great resource. It underscores a teacher’s own lifelong commitment to learning and contributing to his/her field of expertise. In addition, it is an opportunity to highlight the implementation of knowledge to a timely application.
Q: What is one of the most useful and effective techniques you employ in your teaching?

A: When leading the learning journey, we “load” students with a number of “tools” (courses) that are intended to help them along the way. As the load becomes heavier, students often, and for a good reason, question the purpose and usefulness of an added load. The “trust me you will need it later” approach lowers our expectations of their ability to appreciate and understand. Tying the content of the course to relevant applications has proven an effective answer to students’ concerns. More importantly, it makes them partners in the education process rather than passive recipients of knowledge.

I always start each course by asking the simple question, “Why are we learning the subject matter? Is our wisdom in requiring or recommending (for the case of elective courses) such a course well substantiated?” To provide an answer, I have built, with the help of students over the years, portable demonstration tests which highlight, in a lively manner, particular results of the course. All too often these tests bring the natural question from students, “Why is it showing this particular phenomenon?” It’s this inquisitive mindset that provides motivation and purpose in the learning process.

Using my current research to show applications of the fundamental principles I teach has also proved to be effective; it motivates my students and provides them with physical insight, in addition to often helping them persevere.

Current engineering events are pertinent resources for underscoring the significance of the material being taught. An example of the importance of units in quantifying physical variables is the Mars Orbiter unit error which led to the loss of a $125 million craft. Engaging students in the learning process, through finding solutions to open-ended problems, promotes critical thinking and provides opportunity to experience the thrill of making an original contribution.

Q: What is a teacher’s biggest responsibility in the learning process of students? What is the students’ biggest responsibility?

A: A teacher’s biggest responsibility in the learning process is to ensure an accurate comprehension, and not mere transfer, of knowledge to students in the short run. In the long run it is to instill a dedication to lifelong learning.

The students’ biggest responsibility is to believe that learning is a two-way process and to back up this belief by being dedicated to understanding and taking charge of “personalizing” their learning. By personalizing I mean putting into perspective their career goals as they become better informed.

Q: What kind of activities do you do in your classes to involve students in the learning process?

A: Having students work on problems with “what if” scenarios and team projects. Special Problem
courses, where students get involved in a research-related topic at their level or participate in a team design competition, are good vehicles for supporting the material presented in core courses.

Another effective activity is to have students search for information related to a given topic and provide a critical review of their findings based on the material they learned in the course.

Q: What do you see as the limitations of conventional teaching methods? What are the advantages?

A: Conventional versus non-conventional teaching methods may mean different things to different people. If non-conventional teaching means substituting a chalk and a black board with a marker and white board (or a laser pointer and a computer screen) while carrying on a monologue to accompany what’s on the board (or screen), then the same limitations are perpetuated.

There is no substitute to an accurate presentation of fundamentals and no substitute to understanding. However, in order to be understood one needs to understand. Understand the engaging environment a student deals with on a daily basis when accessing information. A web browser is able to gather data in written, visual and audio forms from around the world on a given subject at the touch of a button. Is it accurate information? Does it contribute to enhancing knowledge? Today’s educator needs to prepare his/her students to address these overriding concerns.

On the other hand, one cannot afford to overlook the fascination and influence this technology has on students. It is a formidable competitor and, at the same time, a unique resource and ally if put into proper perspective. This underscores the need to engage students as active learning partners, to train them into the thought process required to analyze and solve a problem, and ultimately to enable them to forge metrics for assessing the reasonableness of their solutions. Effective conventional teaching would have the same objectives. However, taking advantage of the resources available to today’s students requires non-conventional means. A good example is the ability to reach a greater number of students via distance learning, which certainly requires non-conventional means of delivering course material and assessing subsequent learning.

Q: What advice would you give to a junior faculty member just starting out who wants to be a great teacher, but who also wants to get tenure here?
A: Strive to manage your time to inspire your students to be lifelong learners in and outside of the classroom through your own example as an active researcher and scholar. We owe it to our students to strive for continuously improving our teaching, and we owe it to ourselves to stay on top of our field of technical expertise.

Being active researchers and scholars backs up our urging students to be dedicated to learning, underscores our contributions to society and gives us the thrill to introduce those quality teaching moments that begin with “let me share with you how I worked on an innovative solution to the challenges of…” Good teaching and research are not mutually exclusive.

Q: If you could make one big change in the educational system at Georgia Tech, what would it be?

A: The one big change would be, in my view, a change in attitude. If, as teachers, we feel that students are not as hard working and dedicated as we were, let’s not forget the litany of attractive alternatives we did not have to struggle with. The temptations of having a multitude of cable TV and satellite channels and of having laptop computers that connect them to the world makes their hard work and study an increasingly rewarding reason for pride. The fast progress of these industries remains a challenge to both student and teacher. A dynamic teaching style in both the content and delivery would go a long way towards helping students maintain the right focus.

Q: What advice would you give Tech’s Administration to help them encourage and reward excellent teaching?

A: The obvious answer would be through exceptional raises and promotion. In addition, I would urge the Administration to invest in helping faculty members to continuously improve their teaching. How about starting a Semester Teaching Sabbatical? For a semester, a faculty member would be totally devoted to studying the latest techniques for improving teaching delivery and content, and would work at optimizing his/her course offerings and assessment.

Q: What do you like most about being a faculty member at Georgia Tech?

A: The quality of students, staff and faculty colleagues.

Q: What is the most important part of your job?

A: My role as educator, working in and outside the classroom, with undergraduate and graduate students. Time and again I have witnessed the magic of caring. It brings the best. In Aerospace Engineering, each faculty member is assigned a number of students to advise and mentor from their first semester till they graduate. This personal contact is a quality time where, from experience, the total learning experience is addressed. We take personal interest in guiding students from curriculum requirements to career advisement. The one-on-one interactions I have with my graduate students are often the highlight of my day. They keep me honest and young.

Q: What is the hardest part of your job?

A: To be available to all students who knock at my door, call or e-mail me. The balancing act of teacher, researcher, scholar, advisor and contributor to the community is increasingly harder to master. One is always faced with tough choices, and choosing often means sacrificing.
To Improve the Academy is an edited volume of articles related to the theme “Collaboration, Connections, and Community,” the theme of the 1998 annual conferences of the Professional and Organizational Development (POD) Network in Higher Education. The CETL staff made its first trek to a POD Conference in 1999, and we received a complimentary copy of this volume during our activities.

The articles in this text relate to some of the current trends in faculty development, specifically, the current emphasis on long-term collaborations (both intra- and inter-institutional) for successful faculty development, as well as the changing assumptions regarding faculty interactions which are having profound impact on such development.

The editors divided the seventeen articles into three broad sections. The first, “Organizational Change in the Academy and in POD” presents six articles, mostly essays, which express thoughts, concerns, and introductions to programs and organizations which are experiencing growing pains and change (i.e., multicultural, social, institutional); what those pains and that change mean to the organizations involved; and how faculty developers need to proceed with that information. While most of these articles might be too specific to POD for the majority of the Tech community, Cambridge’s article regarding the national discussion of Boyer’s concept of the scholarship of teaching should be read by all interested in this topic.

In the second section of this volume, “Collaboration and Partnerships,” six different descriptive articles advocate that faculty development is enhanced through collaborative efforts, be they collaborations between faculty and students, teams of faculty, educational technologists and faculty members, or even assessment offices, faculty, and teaching centers. For those interested in sparking collaborative efforts towards teaching and learning, all of these articles provide valuable insights.

Section three is entitled “Examining Assumptions About Teaching and Faculty Development.” The authors in this section utilized various methodologies, including survey, case study, and interviews, as well as others, to examine in a critical way how faculty “enhance” themselves and “are enhanced” by others. The articles explore instructional and developmental issues such as the pros and cons of the integration of teaching, research, and learning for faculty development; faculty and student expectations of effective classroom discussion; student and faculty acculturation and culture shock; and the inherent versus the evolving nature of the faculty member. These five articles engage the reader to critically examine his/her own priorities towards enhancement of his/her teaching and professional persona.

Though definitely not geared towards a novice to the topic of faculty development, To Improve the Academy should be examined by administrators and faculty members interested in the issues of collaboration and faculty enhancement. Many of the articles will stimulate the reader to reflect on the personal and institutional aspects of collaboration, both for instruction as well as professional development, currently present or lacking on Tech’s campus.

Eds. Kaplan and Lieberman
Anker Publishing
www.ankerpub.com
ISBN 1-882982-31-2
More Quick Hits is the second volume of instructional hints developed via the Indiana University’s Faculty Colloquium on Excellence in Teaching. Participants in the Colloquium (from all disciplines and across the University’s eight campuses) were invited to submit their favorite teaching strategies towards this text. Differing from the first volume, however, the editors focused this particular selection of strategies on student’s learning: “a subtle but profound shift in thinking about education that is influencing classroom activities at all levels” (pg. 10).

In this text, you will find the strategies grouped into seven sections, ranging from nine to thirty strategy descriptions, on the following topics: 1) designing courses and learning environments; 2) creating learning communities; 3) fostering critical/creative thinking; 4) self-directed learning; 5) service and learning; 6) technology and learning; and 7) learning assessment and evaluation. The average strategy description runs about one-half of a page, and includes the faculty member’s name, academic area, and campus. Additionally, a number of these sections include a “Quick Wit” page of inspirational and/or humorous quotes about teaching and learning. One entire section of the volume is dedicated to strategies geared towards learning about teaching, including topics such as team-teaching, developing a philosophy of teaching and/or learning, gaining inspiration, among others. Finally, readers of this text encounter a list of recommended reading, an indexed list of contributors (with email addresses), and a subject index.

I would judge this book to be a good resource for people who are looking for just what the title describes: a reference of “quick hits,” ideas or strategies to help a faculty member when he or she wants to try something new, whether to solve a classroom problem, to invigorate his/her instruction, or “just for the heck of it!” The book is easy to peruse; the descriptions are short and to-the-point, and while some of the suggestions might seem trivial or not appropriate to one’s own discipline, many of the others might evoke the reaction, “Hey, now’s there’s a unique way of approaching that.” Through taking a look at this book, almost all faculty members will gain a new idea to try out in their own classroom.

Eds. Stocking et. al.
Indiana University Press
www.indiana.edu/~iupress
ISBN 0-253-21238-3

To borrow these (and other) books and videos about Teaching and Learning, visit CETL in Swann 108.

To submit a book to be reviewed, or to write a review for The Classroom contact CETL at 404/894-4474.
Do you sometimes feel as if students are not interested in what you have to say? Do they seem unmotivated, uninspired, or undisciplined despite your relentless efforts to the contrary? Last year, a group of concerned students established a committee to research these issues, problems, and possible approaches to improving the quality of the learning environment at Georgia Tech. These issues plague many—although not all—students and faculty. The committee on the Quality of Learning Environment was initiated as a student effort to change the teaching and learning culture of Georgia Tech. It is composed of approximately eight students who work closely with the Center for the Enhancement of Teaching and Learning. Inherent in all of the committee’s efforts are the steps of evaluation, analysis, research of alternative solutions, and the final recommendation. Outgrowths of this committee are numerous, as one would expect in the attempt to change organizational behavior. With the vision and initial stepping stones such as the ideas discussed in this article, the committee works with the aspiration that it is embarking on a long fruitful journey in changing a culture. Following a series of research efforts, discussions, surveys, and interviews with students and faculty, the committee is now resolved to improve the quality and frequency of interaction between students and instructors within the classroom.

Unfortunately, many students at Georgia Tech do not realize the wonderful faculty and curricula that Georgia Tech has to offer until they are close to finishing, or have graduated. The committee feels that academic experiences in the first few terms of students’ careers at Georgia Tech can taint their perspectives and approaches to learning, professors, and classroom behavior. Because of these unfortunate lessons learned in the first few months, desperate pleas for classroom discussion or interaction by professors in advanced courses are often ignored or rejected by students. Because of the curriculum design of most majors at Georgia Tech, students are inevitably introduced to collegiate academics with a series of lecture-style core classes in which there is little room for interaction with professors. The only interaction that most students experience in their first set of classes is with teaching assistants. While many teaching assistants are both helpful and diligent,
many students experience a series of less than stellar teaching assistants who, by no fault of their own, are unqualified, distracted by their graduate studies, or are unable to instruct.

Observations such as those mentioned above led the Quality of Learning Environment Committee to focus on ways in which freshman core classes can be improved in order to accommodate interactive learning and encourage students to approach professors. The committee envisions an environment for freshman core classes in which students are inspired to learn, encouraged to approach professors in class and out of class, and made passionate about their chosen discipline. Inspiration and passion about any subject matter can be infectious. If students are exposed early in their careers to professors and teaching assistants who are excited about discussing their work, their lives, and how they became so successful in their fields, students’ attitudes and perceptions about academics at Georgia Tech will change.

Through the judicious hiring and preparation of teaching assistants for freshman classes, an equally significant impact can be made on attitudes toward learning. Most freshmen only talk to their TAs. Teaching assistants, by some means, should realize the life-long impact they have on students. With the help of the professors, teaching assistants can become influential advocates of quality learning at Georgia Tech. The committee on the Quality of Learning Environment is eager to begin work on these and many other issues. If you would like to assist or have suggestions, commentary, or questions about our efforts, feel free to contact the committee at treychildress@hotmail.com.

Students, do you want to write an article for this space?

Contact CETL at 404/894-4474
A Congressional Simulation

Dr. Gordon Kingsley, Assistant Professor in the School of Public Policy, wanted to bring the subject matter in his class to life for the students. This subject matter includes basic functions of government which he feels can be very dry reading “even for the most enthusiastic of social scientists.” According to Dr. Kingsley, “for students of the engineering and natural sciences these basic lessons of civics and civic engagement are the surest cure for insomnia yet devised.” The sometime lackadaisical attitude of students is compounded by an average class size of 220 students. How do you enliven discussion of the basic functions of government with so many students? Dr. Kingsley organized a plan to involve students actively in the subject by enacting a simulation of the United States Senate. “They are, in effect,” states Dr. Kingsley, “learning by doing, by becoming a legislature.”

In this process, students are confronted with “the wide array of tasks necessary to turn a collection of strangers into a functioning legislature,” says Dr. Kingsley. They are required to “propose, debate and vote upon legislation that they have crafted . . . They must determine the structure and rules, and experience the consequences of their choices in their deliberations and the various votes on proposed bills.”

Once the students have some experience developing rules and structures for their own legislature, they review the way the U.S. Congress actually operates. According to Dr. Kingsley, “the contrast between the legislature that the students form and the actual Congress is always instructive.”

The congressional simulation was implemented with the help of Internet technologies. Course web pages, online bulletin boards, and methods of voting were created as the simulation progressed. The following steps provided by Dr. Kingsley outline the procedures as they occurred:

1. We randomly assigned students to two political parties by having them draw lots.

2. Students were then required to log onto the WebCT site and post a brief one paragraph statement of political philosophy on a forum dedicated to their particular party. Instructions were provided on the site for navigating to the proper forum. We also provided basic instructions on how a legislature is structured and the decisions that they must make as a group.

3. We asked for student volunteers to become the legislative leaders. The number of positions that we created were modeled upon the House of Representatives with a Speaker, Majority and Minority Leaders, Majority and Minority Whips, and a Majority and Minority leader for each committee.

4. Committees were created to review legislative proposals from the students. These committees mirrored many of the committees used in the House.

5. Students were asked to volunteer for committees in which they were interested. Roughly half of the students elected to be randomly assigned. Assignment was done in such a way that the proportion of students from each party on a committee mirrored their overall representation in the Congress.

6. The next step was for students to start crafting bills for consideration. Instructions were posted on the site (and given in class) on how
to craft a bill. They could propose a bill for any committee and were required to propose at least one bill. Each bill was between 3 and 5 pages and followed a Congressional structure for bills.

7. Students then posted the bills to a central forum called the Hopper in the Congress and on the class web site.

8. The Congressional leadership then assigned the bills to the various committees for consideration.

9. Additional forums were created for each committee using the bulletin board function. Students used these forums to post their discussions about the various merits of the bills and to pose questions to the bill authors. Roughly 1/3 of the committees also elected to vote on bills through the forum.

10. Some students were selected to be journalists covering the work of the committees. They started posting stories to the main bulletin board for the site describing the work-to-date. The professor served as an “unnamed source” trying to create a lot of trouble along the way.

11. Once the bills were passed out of the committees they needed to be voted on by the legislature as a whole. The students passed roughly 20% of the legislation that came before the committees which is much higher than what the actual Congress approves. The leadership of the Congress was asked to select a few of these bills for in-class debate. The other bills were posted on the main bulletin board and voted upon by the class using the quiz function within WebCT.

12. The Speaker of the House oversaw the floor debate on the remaining pieces of legislation. Students were encouraged to argue for or against the bills in class. Then a vote was taken on each piece of legislation. The debates and final vote counts were then posted upon the WebCT site.

The most significant success of this simulation, according to Dr. Kingsley, is that “students became active learners in the process of creating a Congress. Unlike many simulations that provide students with clearly defined roles that prescribe their actions, Dr. Kingsley’s class simulation engaged students with questions of how and why legislatures are organized. Dr. Kingsley states, “Many students expressed their enthusiasm for the process even when they were frustrated by the decisions confronting them.”

The technology used to implement parts of the simulation had numerous benefits. The amount of necessary paper work was significantly reduced. The rules of the simulation could be easily changed via the web site, and students could still keep up to speed. An unexpected benefit was that several students who would not have participated in the large class setting “found their voices,” according to Dr. Kingsley. He states, “For some students standing up and speaking to a large crowd is intimidating. However, emailing, posting messages to a bulletin board, and voting online is somehow more accessible. As a consequence, a larger number of students participated in the process.” Even though more students participated due to the use of the technology, one of the major pitfalls, according to Dr. Kingsley, “is that students can rely on the technology too much.” At certain times such as when a vote was required, the bulletin board forums were not a good substitute for face-to-face meetings of the committees.

Dr. Kingsley’s words of advice for doing a similar type of simulation is “Don’t over prepare.” Striking a balance between providing enough and too much information is a challenge. The goal of his simulation was to let the students form their own organized legislature and then contrast their solutions and the actual congress. He feels the contrast is a powerful learning tool. However, this requires that much of the responsibility be placed on the students to solve their own problems. The instructor serves as facilitator, monitoring the web site, posting instructions, and responding to student requests for different forms of interaction. ■
Dr. Molly Cochran, Assistant Professor in the Sam Nunn School of International Affairs, wanted to find a way to teach a large number of students more effectively, particularly in relation to philosophical material.

Discussion is essential to learning the content of this material. Students need an opportunity to check their understanding with that of other students. By way of these discussions, students can hear the viewpoints of others and use them to augment their own understanding. However, given a class of one hundred students or more, effective discussion is unlikely. Dr. Cochran wanted to create groups of students which could work through the ideas together outside of class, but in a manner that she could manage.

Dr. Cochran organizes her classes into groups and provides each group with an online newsgroup. The private newsgroups are created using the Bulletin Board tool within a WebCT course. The group work is structured around assignments in which each student serves as leader of his or her group for at least one assignment. The group assignments involve writing an essay that applies reading material from philosophical works to real worldviews. For example, one assignment requires taking a quote from John Locke and defending it as a justification for the American Revolution. The leader of the group writes the essay and posts it on the newsgroup for his or her group to critique. The leader then incorporates the group discussion into the final version of the essay and submits it to the main newsgroup for the entire class to view.

“Student/faculty and student/student communication is improved because a link between them is provided outside the classroom.” - Johnny Jones, INTA undergraduate student
Dr. Cochran’s method has not only worked, but also has had unexpected benefits. She did not anticipate that students would take a study group assignment and build on it with their own questions. For example, in the assignment previously mentioned, a student posted a question to the class asking if a quote from John Locke could also be used as a justification for the aggression taken by the South during the Civil War. The question prompted many replies from other students regarding the possible answers.

Johnny Jones, an INTA undergraduate student in Dr. Cochran’s class, comments, “Not only does this process allow large classes to work efficiently in groups via the Internet, but it also incorporates the idea of a schedule for posting your comments. The entire information process is simplified. Everything a student needs to know is easily accessible on the web. In addition, student/faculty communication is enhanced because a link between them is provided outside the classroom. This applies as well to student/student communication, as each student can potentially network with each and every other student in the class. The process facilitates learning from the thoughts and ideas of my fellow students.”

Students have also taken the initiative to apply material discussed in the study groups to current events that are relevant to philosophical concepts covered in the course, for example, the Elian Gonzales news story. Overall, students have shown better understanding in their assignments than students in previous terms.

The Bulletin Board tool allows Dr. Cochran to keep tabs on each group and monitor their progress without meeting individually with each group. The posts made to the Bulletin Board are tallied and recorded and can be managed with minimum effort. She created the online materials within two weeks of the start of the semester using a WebCT account and a little help from CETL student assistants. The initial investments of time to learn how to work with the bulletin board and organize the online material have been well worth the resulting benefits. She hopes to build on the success of the online group activities by better integrating the online discussions into future class discussions.

For more information about the specifics of using the Bulletin Board tool within WebCT, contact Melissa Bachman (melissa.bachman@oars.gatech.edu).
I am a pragmatist by training, but an idealist because of my need to enjoy knowledge. My formal training in the sciences has lead me to believe that all informational knowledge can be categorized, defined, and explicated through a series of integrated models or instructional design methods. Yet, I have felt firsthand the twinkling of a unique and unexpected thought process loom in my mind, and the desire to give “Breath” to that process for my students. Sometimes, I realize that knowledge is a leap of the imagination, and follows no logical pattern, as seen in a series of dominoes falling. I know that learning is an acquired state of mind that students achieve after a thorough introspection of the subject matter, akin to jumping one or more dominoes to knock the next one down.

Knowledge is inarguably essential to any future developments in life, civilization, and our history. Students learn because they need to progress to a desired goal (e.g., become doctors in our civilization), whereas instructors sometimes ignore these goals. We cannot impose our will or authority in a subject because we believe students are well-oiled, able-bodied learning machines. If an instructor would like a student to understand a subject for longer than the teaching term, then new teaching strategies must be adopted. In this short essay, I would like to emphasize two points that should be understood when attempting to achieve this goal: one, that learning/knowledge is not always a logical series of steps and sometimes requires “leaps of faith,” and two, instructors must realize that their goals and students’ goals are not always aligned.

An instructor can expedite learning for students through delivering new insights in the material. For instance, teaching the principles of quantum chemistry is no trivial assignment, but a new method may consist of asking a student to imagine that he or she is the classic “particle in the box.” How would you as a particle in a box behave with no real way to get out if you possess an extremely small mass, a real wavelength, and a variety of floors to ascend, i.e., discrete energy levels? I have learned from several years of experience that “getting out of the box” to teach challenging material requires an active “quantum leap” of the imagination. Instructors must be willing to take risks and become pioneers in the learning process so students can benefit. Some instructors accomplish the latter by use of electronic media, by using guest lecturers who are in the field, by asking students to teach, and sometimes by using analogies that are down-to-earth and tangible. Instructors should explore and streamline whatever tools or techniques may work for their particular classroom environment. Students become better participants in the learning process if they realize that the funk and cobwebs associated with mundane or trite material is lifted through an instructor’s fresh approach and understanding that accommodate a particular classroom learning dynamic. This approach may involve non-Euclidean, non-linear type thinking that provides the necessary spark to enlighten a student and have a “Eureka” experience.

Finally, I have come to realize that a “utility” and “maturity” gap exists between the student and the instructor. By utility, I mean that the material has more meaning for the instructor than the student since the material is from the instructor’s research or an advanced degree. By maturity, I mean that the instructor approaches the material from several to many years of experience and fruition in the field, through academics and/or through research. A student coming into the course cannot expect to attain a high level of sophistication or to appreciate the nuances of the course since it will only be taught for at most a semester or two. A student hopes to use it as a stepping stone for graduation or to advance in his or her degree requirements, ultimately to land a job. What can be done in such a situation? Well, let me preface the response by
recounting a conversation that I had with Professor Willis B. Person, a physical chemist at the University of Florida, who taught me chemical thermodynamics. *He told me that his understanding of the material was fortified and fully developed when he began to teach it.* That one simple declaration taught me a lot more about learning/knowledge that any other theory or philosophy on the classroom and teaching. How can instructors hope to provide that level of understanding in one semester for students? We really cannot expect it or mandate it.

To overcome the hurdle of the temporal window (one semester) for understanding material (that an instructor has done over many years), instructors can tailor their teaching platform to the needs of the student. They can focus on how pertinent it is to students in their daily lives. In organic chemistry, I try to demonstrate the importance of the subject by indicating that organic materials are a part of their LCD watches and stereos, that beer or alcohol wouldn’t exist without the processes of fermentation and metabolism, and drugs and their design would not be feasible. They begin to recognize the meaning of polyunsaturated fats in their diet or alpha-hydroxy in cosmetics, why all soaps are “antibacterial,” and why nicotine is such an addicting chemical. Since most students in a hard science subject have some interest in a scientific career (medicine, engineering, natural sciences, etc.), I am not too far off base when I tell them that actively learning the material can make a difference now and for the future.

Instructors should not cover more material than can be adequately discoursed. I cannot stress this latter point enough. Covering some points well is far better than covering many points without thorough explanation or care. In ten years, a student may remember nothing from my course if I flew through the material, or perhaps one or more topics if I did my job well. I can still recall learning why we have seasons on this planet from my ninth grade science teacher, Mr. Boyle, who spent enough time on the subject to make a difference. His discussion of the angle of the incident sunlight and its associated low (winter) and high (summer) incident energy density and absorption were well impressed upon me.

Ultimately, as an instructor, I can only hope that my student spends enough time during the semester to “digest” the material. In other words, if instructors appeal to the needs of the students and dwell on a few, well-developed points, then the students must do their part to learn it. However, this learning will be very easy if the classroom environment is conducive to learning and is exciting, entertaining, and lively. The energy in the classroom will spill over into the life of the student and create in them a desire to excel.

One final point to end this manifesto: I believe that teaching is an art, and that good teachers practice their craft through their interactions with students, other instructors, and by developing a good self-knowledge of their abilities and strengths. In the arena of education, all instructors hope that their students will have profited in some way from the learning experience. Nevertheless, effective learning can only come about if instructors treat teaching as an active dialogue that addresses the student.
Upcoming Events

Instructional Technology How-To Sessions:
April 21 Scanning Documents and Images
April 21 HTML Basics I
• Watch for the schedule of How-To Sessions this summer.

Faculty Development Seminars
April 20 Showcase of Campus Uses of Instructional Technology
• Watch for the schedule of Faculty Development Sessions this fall.

Other Events:
April 17 - 28 Course/Instructor Opinion Survey online
April 19 Teaching Fellows Day
August 15 - 18 New Faculty Orientation Week

For more information on these events, contact CETL at 404-894-4474

The Classroom
CETL
613 Cherry Street
Georgia Institute of Technology
Atlanta, GA 30332-0383