

Gosha Zywno's Teaching Philosophy

Dr. Leo Buscaglia [1], a Professor of Special Education at the University of Southern California, once said that he disliked the word “professor”, since in our practice we tend to profess too much. He liked to call himself an educator, the word with a Latin root of “educare”, meaning “to guide”. What wonderful words to live by as a teacher!

Someone wise said that we are a sum of our experiences, so as I reflect on my teaching philosophy, I realize that its emotional centre has been shaped in part by my experiences as a learner. I like to think that compassion and empathy are at the core of who I am, and even though my undergraduate days are almost 40 years in my past, when I look at my students, I still think about how I would feel sitting among them, and I want to make their experience richer and more supportive than what I went through. Since past is so relevant to who I am as a teacher today, I will ask the reader to indulge me as I take a short walk down the memory lane...

When I studied to become an engineer, I never imagined that teaching would become my professional passion. And yet, in hindsight, I always enjoyed teaching others, and more importantly, I was good at it - I supported myself through high school and university by tutoring, mostly in English, but later also in Sciences. I do not have any teacher role models from my time at the university - institutions of higher learning in Communist Poland were not exactly enlightened: competitive, rigid hierarchy, huge classes and TAs taking out their frustrations on us undergrads - we were the plebes. All I remember is a blur of boredom in classes we had to attend as it counted towards the final grade, being subjected to petty humiliations in our dealings with lecturers and TAs, hard work, stress of tests and exams used to winnow us out. In a way, watching disinterested professors rhyming off their notes in front of a chalkboard, I learned what NOT to do as a teacher, such as: be an unavailable and unapproachable figure who delegates to TAs all daily dealings with students; when in class, lecture non-stop; never use anything other than chalk and talk; either ignore students completely or single out individuals with unexpected questions, drag them on the podium for all to chuckle at their anxiety and then smirk about own superiority, and so the list goes... About the only class I clearly remember was Physics, where the professor was conducting experiments, illustrating theory taught - that was my early lesson in the value of experiential learning. I actually looked forward to that - it was interesting! Unfortunately, that professor also had a mean streak and took pleasure in humiliating his assistants, and us students, at every opportunity...

We all chafed under Communist-imposed rules and policies, but I also kept buckling against conventions of a conservative society where political stagnation and isolation had bred a nasty streak of intolerance against anyone different, whether by religion, sexual orientation, gender or even looks or ambition. On paper, Communist-imposed equality for women looked great, but in reality I quickly found out that engineering was still a man's world - well, in a different time, society and place, this bit sounds depressingly familiar.... but I digress. I was one of only five women in a cohort of 200 engineering students and to survive I had to be smarter and work harder. I also had to put up with stupid jokes, exclusion and sometimes outward harassment. That was another early lesson that stayed with me for life - that exclusion and discrimination, overt or covert, and lack of respect, really impact negatively lives of students, and affect their learning. The impact is not just on the minority affected, but on the majority as well, who lose an opportunity to develop as human beings.

Years later, in Canada, when I started teaching, I swore that I would never allow any student in my class to be made to feel that way. I consider the human aspect of what we do in classroom as a prerequisite condition to learning. Having taught for over 30 years, I am proud to say that I have always strived to recognize my students as individuals, get to know them, listen to their concerns, try my best to offer guidance, help, motivation, mentoring, to serve as a role model, to be fair in my dealings with the students and in their assessment, but at the same time to have zero tolerance for cheating, bullying, discrimination, or boorish behaviour. I pride myself on the care I take to create an environment that is safe and conducive to learning for all. It is my life's experience, not just professionally, that people return what you give them, and when the students see the professor who cares about them and their learning, who is fair and enthusiastic, they will put an extra effort, and will behave well. In my estimate I have taught over 3,000 students and I can count on one hand the instances of the so-called “class management problems”, and students labelled as poor achievers and troublemakers somehow find interest and actually thrive in my classes!

This is the point in the statement where I am supposed to espouse some particular educational theory that I have been successful at, and it is true that, over the years, I gained a lot of insight into what works and what doesn't in a particular learning environment. I also learned the value of reflection to develop as a teacher. But it has been a slow and gradual journey of personal discovery and I worked hard at it - I can offer no tips or shortcuts. I am by nature reflexive and intuitive, and I found both these traits extremely helpful for me as a teacher. I started out from a master-apprentice model, which had worked for me when I tutored individuals. Back in early eighties when I started at Ryerson, the classes were very small and I worked with all my students closely in the labs, where the experiential aspect of teaching was a given. I was quick to establish rapport with my students, and to "infect" them with my enthusiasm for my area of expertise, which is Control Systems. However, as we moved from a Polytechnic to a full-fledged University, the class sizes grew exponentially, and I realized that the personal guidance model that worked so well in a class of 20 (and still does, when I work with my TAs or with my peers), is impossible to sustain in a class of 100.

It is a cliché to say that we academics have no theoretical foundation in educational psychology or learning theories that would help us deal with that, but, as many clichés are, it is also very true. It has been a long-standing tradition to assume that if one has a PhD in his/her field, somehow one will be able to miraculously impart that expertise onto hundreds of eager undergrads, and thus freshly minted assistant professors will learn to paddle quickly to avoid the figural drowning in those huge auditoria. Some will treat teaching as a necessary evil, most will make do, but this approach has created a default culture of indifferent and mediocre teaching on our campuses, where good teachers are outliers rather than the norm. Parker J. Palmer in his beautiful book "The Courage to Teach" [2] calls this "the world of education filled with broken paradoxes and with the lifeless results: we separate head from heart; we separate facts from feelings; we separate theory from practice; we separate teaching from learning". However, it is very gratifying to see more recently a determined push on part of the academia to change that, and student engagement becoming a hot button issue.

My answer to the challenges before me had been to hit the books and connect with others that would help me find out more about what it is that we are supposed to do as academic teachers to create this phenomenon of learning, critical thinking and problem-solving. And so beyond my own experiences as a learner, I can think of two major sources of inspiration and help for me in my professional journey. The first is a Community of Practice, the second is Educational Research. I do believe that being immersed in the Community of Practice is necessary to develop and grow in any profession, including ours. I believe in learning from others and in giving back. Teaching is still mostly a solitary pursuit behind the closed doors - we do not often see our colleagues teaching, and we do not routinely engage in conversations about what we do in our classrooms. Palmer [2, p. 144] memorably said this: "If surgery and the law were practiced as privately as teaching, we would still treat most patients with leeches and dunk defendants in millponds." Harsh words, these, but let's face it, has teaching changed much over the last, oh, 500 years? But we live in interesting times - the Internet and social networking technologies have already showed their potential to revolutionize the way we teach and learn, probably the first really significant "revolution" in the classroom since Gutenberg and his printing press!

I first reached out to connect with our Ryerson Teaching and Learning Community back in the mid-nineties. I found help and inspiration from people who would be instrumental in creating the Learning and Teaching Office (LTO), at GREET Conferences, working with instructional designers in the Digital Media Projects Office. Later when I joined the LTO as Faculty Associate, I found professional nourishment, a source of constant discoveries and a chance to share. I have been involved with the LTO and the educational developers community for close to a decade, and working with my peers across the University and outside has been the best thing that could have happened to me professionally! I particularly enjoy working with my younger colleagues in the University Teaching Development Program (UTDP), and facilitating the Instructional Skills Workshops (ISW).

Access to educational literature and connecting with like-minded people opened up a whole new world for me as a teacher and I never looked back. I found theoretical underpinnings for my intuitive teaching approaches, and I learned how to adapt the active/experiential learning model to the realities of large classes. I also discovered the work of Dr. Richard Felder [3] from the University of North Carolina, one of most influential engineering educators in recent memory and an avowed advocate of active & collaborative learning, as well as his Theory of Learning Styles [4]. Dr. Felder later became my mentor and a colleague. His work allowed me to gain insight not only into how I learned, but also to understand how students learn and how important it is to use a wide variety of teaching strategies. Most untrained teachers who do not reflect on their practice, tend to teach the way they were taught and which feels comfortable to them. They successfully navigated the graduate studies and connected with their professors partly

because their highly theoretical teaching style and a developed habit of individualistic, competitive pursuit of learning suits them well as future researchers and professors - that is why graduate students are more and more like their professors the closer they get to their PhDs. This self-replicating formula unfortunately does not take into consideration the fact that a vast majority of undergraduates do not head for the graduate school but out into the world of practising engineering, where working in, often interdisciplinary, teams, personal skills, communication, conflict resolution etc. are the order of the day. According to Dr. Felder's work, most professors and graduate students are Reflective, Intuitive, Verbal and Sequential, and tend to teach to these styles, whereas most engineering students are Active, Sensing, Visual, and many of the most unconventional thinkers that would really enrich the engineering profession are Global learners. While it is true that teaching to a particular style is not proven to result in better learning, teaching in a style that consistently ignores the needs of the majority of learners results in frustration, more academic problems, and higher dropout rates, particularly among those students who do not fit the conventional mould.

Dr. Felder's assertion that our teaching should target cognitive flexibility by providing support for all learning styles, but at the same time by challenging students to stretch, became a cornerstone of my approach to developing effective classroom strategies. It allowed me to understand why (I am Visual learner) I was quick to realize early on the value of immediacy and visualisation offered by multimedia, computer simulations and the Internet in supporting the teaching and learning. In 1995 I was the first to build a website to support my course, and once Ryerson introduced university-wide course management system (WebCT and later Blackboard), I was one of the first adopters - I started using presentation technology and web support in teaching my classes in 1998. At the same time, I realized that while my personal learning style is intensely Introverted, Intuitive and Reflective (I like theory and like to learn alone) many of my students are Extroverted, Active and Sensing - they like interaction, working in groups, experiential learning and real world applications. I thus became in my teaching a "Pseudo-Extrovert", a term used by Dr. Brian Little [5], a Canadian psychologist and a 1995 3M Fellow, more recently of Harvard fame. I consciously introduce active learning and student engagement strategies into my classes even though it costs me much more mental energy and recovery time since my first instinct facing 200 people is "to run for the hills"...

Over the years I have also developed my facilitation skills, and I do not need to constantly "profess", citing good Dr. Buscaglia. I feel comfortable letting students loose in a classroom to work in "buzz" groups, to discuss, move physically. I am proficient in learning technologies, and I know how to leverage them in class to engage students - say, I will show them an interactive Java applet, then discuss a problem and solve it together with them jotting down notes on my Tablet PC, run a computer simulation where we can immediately implement our solution, and then check the students' comprehension of the problem by a quick poll using "clickers". At the same time, I try to balance technology with students being active, doing stuff, solving, talking, even taking part in a skit where they will enact how signals move in a closed loop system, or how two sequences correlate - a practical lesson in statistical methods by doing a "stadium wave"!

Core beliefs are what allows us to be good teachers, and it helps to create a mental schema, a framework, of how we see our teaching and our students. I already mentioned the "pre-requisites" that I believe in: enthusiasm, fairness, respect, rapport with the students, building them up rather than cutting them down, creating a safe environment. I cannot overemphasize how important I believe these are - too often we "live in the head" (Cognitive Domain) and forget about the "heart" (Affective Domain) and how important it is to successful learning... What I believe needs to happen next between me and my students, and what I try my best to practice, is best summarized by Arthur Chickering and Zelda Gamson [6] whose "Seven Principles for Good Practice in Undergraduate Education" became a sort of manifesto for educators concerned with the state of our campuses. It goes this way: "Good Practice... encourages contact between students and faculty, develops reciprocity and cooperation among students, encourages active learning, gives prompt feedback, emphasizes time on task, communicates high expectations, and respects diverse talents and ways of learning". This I keep as my teaching compass. Of course, as they say, devil is in the detail, which is why I learned that to be effective in classroom, one has to learn a bit about instructional design. Too often our courses have grown organically over the years, and we do not question the how and the why of doing things that we do. I have gone through several major overhauls of my courses, as I learned to navigate the triad of Learning Outcomes, Instructional Strategies and Assessment and Evaluation. On the way, I discovered some things old (Bloom's Taxonomy of the Cognitive Domain of Learning [7], Kolb's Experiential Learning Cycle [8]), some things new (Felder's Learning Styles [4], Fink's Five Principles of Good Course Design [9], [10]), but all useful to the extreme.

As to how I got involved in Educational Research - I have a need to understand why things work the way they do, which I suppose is a very "engineering thing", and also to explain it to others, consequences be damned - must be the

"teaching thing" ! When I started experimenting with educational technology and multimedia in classroom, I was met by my engineering peers with a lot of indifference and even disdain for my efforts. They simply did not believe that what we do in classroom made any difference, especially with technology. Spurred by that resistance, I embarked on a lengthy and carefully planned study to find the proof that such difference can be quantified. One led to another, and a decade on, I published over 30 papers on educational topics, received several awards and succeeded in securing SSHRC funding, very unusual for an engineer! On the way I entered a whole new realm of research with human subjects, ethic committee reviews, vagaries of conducting action research in classroom environment, and got hooked! Here again, Dr. Felder was my inspiration, with his many influential publications in various educational journals. What I found out from my research into learning technologies, learning styles and academic success has definitely influenced my professional practice. It has also immensely expanded my professional horizons as an educator, and again connected me with a larger Community of Practice of educators interested in building the Scholarship of Teaching and Learning (SoTL) - a term introduced by Ernest Boyer [11], who validated teaching as a scholarly pursuit, where teaching is reflective and informs educational research, and vice versa. I ascribe to the SoTL philosophy as it leads to real changes in classroom and in academia. We can already see more interest in how teaching is evaluated, in continuing professional development, certification programs, using teaching dossiers for hiring and promotion, and a positive change in how teaching is regarded at universities.

In summary, as I look back on my teaching, the one thing I can say that stays constant, is change. I have changed enormously and grown as a teacher, and hopefully through my actions inside and outside of classroom I contributed something positive to the lives of my students, my colleagues and my University. My journey has been the source of my professional pride and joy, and great satisfaction. I said that when I started I could have never imagined where this journey would take me - into a different world, literally and figuratively. Looking back, I would not have had it any other way!

Teaching Strategies that Work for Me

Getting to Know Your Students

Ever since I started teaching over thirty years ago, I found that establishing a personal rapport with my students is not only mutually enjoyable but is also extremely helpful in motivating and guiding them through their learning. It involves respecting students as individuals, establishing effective communications and providing timely feedback. But learning students' names is the pre-requisite. It seems such a no-brainer, a basic gesture of civility between individuals, but my students tell me that too often they feel just like another face in a nameless crowd. With all the pressures, especially in content-crammed professional programs such as engineering, university can be a very isolating experience. It never ceases to amaze me how far a smile and a personal acknowledgement of the students' names go towards establishing rapport and the right dynamic in the classroom! Students tell me that they feel more motivated and engaged when a professor knows their names and takes time to talk with them. For a teacher who learns his/her students' names, there is a practical upside too, as it generates a lot of goodwill that one can capitalize on, and it makes it more difficult for the students to remain anonymous, and thus much less likely to engage in disruptive behaviour. However, the names exercise is very important to me on an emotional level, because I know from personal experience how unpleasant it is to be invisible, and because I believe that students deserve for us to recognize them as human beings, and not as cogs in some sterile education-processing machine.

A practical tip for lectures - in my classes students always have name tents in front of them. I have a separate folder for each student section and as the students come in, they quickly locate and pick up their tent name, then return it after the class. Another tip - when I taught short courses in France, I used to receive class lists with photos, which was extremely helpful in quickly memorizing student names. This gave me an idea of taking digital snapshots of student teams - I visit each tutorial/lab group in the first week of classes, and mindful of the privacy issue, I always give students an advance notice about the "photo-ops" - if they do not wish their pictures to be taken, which almost never

happens, they can simply leave the lab for a few minutes. Next I create cue cards with pictures, names and some helpful factoids that I learned from the “Introduce Yourself” essays I ask students to (voluntarily) submit, and I sift through these cards at home until I get them right.

Class Ambassadors

My students elect "Class Ambassadors", and I meet with them regularly through the semester, and take them out for a celebratory lunch after the exams. In my experience having student reps is one of the most helpful strategies for a large class. I get the measure of the class “pulse” through them, as some students may feel intimidated to express their concerns to a TA or a professor, but all speak freely to their peers. Our meetings allow me to respond to concerns and to keep the class morale high. The Ambassadors in turn get a practical lesson in how to resolve problems, learn accountability to their constituency and generally get to hone their leadership skills. I use a similar approach working with my TAs - meeting with them regularly and mentoring them as they transition, on their way to a Ph.D., from being students to becoming our colleagues and peers.

The Importance of First Class

I have read somewhere that students make up their minds about the teacher and the subject within the first 10 minutes of the first class, and that it is very difficult, if not impossible, to change those first impressions. However intimidating that is, my experience confirms that if I want to get the message across to my new class that I care about them, I want them to succeed, and that this course will be different, I need to model every new element of what I hope to bring to enrich their learning, right there in the first class. When I start a course, rather than proceeding with an overview of a course outline, management and content, I introduce a concept of active learning that I want the students to engage in, and then model it immediately through a role-playing activity illustrating basic principles of feedback. I also summarize the first class with this line “I am not here to teach you – I am here to help you learn”, which drives home the point that we are partners in a journey of discovery, but that with partnership comes the responsibility of taking ownership of one’s learning. This sets the tone for the rest of the semester, and then all I have to do is simply live up to the high expectations I encouraged ☺!

Since I teach an introductory course in Control, in the first class I get a group of volunteers to enact a skit illustrating basic principles of feedback. I bring props: a blindfold, a big target and a bunch of big labels pinned on the volunteers describing their roles - Reference, Feedback, Disturbance, Error, etc.. System Response volunteer is blindfolded, rotated a few times and sent on his way across the stage in quest of the target. System Response is accompanied by Safety Limit Switch who models shutting down the system if its operating range is exceeded (simply making sure that the blindfolded person does not fall off the stage). Disturbance acts as an unexpected signal that may affect the system performance, by sneaking up on the hapless System Response and nudging him/her in the wrong direction. Much hilarity ensues with System Response missing the target by a mile. The whole exercise is then repeated with Feedback providing continuous verbal clues to the System Response to get him on track and to avoid “sneak attacks” from Disturbance. This activity drives home two useful points—it provides an introduction to the whole concept of feedback systems design that can be easily understood without any preparation, and it shows the students that when I talk about getting them actively involved, I really mean it.

Focus on Active Learning & Learning Technologies

An oft-used quote says it all: "Learning is not a Spectator Sport" [6]. We remember only 20% of what we hear, but 90% of what we say and do. Engaging students in active learning is a proven and effective educational approach. Active learning is central to my teaching and fostered through small group activities during lectures, through labs and teamwork, problem solving and open-ended design projects. Since so many engineering courses are taught in a non-engaging manner, I try to set the right tone from the very beginning. I also put a lot of effort into implementation of

learning technologies, where student learning and engagement is supported online and where we can capitalize on the immediacy of computer simulations, scribbling on a PC Tablet or using “clickers”. When I began developing online materials, I wanted to enhance visualization of difficult theoretical concepts in control engineering. I envisioned a web site that would act as a hub of course activities, providing a repository of course notes, review materials, and interactive components presented in the classroom, but also encouraging asynchronous communications, giving voice to students who are often not heard in large classes but who thrive on the Blackboard Bulletin Board. I saw this as a way to help students become more active learners. I use interactive Java applets, computer simulations and video clips to illustrate real-life applications and for better visualization, as well as a learning object that I co-authored - as set of online tutorials.

My students do not have to busily scribble notes, because they can download my “active slides” (i.e. with some details not included) before they come to class, and can pay more attention to what is going on. I can then get students involved in the class in annotating along with my PC Tablet. After class, students can download a full set of complete notes for the lecture, written in a book-like format, with graphs, explanations and lots of examples. The posted slides allow more time for small group activities - I mix & match different strategies - after 15 minutes of PowerPoint I ask students to work on a problem in twos or threes (“buzz groups”), create a list of applications, etc. and then poll the class using the “clickers”. I also use paper quizzes, but students write them in pairs, which goes a long way to prevent test anxiety but also prevents “rubber-necking”. I also try puzzles and games as a teaching tool. The active nature of the class goes a long way towards student engagement! By the way, having complete after-class notes and additional solved examples posted online has never, in my experience, kept students away from the class, because of the activities they would otherwise miss.

Visits from Industry, Peer Teaching and Interdisciplinary Learning

Over the years, I have arranged for former students, now working in industry, to visit my classes and have a short presentation and Q & A session with the students, and I have arranged for my students to visit Controls labs in Mechanical Engineering. I have also invited senior-level students to make presentations to third year students, which is of a tremendous benefit to both the junior students, who get to hear about research and projects from their older peers, and to the senior students who gain experience in peer-teaching, and through it, an often better understanding of the project they have been working on. For my lectures, I look for examples of real-life applications, such as assistive technologies or biomedical engineering, where the impact of engineering on the quality of life is immediately understood. In the past, my students also had an option to participate in the Ryerson Interdisciplinary Charrette where they worked with students from a variety of academic backgrounds from all five Faculties. Participating students then shared their Charrette experiences with their colleagues in the classroom, acting as process coaches other teams working on their own class presentations.

Student Learning Styles

I have found that talking with students about their learning is a good way not only to help them improve their learning strategies, but also to engage and motivate them. Within the first week of classes I ask students to complete an Inventory of Learning Styles [4]. I discuss its results with students and we talk about how the awareness of their learning style can help them to modify learning strategies for greater success. I found that students are eager to learn more about themselves, and that discussing their learning at the beginning of the semester has a motivating effect. This topic also serves as an “ice-breaker” that helps me to get to know my students. Following the Felder Model [3] helped me reflect on what I do in the classroom and expand the range of my teaching strategies. It allowed me to structure my course materials so that I could reach students with a wider range of learning styles, including those who usually do not get support in the traditional, lecture-based environment. I also found the model very useful in creating web-based materials to address different learning preferences.

Focus on Collaboration and Self- and Peer Evaluations

In my experience, whenever I have had opportunities to listen to pre-eminent academics and industry leaders alike, they implicitly assumed technical competency of our graduates, and concentrated on other, non-technical skills. Ability to be a team player, flexibility, diverse thinking, global “systems” approach to problem-solving, effective conflict resolution and communication skills, merit evaluations of team efforts, etc. are encouraged, and expected from engineering graduates. Yet they are typically not the top priorities of an engineering curriculum. Thus, I made a conscious decision to try my best to incorporate those often neglected softer skills into the learning objectives of my courses.

In my upper level elective, students work in teams on a series of design projects, on independent Internet research and prepare classroom presentations. These aim at developing a sense of currency and relevancy of theory to the newest developments in the field, improving students’ communication skills, and at providing them with an opportunity to develop evaluation and judgment skills. Collaboration and peer-assessment are empowering strategies and help students become active partners in their own learning process. However, I am mindful that it does not equate putting students in groups and leaving them to their own resources. I take time to actively coach teams, learn about their dynamics and, if required, I am ready to engage in conflict resolution. I have also teamed up with the Ryerson’s Interpersonal Skills Training Centre (ISTC) - their trained actors bring various scenarios into the class where students discuss, say, how to resolve a conflict. Finally, peer-evaluation within teams provides an incentive to mediate possible conflicts, and peer-assessment of presentations creates a sense of ownership in the course. I use a “Personal Statement”, a one-page reflective essay, as a compulsory part of all lab and assignments reports. Students reflect on their learning process in the task as well as describe their role in the team process. These statements have three goals – to help ensure the integrity, originality and the ownership of the report, to improve students’ written communication skills, and to develop meta-cognitive skills. Though usually met with resistance at the beginning of the semester, eventually the students come around and begin to appreciate the value of reflection to help them function as well-rounded professionals as well as to be able to communicate with people outside their own field.

Assessment and Feedback

In course assessments, I like to have some course deliverables every one-two weeks, and I make sure all student work is marked and returned promptly. I have used online quizzes and “clicker” quizzes, primarily for student self-assessment, to test their comprehension and provide feedback in responses seen as histograms displayed after the quiz. I am also a big proponent of “participation marks” - typically I set 10% of the total grade for a range of activities that include Buzz-Group or Think-Pair-Share work, discussion, Paired Quizzes (two students completing a quiz together), problem-solving in class or at home, “Clicker” quizzes, posting, and responding to, threads on a course Discussion Board, etc. Typically, two-three activities take place each week, some completed in-class, some online or at home. The “kicker” is, to get maximum points, students only need about one third of activities that take place over the course of the semester - thus, there is no pressure if a student misses something. Interestingly, most students end up participating in the majority of scored activities, and class attendance remains uniformly in 90% range.

Since I “discovered” the Bloom’s Taxonomy [7], I found it very helpful in setting and assessing learning objectives. University teaching aspires to foster deep learning, creativity and critical thinking, all associated with upper levels of the Taxonomy (i.e. analysis, synthesis and evaluations). Yet passive lectures and standard tests too often encourage surface learning, regurgitation of facts and simple application skills, associated with the lower cognitive levels. Thus, whenever feasible, I mix or replace tests and exams with longer assignments, portfolio-type evaluations throughout the semester, collaborative projects and group presentations, as well as incorporate personal reflection and self- and peer-evaluation into a marking scheme. These tasks are much more representative of how people work and learn in real-world, and are more appropriate for encouraging and assessing higher cognitive activities.

Students need feedback on how they are doing in their learning, but we, as teachers, also need feedback - we need students to tell us how we are doing. Over the years, I adopted several strategies to get that feedback. One of them is a One Minute Paper. Every week, I ask students to write on one side of a half-page the one thing they understood to be the most salient point of the lecture, and on the other side the one thing they would like more explanation on. I collate the responses into histograms and the following week I show them to the class. We then begin with an overview of the least understood concept. I also collate and show the “understood” responses - reading

what students missed from our classes can be quite a downer, so we need to give ourselves, and the class, a pat on the back for a job well done ☺. The One Minute Paper provides me with a very effective formative feedback throughout the course as I “measure the pulse” of my class during the semester, and can provide remedial action if the learning objectives that I set out for the students are not being met. I also allow students' input in the course and ask for suggestions on handling process-related issues. They can bring them up through Class Ambassadors and also through an anonymous Start-Stop-Continue survey - after a few weeks of classes, I ask students to write about things they would like me to keep doing or change in the course. We repeat this exercise two-thirds through the semester. I also ask students to complete a detailed end-of-the semester Exit Survey that gives me a summative feedback to improve the future offerings of the course.

Feedback about our teaching also comes from individual conversations with the students, be it course-related, or just a chit-chat. I am acutely aware of the power differential in the classroom. We may not realize that, but we can be so intimidating to the students! And so I make sure that I am seen as approachable, not just during office hours, but after the class or at other times and importantly, online as well. Class Ambassadors, Email and online Discussion Board allow me to improve and expand my communications with students, especially in large classes. Students who otherwise would never speak up in the class, or show up in my office, often become very familiar to me online. And, investment of time spent setting up discussion groups and posting messages online, pays off many times over in increased class engagement, and better feedback both ways.

Bibliography

1. Buscaglia, L., "Living, Loving and Learning", 1982.
2. Palmer, P.J., "The Courage to Teach", Jossey-Bass (1998).
3. Richard Felder's Home Page for Resources in Science and Engineering Education; Available at: <http://www4.ncsu.edu/unity/lockers/users/f/felder/public/> [Accessed June 16, 2010]
4. Felder's Index of Learning Styles (ILS); Available at: <http://www4.ncsu.edu/unity/lockers/users/f/felder/public/ILSpage.html> [Accessed June 16, 2010]
5. Brian Little's "Pseudo-Extrovert"; Read about it at:
 - a. <http://briansmithslife.blogspot.com/2009/08/not-waiting-for-last-dance.html> [Accessed June 16, 2010]
 - b. <http://prod.ottawabusinessjournal.com/Opinion/2009-10-30/article-205074/Hammering-out-a-free-trait-agreement/> [Accessed June 16, 2010]
6. Chickering A.W., Gamson, Z.F., "Seven Principles of Good Practice in Undergraduate Education", The American Association for Higher Education Bulletin, March 1987; Available at : <http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/7princip.htm> [Accessed June 16, 2010]
7. Bloom's Taxonomy; Read about it at: <http://www.nwlink.com/~donclark/hrd/bloom.html> [Accessed June 16, 2010]
8. David A. Kolb on Experiential Learning; Read about it at: <http://www.infed.org/biblio/b-explrn.htm> [Accessed June 16, 2010]
9. Fink's Five Principles of Good Course Design, University of Oklahoma Instructional Development Program, 1999; Available at: http://engineering.missouri.edu/neuro/downloads/2-instruction_design-1.pdf [Accessed June 16, 2010]
10. Fink, L.D., "Creating Significant Learning Experiences", Jossey-Bass (2003).
11. Boyer, E., "Scholarship Reconsidered", The Carnegie Foundation for the Advancement of Teaching (1990); Available at: <http://www.pnc.edu/te/FACCOMM/BoyerScholarshipReconsidered.pdf> [Accessed June 16, 2010]