



Short-duration, High-intensity Executive Education: Mission Impossible?

Assistant Professor Scott Fritzen
Lee Kuan Yew School of Public Policy

This article examines a pedagogical challenge often encountered in professional schools but not frequently discussed as compared with ‘normal’ semester-long classroom teaching. How can we make short-duration executive education programmes (EPs), typically conducted for mid-career professionals, a meaningful learning experience for the participants?

The course aims to provide training to today’s leaders in public management. Imagine the following scenario:

You walk into a classroom filled with mid-to-high-level public managers, ranging from vice-mayors of large cities to senior officers in the armed forces. They come from various countries—some rich, some poor; some with authoritarian, one-party governance systems and others with chaotic democracies. Academic preparation of participants ranges from high school to those holding doctorates, while their spoken English proficiency ranges from basic to positively eloquent. They have often been out of school for over 20 years, and you—their lecturer—have them as your captive audience for the next several hours of EP sessions

on ‘strategic management in government’. The donor funding their presence states the objective of the session as nothing less than “to update participants with the latest theoretical developments in the field and to provide them with practical tools that will add value to their work immediately.”

Configurations vary, but some of the most challenging EPs in our School of Public Policy (and probably elsewhere) have several characteristics of the above scenario:

- Time-on-task is both short and high-intensity: participants receive several hours of instruction per day either with the same or different instructor, for several days at a time;
- The instructor often has little or no knowledge of the participants prior to the session;
- The class may be both diverse and non-cohesive as the participants come from different countries solely for the purpose of attending the session;

continued next page...

inside

Teaching Students: A Teaching Experiment	3
Teaching Pharmacogenetics at NUS	5
Seeking Directions in Teaching	12

Teaching Methods

Do Anxious and Fearful Teachers Learn in Classroom Situations?	7
Living and Learning Medicine: Any Changes in the Past Five Years?	14

**Professional Development/
Learning Issues**

Outstanding Educator Awards Public Lecture Series 2005	8
Announcement/Welcome to CDTL/Goodbye	9
Teaching and Learning Highlights	10

**CDTL News /
From the Faculties**

- The ‘stakes’ of the training for participants are limited since there is generally no assessment and since third parties (e.g. governments or donors) are often paying for the training;

A daunting teaching assignment, or is it mission impossible? The answer depends, of course, on one’s ambitions. It is not particularly difficult to keep the class occupied for the time required; indeed, this requires little more than an adaptation of teaching materials typically used in one’s semester-long courses. But what could make this format actually *useful* for participants?

Some lessons learned

The following five guidelines have grown out of my active experimentation in EPs over the past five years:

1. *Keep it simple.* This piece of advice, true enough in our normal classes, is even more relevant for EPs. The temptation to take the ambitious and externally imposed learning objectives (such as those listed in the scenario above) too literally can and will lead to information overload and an easily forgotten session. This leads to the next point, which may be more controversial.
2. *Leverage learning by encouraging small shifts in perspective rather than formal content.* Einstein once said that “imagination is more important than knowledge.” Whether or not this applies to a semester-long calculus course, I take it as my North Star when designing EP sessions. I know the EP sessions I facilitate have worked as intended when they leave participants with an unexpected insight—one that helps them to see a complexity behind an otherwise familiar aspect of their work. To accomplish this, I look for relatively simple but intuitive frameworks that essentially invite participants to organise their own extensive professional experience in new ways. My aim is for such heuristics to be remembered and to prove useful even several months after the session. But this requires going beyond a lecture presentation of a particular framework, which brings us to point three.
3. *Build the session around interactive problem-solving.* One benefit of an ‘imagination’-driven approach to EP teaching is that it allows more time for what may really wake participants up—interactive problem-solving. For my sessions, this typically takes the form of joint analysis of case studies. Participants are presented with an open-ended policy or managerial dilemma and asked to develop and present their own recommendations for

its resolution using one of the frameworks taught in the session. I find that by mixing challenging and easy questions, I can reach almost all participants at some point during the session.

4. *Raise the stakes.* As noted above, the lack of any form of participant assessment, coupled with the fatigue factor caused by an often gruelling EP schedule, means that participant motivation and energy can often wane. The interactive, problem-solving approach may help combat fatigue, as do small-group work, presentations of case analysis and organised debates between teams of participants. Such activities turn up the heat in the classroom. As successful professionals, participants are often eager to demonstrate their creative problem-solving skills to their peers *du jour* (and at least not appear unprepared).

Incentives matter for the instructor as well. Participant evaluation forms are common (but still not universal) practice. But since the evaluation results are typically not linked to any obvious consequences, they can often fail to motivate instructors to make an extra effort in these ‘one-off’ courses. One well-known principle is to make participant feedback on all EP sessions available to all instructors involved. Having joint planning and debriefing sessions among faculty members and EP clients can also help create an enabling environment for continuous improvement and sustained instructor effort. These steps additionally help promote the customisation and coordination of content that are essential for high-impact EPs.

5. *Innovate!* The Executive Programme practice is constantly evolving. We are only now beginning to incorporate distance and e-learning tools into EPs. Such tools may help overcome some constraints inherent in the EP format (for instance, enabling even short programmes to include assessed participant work).

Whatever the form EPs take in the future, the core principles of focus, interactivity, attention to learner and instructor motivation, as well as continuous innovation are likely to be just as important as they are today. ■

Teaching Students: A Teaching Experiment

Associate Professor Joel Lee
Faculty of Law

In this paper, I will document a teaching experiment conducted for first year law students taking LC1004, “Law of Torts” in AY 2002/2003, examine students’ feedback on the experiment and propose some guidelines for the further exploration of the method.

The experiment

Ideally, a tutorial should be a lively discussion for students to apply what they have learnt and raise questions. However, in reality, this is rarely the case for various reasons and tutorials often became mini-lectures. The main idea for my experiment was to teach students by having them teach because I believe that a person learns most when he/she has to teach. Getting students to teach other students meant that they must not only understand the content, but also think through how it fits together. Furthermore, this role reversal puts students in the teacher’s shoes. Students now have to think not only about content and structure, but also how best to convey the information effectively. My aspiration was that students would realise that a pure lecture method was not necessarily the best way to teach and learn. Finally, it was hoped that with this method, students will gain confidence in public speaking.

This experiment was conducted over two tutorial sessions (Sessions 1 and 2) with students divided into two teams (Teams A and B) two weeks before the first session began. In Session 1, Team A would conduct the tutorial as if they were the teachers and Team B the students. Students from both teams were told that they would have complete freedom to structure and conduct the tutorial. They could consult me as many times as they wished two weeks before their respective sessions began, after which I would only sit in as if I were a student. As students during Session 1, Team B was expected to be prepared for and to contribute to the discussion at hand. Students were also informed that their performance though noted, would not be graded.

The sessions

In all the sessions I attended, both teams came prepared to present and participate. While there was some initial hesitation on the part of the teaching team, once they realised that I was not going to formally start the class, they took matters into their own hands and began the class. Interestingly, the teaching teams all opted to teach

by facilitating responses from the class. None adopted the ‘mini-lecture’ approach with which they were familiar. However, a number of problems did surface through the course of the sessions. These include:

1. *Occasional foray into irrelevancies.* A student would bring up a point which was irrelevant to the discussion and the teaching team either did not have the experience to recognise that the discussion was going off tangent or did not have the abilities to draw the discussion back. In this situation, I had to ask (in the role of a student) how the point raised fit in with the current discussion. This was usually sufficient to bring the discussion back on track.
2. *Occasional gap in content coverage.* This was generally due to the teaching team not realising or overlooking a vital point. This did not come as a surprise to me and a simple question that addressed the missing point will solve the problem. Interestingly, when brought up in this manner, the teams were able to address the missing point correctly.
3. *Uncertainty of the state of the law.* This was not surprising considering that the tutorial sheet was designed to highlight the ambiguous areas in the law. This uncertainty was typically handled in two ways. The first was resolving the uncertainty through the process of class discussion. This was ideal as students then weighed the opposing views and came to their reasoned conclusions. The second way was for students to accept that this particular area of law was uncertain and be able to argue both for and against. In some cases, students were able to traverse this difficulty on their own. In others, I would intervene by asking appropriate questions.

Interestingly, none of the presenting teams got the law wrong. This reinforced my belief that students can learn the law on their own provided that there are sufficient guidelines and parameters to assist them. At the end of each session, both teams were asked to provide feedback on the experiment via email.

Feedback

Generally, students’ feedback on the experiment was positive. Four main themes emerged from the feedback:

continued next page...

1. *Ownership of the lesson.* Students felt that this method gave them more ownership of the lesson which motivated them to prepare for class, respond to the teaching team's questions and engage in discussions.
2. *Effect on learning.* From the feedback, it appeared that this method had a significant effect on students' learning. By requiring them to prepare and teach, students were compelled to fully understand the content of that session. As one student wrote:

[It made me] aware of the fact that I had to be a lot more organised. [...It's] different when you conduct a class because you have to be a lot more certain about the different issues and the different strands of arguments and to make sure they follow the same thread and to make sure they eventually end up somewhere.

In addition, requiring the presenting teams to respond to questions from the other students allowed them to work through their own areas of doubt and uncertainty as they formulated responses to those questions.

3. *The learning environment.* Some students felt that having their peers conduct the class created a good environment for exploration and learning. Because students knew each other well, their intra-group rapport created a fun and relaxed atmosphere which relieved some tension for the teaching team. One student expressed:

I felt less inhibited in asking questions and challenging the answers presented by other students (Perhaps this is reflective of the respect Asian students generally have for their teachers, which may in certain circumstances inhibit students from putting forward any question or argument that may seem rude to the teacher).

4. *Student development.* In the process of teaching and working together as a team, students developed effective presentation and learned to work as a team. This would be particularly useful to their future careers as lawyers.

Of course, as with all things, there was feedback about difficulties faced by the students:

1. *Amount of time and effort needed.* A common difficulty was that some students felt that the time and effort needed for them to do this well placed burden on an existing heavy workload. Another student felt that:

[B]ecause we don't know very much about what we don't know, [...] I think a disproportionate amount of time is

committed towards investigating the subject.

In fairness, there is some truth to this. This experiment basically threw students into the deep end. Further, because this was a new activity for the students, their unfamiliarity with the subject would lead to some stress and take more time this first time round.

2. *Uncertainty in learning.* Students were uncertain whether they were learning the correct things. There are two aspects to this. Firstly, they were not confident that they were on the right track. The ambiguity of the law and the lack of a teacher-imposed structure in the class contributed to this uncertainty. There were also concerns that students answering the questions of other students was a matter of "the blind leading the blind". Secondly, because of students' lack of knowledge and experience, there was also a feeling that the class may not be getting as much as they should from the session.

Again, these are admittedly fair concerns. As mentioned earlier, there were times where intervention was necessary to bring the discussion back on track or fill in a content gap. However, student feedback also revealed an 'over-concern' with acquiring the correct content as opposed to focusing on the processes of thinking, reasoning and argumentation.

3. *Issues relating to teamwork.* There were three main concerns relating to working as a team. The first was that the working group of about 6–8 students might have been too large. On hindsight, teams of 2–4 students might have been more ideal. This leads to the second concern that there was unfair distribution of work in some cases. Requiring students to submit a written or verbal report before the class and allocating marks for their performance might have helped to resolve this issue.

The final concern relating to teamwork was that of overspecialisation. As one student expressed it:

Students are delegated various areas/questions to do, which if done well means that they are very well versed in that area. The flip side is that if the question is not broad enough, they are ONLY well versed in that area... as compared to usually when they have to do all the questions.

This is a fair concern and presumably, relevant only from the viewpoint of the teaching team. Again, this can in part be addressed by having smaller working groups and careful drafting of the tutorial questions to encompass a balanced coverage of issues.

continued on page 13...

Teaching Pharmacogenetics at NUS

Assistant Professor Zhou Shufeng
Department of Pharmacy



Introduction

Pharmacy is a healthcare profession that deals with all aspects of medicines, including the manufacture, supply and management of drug therapy for patients. The primary aim of the pharmacy course at the National University of Singapore (NUS) is to provide students with relevant knowledge and skills required for entry into the profession. The course focuses on laying a strong foundation in topics related to pharmaceutical sciences and pharmacy practice so that graduates can readily apply these fundamental and important principles to their future practice, be it in the community, hospital, healthcare, pharmaceutical industry or research.

Current concepts in drug therapy often attempt drug treatment of large patient populations as groups, irrespective of the potential for individual, genetically based differences in drug response (Evans & Relling, 1999). It is well recognised that most medications exhibit wide inter-patient variability in their efficacy and toxicity. Pharmacogenetics, the study of how the genetic variations affect drug response in individual patients (Evans & McLeod, 2003), emphasises the identification of the network of genes that governs drug response in individual patients using genome-wide approaches (Evans & Johnson, 2001). All of these will lead to novel approaches in drug discovery, individualised medication dosage and new insights into disease susceptibility and prevention (Milos & Seymour, 2004). Pharmacogenetics and pharmacogenomics, both interchangeable, may help focus effective therapy on smaller patient sub-populations which, despite demonstrating the same disease phenotype, are characterised by distinct genetic profiles.

Due to the importance of pharmacogenetics, the great potential application of pharmacogenetics in future medicine and the vital role of pharmacists in healthcare, pharmacy students must be educated with adequate knowledge in pharmacogenetics (Frueh & Gurwitz, 2004). In NUS, pharmacogenetics is incorporated into other modules (e.g. pharmacokinetics and toxicokinetics). In this paper, I will highlight my experience teaching pharmacogenetics at NUS, emphasising on teaching topics, approaches, evaluation, emerging problems and possible solutions.

My teaching of pharmacogenetics for pharmacy students at NUS

In AY 2004/2005, pharmacogenetics is incorporated into three modules, namely, PR3106 “Pharmacokinetics and Drug Disposition”, PR4207 “Applied Pharmacokinetics and Toxicokinetics” and PR5113 “Clinical Pharmacokinetics and Therapeutic Drug Monitoring”, to cater to students at both the undergraduate and postgraduate levels with a basic knowledge in human genetics and pharmacology.

Teaching approaches involved for pharmacogenetics

The application and combination of the major teaching methods I use may vary depending on the module and students (Table 1). An IVLE website is also set up for each module and a forum is used for discussion on pharmacogenetic topics. The lecturer will monitor the forum and provide proper guidance regularly.

Table 1. Major teaching methods for pharmacogenetics.

Module number	Teaching methods for pharmacogenetics
PR3106	Lecturing, tutorial, individual projects, case study, IVLE, continuous assessment
PR4207	Lecturing, tutorial, group projects, student presentation for case study, IVLE, continuous assessment
PR5113	Lecturing, tutorial, individual projects, student presentation for case study, IVLE, continuous assessment

In addition, I have also provided a number of useful websites, journals and books to students. Many key points in my lecture notes are extracted from these materials and students are encouraged to read them thoroughly if time allows.

continued next page...

Problems and possible solutions in my teaching of pharmacogenetics

Efficiency of my teaching methods

Choosing the proper teaching methods for a complex subject like pharmacogenetics is important. Student feedback indicate that the methods I used (Table 1) are basically and technically efficient, although there are some concerns (Table 2).

Table 2. Major teaching methods for pharmacogenetics.

Major concerns from students	Possible solutions
There is too much to memorise	Less topics, less lecture notes
Some concepts are hard to understand	More elaboration and details
There are too many drugs as examples	Less drug as examples
Individual project is time-consuming	Set up group project
Case study is time-consuming	Less case study and converted to group project
Some diseases as examples are too simple	More elaboration and details
Tutorial is too short	Increase tutorial time
IVLE forum is not active	Encourage active participation

There is debate about what the various complexities and implications of teaching pharmacogenetics are. On the one hand, pharmacogenetics contains multiple fundamental scientific concepts that are really complex, but its education for pharmacists must focus on the application of such complex science in clinical settings. On the other hand, gaining key pharmacogenetic knowledge in pharmacists will benefit patients to some extent by turning this knowledge into practice and eventually the well-being of patients.

There is a growing expansion of pharmacogenetic knowledge with the advent of Human Genome Project. Thus, there is a need to incorporate this increasingly complex body of knowledge to the standard curriculum of pharmacy schools. Some additional topics in pharmacogenetics are of importance, but, due to time constraints, not included in my classes. These important topics should be included if a new module on pharmacogenetics is launched for pharmacy students at NUS.

However, there is still considerable space for me to improve and a flexible attitude and mindset are needed to better my teaching. I will also need to consider how my classes need to be dovetailed with other relevant topics such as pharmacotherapy and toxicology.

Problems facing the teaching of pharmacogenetics in the faculty

In pharmacy education, pharmacogenetics may receive less attention due to several reasons (Sansgiriy, 2004) including a) genetics and relevant disciplines are not considered as a priority for pharmacists; b) pharmacogenetics is a complex and large teaching area with uncertain coverage and teaching outcomes; c) long timescales will be required for both teachers and students; d) students may lack interest in this subject; e) there is already overcrowding of the curriculum; and f) shortage of adequately-trained teaching faculty. The last issue may be resolved when faculty members integrate pharmacogenetics into other courses, provided that they understand the relationship and relevance of pharmacogenetics to the subject in question.

Pharmacogenetics is becoming a core subject in some countries (Brock, Faulkner, Williams & Smith, 2002) where pharmacists who play a key role in drug therapy and patient care (Sansgiriy, 2004) are greatly valued. I suggest that an independent module on pharmacogenetics for pharmacy students be set up in the near future to help students construct comprehensive knowledge needed to achieve safe and optimal drug therapy in their future careers. For working pharmacists in Singapore and other East-South Asian countries, a continuing education or a special programme in pharmacogenetics may be set up to assist them in updating their pharmacogenetic knowledge.

References

- Brock, T.P., Faulkner, C.M., Williams, D.M. & Smith, S.R. (2002). 'Continuing-education Programs in Pharmacogenomics for Pharmacists', *Am J Health Sys Pharm.* Vol. 59, pp. 722-5.
- Evans, W.E. & Johnson, J.A. (2001). 'Pharmacogenomics: the Inherited Basis for Interindividual Differences in Drug Response', *Annu Rev Genom Human Genet.* Vol. 2, pp. 9-39.
- Evans, W.E. & McLeod, H.L. (2003). 'Pharmacogenomics—Drug Disposition, Drug Targets, and Side Effects', *N Engl J Med.* Vol. 348, pp. 538-549.
- Evans, W.E. & Relling, M.V. (1999). 'Pharmacogenomics: Translating Functional Genomics into Rational Therapeutics', *Science.* Vol. 286, No. 5439, pp. 487-491.
- Frueh, F.W. & Gurwitz, D. (2004). 'From Pharmacogenetics to Personalized Medicine: a Vital Need for Educating Health Professionals and the Community', *Pharmacogenomics.* Vol. 5, pp. 571-9.
- Milos, P.M. & Seymour, A.B. (2004). 'Emerging Strategies and Applications of Pharmacogenomics', *Hum Genomics.* Vol. 1, pp. 444-55.
- Sansgiriy, S.S. (2004). 'The Future of Pharmacy Education: Back to Which Basics?' *Pharmacotherapy.* Vol. 4, pp. 688-9; 691-3. ■

Do Anxious and Fearful Teachers Learn in Classroom Situations?

Senior Lecturer (Teaching) Lily Chong
Human Resource Management Unit

We often think emotions can affect our efficiency in the workplace. However, because they are such an intrinsic part of who we are and how we react to any situation, there is a need to understand, monitor and manage emotions effectively. In this paper, I will examine two particular emotions faced by most of us—anxiety and fear. Although anxiety and fear often go hand in hand, they are in fact very different emotions, as shown in Table 1 below.

Table 1. Comparison between anxiety and fear.

Anxiety	Fear
Vague, indirect, self-directed, performance-related	Specific, conscious, direct, oriented towards an object or event
Formed, influenced and embedded in social relationships among colleagues and between teachers and students	Apprehension and tension arise from the anticipation of danger or threats to physical well-being

In a single event, a person's emotion may turn from fear to anxiety if it is perceived that there is no possibility of escaping from or avoiding a dreaded situation or person. In the context of teaching and learning, teachers may experience a mixture of fear and anxiety, characterised by distress and uneasiness when we are faced with certain situations such as teaching evaluations. In particular, if the outcome of the evaluations can either make or break a teacher's career, the possibility of failure constitutes a significant factor in the development of anxiety.

Interestingly, studies¹ have observed that learning is unlikely to take place without anxiety. For instance, if the anxiety a teacher feels can be contained and managed effectively, it may generate an added motivation the teacher needs in order to succeed. However, anxiety may also undermine the positive outcome if the teacher lowers his/her expectations of, resists, avoids or abandons the learning experience because they are unable to manage the uncertainty or fear taking risks. This will undoubtedly hamper the potential for learning and positive change.

Anxiety, therefore, has a strategic dimension in either supporting or inhibiting learning and change. Emotions, such as fear and anxiety, that underpin the experience of teaching and learning, create both the possibilities for making the most of these strategic classroom moments and the capacity for ignoring them. Thus, teachers face unique learning situations created from emotional responses to experiences in the classroom setting.

The emotional aspect of learning can often be difficult for teachers to acknowledge and work with. Learning is possible if a particular strategy of ensuring success (e.g. an appropriate choice of activities, pace of instruction or level of task difficulties) is employed during classroom instruction. Additionally, teachers can learn to accept mistakes, receive constructive feedback from colleagues and students alike. This provides them with the opportunities for learning: formulating expectancies, examining reasons for success and failure, or sharing concerns regarding future teaching evaluations. Furthermore, teachers can gain useful insights when denials, defensiveness and avoidance strategies are utilised as knowledge for learning.

In conclusion, the extent to which teachers and organisations address these emotions and learning behaviours can make a difference to learning. In an environment where these emotions are acknowledged and dealt with positively, in-depth understanding and the development of learning and positive change are then possible. ■

1. The following works support the claim that learning is not likely without anxiety:

Vince, R. & Martin, L. (1993). 'Inside Action Learning: the Politics and the Psychology of the Action Learning Model', *Management Education and Development*. Vol. 24, No. 3, pp. 205–215.

Kofman, F. & Senge, P.M. (1993). 'Communities of Commitment: the Heart of Learning Organizations', *Organizational Dynamics*. Vol. 22, No. 2, pp. 5–23.

Schein, E.H. (1993) 'On Dialogue, Culture, and Organizational Learning', *Organizational Dynamics*, Vol. 22, No. 2, pp. 40–51.

Outstanding Educator Award Public Lecture Series 5 May 2005

Associate Professor Kulwant Singh (Department of Business Policy) and Professor Ip Yuen Kwong (Department of Biological Sciences), winners of the Outstanding Educator Award 2005, delivered lectures as part of the OEA Public Lecture Series at the Engineering Auditorium on Thursday, 5 May 2005.

The Guest-of-Honour, Provost Tan Chorh Chuan, also issued certificates to the winners of the Excellent Teacher Award. Congratulations to all! ■



Registration for the event



Winners of the Outstanding Educator Award 2005, A/Prof Singh and Prof Ip



CDTL Director A/Prof Pan giving the welcome address



Tea-break discussion



Guest-of-Honour Provost Tan Chorh Chuan



A/Prof Singh giving his lecture



Prof Ip and the Provost



Provost Tan and Excellent Teacher Award winner A/Prof Cecilia Lim



A/Prof Pan inviting everyone to a scrumptious tea spread



Provost Tan and Dr Chng Huang Hoon during the tea break



Provost Tan engaged in discussion with the winners of Excellent Teacher Award



Calling All Writers

CDTL invites articles on any teaching and learning topic for the following two newsletters:

- *CDTLink* (700 words maximum per article; photos & illustrations in hard/digital copy are welcomed)
- *CDTLBrief* (text-only newsletter; 1000 words maximum per article)

To submit articles for consideration or to obtain more information, please contact:

Sharon Koh

Email: cdtsksp@nus.edu.sg

Tel: (65)-6874 4692 • Fax: (65)-6777 0342 ■

Welcome!

CDTL would like to welcome as Educational Technologist:

Alena Yap Lee Yong, who joined us in January 2005.

Goodbye!

We would also like to thank:

Miss Lisa-Angelique Lim, our Research Assistant, who left in May 2005 for all her invaluable support in the past and wish her the best for her future endeavours. ■

Teaching & Learning HIGHLIGHTS

Yong Loo Lin School of Medicine

Faculty Training Workshop 2005

The Yong Loo Lin School of Medicine recognises that faculty training is imperative to implementing an assessment system that is beneficial to both students and teachers alike. The latest component in faculty training is the Key Features (KF) Test, a new assessment format based on clinical scenarios. It comprises a description of a problem followed by two or three questions focusing only on *critical*, *challenging actions* or *decisions*. KF is believed to assess a person's essential clinical decision-making skills more accurately.

The Medical Education Unit of the School recently organised a two-day workshop 'Developing Key Feature Cases and Examinations' (March 7–8, 2005). Professor George Bordage (University of Illinois, Chicago) and Dr Zubair Amin facilitated the workshop for 20 enthusiastic faculty members. The workshop was highly rated for its usefulness, interactivity and practicality.



Figure 1. FOM workshop participants.

This is one of the several ongoing faculty development workshops on assessment. Other workshops implemented recently include Multiple Choice Questions, Extended Matching Item, Objective Structured Clinical Examination, Standard Setting and Blue Printing. ■

Faculty of Science

The Art-and-craft of Research in SPS

One of the key objectives of the Special Programme in Science (SPS) has been and is to nurture talents among aspiring scientists. Since its inception in 1996, the programme has strived to foster a culture that imbues creative and critical thinking among its participants. To facilitate this, peer learning and teaching form the basis on which many of the academic activities are run.

Leveraging on a strong mentorship programme, participants are engaged in academic pursuits by senior students and faculty, from attending interdisciplinary seminars to undertaking advanced research projects. Being primarily a faculty programme, students undertake focused literature surveys on topics that straddle various disciplines in science. For instance, in the last semester, students examined the theme of 'Symmetry' from diverse perspectives. This then served to initiate them into the arena of scientific investigation where they design and conduct laboratory experiments on a topic within the theme. With its interdisciplinary flavour, the programme provides an avenue for students from several disciplines to work together and it also lays the foundation for further research activities. ■

School of Business

Classroom @ Au Jardin, Les Amis

Au Jardin, one of Singapore's finest French restaurants located in the heart of the Botanic Gardens, became the classroom for 58 undergraduates taking the course, GEK1030 "Service Work—Winning Hearts and Minds", on March 25, 2005. It was indeed a 'good' Friday as students soaked in the exquisite ambience of a fine French restaurant. The restaurant's staff shared their personal experience and provided students with first-hand knowledge of what it takes to excel in the service industry. The fine dining experience also provided an opportunity for students to participate, observe, evaluate the whole experience and relate them to what has been learnt in class. Indeed, the IVLE discussion forum was full of diverse insights after the outing! Beyond learning and dining, what did students value most from the experience? Fond memories of friendship and bonding @ Au Jardin! ■



Figure 1. Cheers!



Figure 2. Bon Appetit!

Faculty of Engineering

Industrial Participation Enhances Students' Learning Experience from the Design Project

The capstone Design Project (DP) is carried out by about 300 final-year undergraduates in the B.Eng. (Chemical Engineering), B.Eng. (Environmental Engineering) and B.Tech. (Chemical Engineering) programmes in their final semester. They are divided into teams of 4–7 students, each designing a process plant with different specifications. The DP challenges students to solve an open-ended and realistic problem, to take initiative and to develop creative solutions. In addition to applying knowledge gained from previous modules, students also learn new techniques, learn how to work independently and in teams, as well as hone their communication skills. The DP thus includes several aspects of integrative problem-based learning—students get to appreciate the interplay between chemical engineering principles, performance tradeoffs, safety issues, environmental impact, economic implications and so on. The academic staff act as facilitators of the project.

The DP not only provides a wholesome and realistic educational experience to students but also enlists Singapore's thriving chemical and pharmaceutical industry to train future engineers. Consequently, the DP is often tied to problems of local interest (e.g. students designed a plant to produce potable water from sea water and municipal wastewater in AY 2002–03). Industry practitioners have been contributing to the DP for many years and their involvement has increased significantly in the recent years. For example, Mr. Aspi G. Vania and his team from Singapore Refining Company helped us with a DP on a crude distillation unit during AY 1998–99. Dr Larry June and his team of engineers (all of whom are NUS alumni) from Seraya Chemicals Pte Ltd participated actively in the DP involving a styrene plant during AY 2003–04. For AY 2004–2005's DP, we have enlisted the help of Mr Wong Chee Seng (NUS alumnus and currently Manager of the Technical Support Section) of Ethylene Glycols Singapore Pte. Ltd.

The industry practitioners help us in defining the project scope and contribute by providing industrial data, giving technical talks to all students, being available for weekly meetings with team leaders, participating in the IVLE forum and so on. Indeed, the industry practitioners' involvement, participation and support in the DP have enhanced and enriched the learning experience of both students and faculty as they tap on the expertise and knowledge of practising engineers. We are hopeful of continued strong support from Singapore's chemical, petrochemical, pharmaceutical and related companies for the DP and indeed, for our overall educational mission.

Seeking Directions in Teaching

Associate Professor Rajendran, K.
Department of Anatomy



Why teach?

Teaching and learning have been integral to the human community from time immemorial and everyone is potentially a teacher one way or the other. In spite of the high regard for the profession, the choice to become a teacher is often a personal one. For me, I was largely influenced by an exposure to inspirational and dedicated teachers, who in various ways became role models, and also by the recognition of teaching as a kind of activity with a strong sense of community and likely to bring a sense of fulfillment from positively influencing young minds. Seeing teaching as an avenue for one's creativity is perhaps quite critical as that will help generate the necessary passion and energy.

Becoming a teacher

The earliest anxiety for a lecturer is that of taking on the title of a teacher before having achieved any level of competence, a feeling further reinforced the moment students come into the picture. The appointment therefore was to become the official beginning of a search for directions in teaching, and in many ways it was the students who would become key players in providing guidance. Under their influence, a gradual process of evolution occurs over the years especially in the absence of formal programmes in teaching methodology in one's chosen field.

Coping with information

The basic sciences in Medicine are factually intensive and the only advantage as a novice teacher then was to have been in the same profession and therefore endowed with some working knowledge but often lacking the broader picture and most of the details. The early efforts at 'competence' were therefore primarily driven by the acute awareness of appearing factually deficient to students. Details therefore frequently took priority over a meaningful structuring of information.

Structuring of learning material

Exposure to students' learning activities around lectures, practical classes and tutorials has a profound influence on the next stage of development to move beyond information. Lectures are 'safe' activities for the beginner teacher, almost totally within one's control

and easily designed to appear exhaustive to avoid being assaulted with embarrassing questions. Comprehensive handouts that match the actual presentation will give students a perceived sense of security. It is also desirable that the allocated lecture time be filled completely so that questions (if indeed they could be generated) could be answered late (if ever).

It is soon apparent (from the kind of questions students actually come up with) that lectures can provide the ideal platform to deliver important visual or functional concepts. This, as opposed to detailed information, will allow students to develop the kind of understanding that will facilitate reflection and encourage the pursuit of self-directed expansion of knowledge. Essentially, they provide the basic tools for navigating the ocean of knowledge without getting hopelessly lost. Aiming to be comprehensive in the delivery of information in a lecture is often a futile attempt to outdo the reference texts which develop the 'big picture' that students lack. This should be an integral part of a lecture even at the expense of seemingly important details. Students need a sound framework onto which they can add the details comfortably. The promise of the big picture is often what attracts students to a lecture.

Practical classes provide great opportunities to get to know students as individuals and to understand unique difficulties faced by different individuals. A degree of teacher-student bonding is likely to facilitate interaction and better learning. The management of practical classes in human biology should focus more on the right approach and emphasis as well as aspects of application to stimulate interest in the subject matter. To be effective, the number of students per tutor therefore requires to be the bare minimum. For the teacher, these classes are often the setting for discovering one's own shortcomings. Being humble will help towards continued personal development and fostering respect from students who are often sharp enough to know who is trying to 'bluff'.

When conducted in a small group setting, tutorials give students the opportunity to demonstrate a level of understanding of the subject as well as its application. In addition, stragglers can often be identified and

continued next page...

given the appropriate advice and encouragement. The opportunity for mentoring should never be overlooked. Small group teaching is the closest one can get to an apprenticeship where close attention can be paid to the development of individual students, and opportunities taken to impart values and attitudes that help develop professionalism in students.

A personal teaching style

Being sensitive to the difficulties faced by students will help develop a personal teaching style. Tutorials and practical classes are ideal settings to determine the areas where students falter and pick up new directions in teaching methodology. Positive reinforcement from students on experimental methods is therefore an added impetus. However, any experimentation with unique methods has to be balanced by an awareness of the broader curriculum requirements and an understanding of students' capabilities and limitations.

Sharing and exchanging of teaching approaches

It would be a shame if existing good teaching practices are overlooked in favour of a personal style. Of subtle

benefit is the habit, among colleagues, of sitting in at one another's classes and exchanging ideas. Not only is one able to pick up different styles (both good and bad) on teaching but the exposure to related fields (taught by others) helps one develop a better integration of topics and broaden one's own big picture. There is also the added benefit of generating team spirit among teachers who often have to work together towards common goals such as curricular development.

Technology

The advent of IT offers a whole new dimension to the learning environment. User-friendly technology provides an outlet to one's creativity in generating interactive software to facilitate the visualisation of complex structure/function so essential to the understanding of biological processes. The teaching/learning experience enjoys a new level of efficiency which literally frees up a lot of useful knowledge from being categorised as 'information overload'. With the current enthusiasm for trimming contents in the interests of relevance and integration, IT should be positioned to restore relevant disciplines closer to a

continued on page 16...

Teaching Students: A Teaching Experiment

...continued from page 4

Direction for the future

The purposes of the experiment as set out earlier in this paper were achieved in varying degrees. Of course, one experiment and limited feedback are insufficient to determine the usefulness of this method. More 'experimentation' over a period of time and by a broader base of teachers will be required. Below are some suggested guidelines for colleagues who might be interested in conducting similar experiments:

- Small teams of 2–3 will be appointed the previous session to prepare for and teach the upcoming session. This will be done on a rotational basis so that everyone in the class can expect to be assigned such a role.
- The teaching teams will have two consultation sessions with the teacher before their teaching session to assist them in their task and to clarify any doubts they might have.
- Each student in the teaching team is expected to contribute equally to the preparation and teaching of the coming session.
- Assuming the course allows for this, the teaching teams will be allocated a team grade that will count towards their final grade for that course.
- During the teaching session, the teacher will be present as a 'student' to assist if necessary.
- Specific tutorial questions should be drafted carefully to cover a range of issues relating to the particular topic.
- The first consultation session should be arranged and instructions, expectations as well as distribution of the workload set out.
- The second consultation session—held about three days before the teaching session—should focus on the team's proposed teaching plan, method and content. The teaching team can also discuss areas of uncertainty and clarify doubts with regards to content.
- The teacher should attend the class and intervene only where necessary (e.g. to bring a discussion gone awry back on track, point to a gap in content or reasoning). After the teaching session, the teacher might choose to meet with the teaching team a final time to provide feedback on the teaching session. ■

Living and Learning Medicine: Any Changes in the Past Five Years?



Professor Vernon Oh
Yong Loo Lin School of Medicine

In my last contribution to CDTL's publications five years ago (Oh, 2000), I made two points which I will revisit in the present paper. I would first like to re-examine the statement that: "the smarter scientists understood the limitations of both the empirical method and available technology. Karl Popper has shown that experiments can only disprove hypotheses; in proving concepts, an element of uncertainty remains forever. Instead of being paralysed by uncertainty, however, students can and should derive a zest for research from it".

From my observations of students in the School of Medicine for over 25 years, I believe that many are still unable to adapt their school-derived attitudes towards knowledge, and consequently fail—to an extent—to accept learning and research as an endless exploration, or an evolving adventure. Instead, they become increasingly discouraged by the lack of certitude in many areas of medical science and, worse, the continuously evolving methods of diagnosis, investigation and of patient treatment. It is similarly unsettling for practising physicians to note often that the 'best treatment' of today becomes the obsolete or even harmful 'misguided practice' of yesterday.

Faced with the shifting ground of medical knowledge, a few unfortunate students may be so fatigued or, worse, bored by the business of learning that they retreat to their default mode. By this, I mean the minimalist method of only learning just enough, and just in time, to pass the continuous assessments. In Medicine, this often means learning only the transient practice guidelines that students may acquire during hospital internship, or (more likely) Web-based extracts of dubious accuracy and currency. Whereas minimalist learning may enable students to pass examinations and survive the rigours of practice for a time, it is clearly insufficient for practising medicine as a lifelong career. Students locked into this mode tend to be poorly motivated, unquestioning and

perhaps depressed. Later, they may be professionally uncritical. In short, the behaviour is a prescription for probable under-achievement or, later, a possible disaster (e.g. serious injury or death of a patient).

In the past five years, I have not observed any significant change in the number of students who own up to minimalist learning. Does this mean that the curricular changes have not produced any detectable benefits? The answer is no as there may be many factors affecting this trend. Firstly, there should be a systematic follow-up study of the behaviour. Secondly, it is difficult to measure the influence of curriculum change on learning across student cohorts. Thirdly, the methods of performance assessment have changed in the same period, so that any benefits might fall below the detection threshold. Lastly, five years might be too short for any changes to take place.

The second statement I would like to re-examine is: "we learn far more from being wrong than being 'correct'. Infants, if not unreasonably inhibited, discover their surroundings by exploration. Through error they learn their own limits of action. So should all students".

Many students are consistently reluctant to admit either ignorance or error. I believe this results from a sudden erosion of the confidence built upon success in school-level physics, mathematics and chemistry—all subjects in which high scores result from knowing principles, laws and formulas. By contrast, biology—the science of living things—is so complex and strongly weighted towards the steady-state that most changes are small. Some biological laws (e.g. Darwinian evolution) are so counterintuitive (or require such leaps of imagination) that many people reject them completely. By extension, Medicine—a subject that encompasses both human biology and pathology—is enormously complex, and individual treatment outcomes in clinical medicine are unpredictable for some, and less than dramatic for

many people. Add the behavioural quirks of patients to this combination and it should surprise nobody that some students cannot cope with caring for patients and thus lack self-confidence.

It does not help that we live in a multicultural and polyglot society. Older people are separated from younger ones not just by gaps of experience, attitude or style, but also by differences in language: many patients over 60 years old speak only dialects. The older patients view disease and sickness differently from the younger students, who may uncritically accept the deep medicalisation of life's down-times that dominates mature societies in the West. Medicalising your experiences means labelling every episode of disappointment 'depression' and calling women's relative indifference to physical sensation 'female sexual dysfunction'. Serious difficulty in communicating effectively with patients is an obstacle in many student encounters. The first step towards defining the patient's problem is thus a stumble.

How do we limit the number of students overwhelmed by these challenges in learning Medicine? One effective way is to carefully select, upon entry into medical school, candidates who possess the following combination of attributes: great enthusiasm for learning, honesty, optimism, a willingness to accept fallibility (i.e. humility), outstanding communication skills and a personal concern for human welfare. Most candidates in this country have survived the rigours of school. But the stamina required to sustain long years of service to demanding patients is of a different order. Therefore, exceptional determination or 'true grit' is very important, as is a burning wish to make things better.

However, the Yong Loo Lin School of Medicine at the present Kent Ridge campus offers only an integrated five-year course, stacked with learning needs, and is somewhat unforgiving. Perhaps the upcoming graduate medical school at the Outram campus will allow some students, who are matched to its mission, to develop

well. But, we must consider that such a graduate medical school, charged with producing both competent clinicians and high-performance bioscientists faces a very tall order.

In the last five years, I have been encouraged by more students asking sensible, and even probing, questions about the nature of Medicine and human biology. This may reflect a refreshing openness to discussion and exploration, or more vocal students, or (as many of us hope) both of these trends. However, there is still a reluctance to voice questions and to thrash out disagreements through argument. I regularly assure students that no question is too silly to ask, and that someone is usually happy that an apparently daft question has illuminated a topic.

In conclusion, I would like to emphasise that to be sufficiently self-reliant in dealing with hospital or clinic patients, students need to have met enough diverse people to be able to think straight and argue convincingly on their feet. Ideally, they should saturate themselves in this quest to experience unfamiliar patients and conditions. Since the quest can be tedious and unrewarding in the short term, students have to be self-driven, which leads me to conclude that, with medical students, it is mostly about 'motivation, motivation, motivation'.

References

- Oh, V.M.S. (2000). 'Living and Learning Medicine: the First 30 Years', in Pan, D. & Mohanan, K.P. (Eds.). *Reflections on Teaching: the NUS Experience*. Singapore: Centre for Development of Teaching and Learning, National University of Singapore, p. 58–59. ■

Seeking Directions in Teaching

...continued from page 13

state of completeness (for the learner). The added advantage of an IT teaching package is that it could be structured at various levels (or strata) to suit the learner's abilities without being incomplete. However, it is difficult to see how, without the direct teacher/student interaction, IT (e.g. online programmes) could have the same kind of profound influence on the continued development of teaching.

Newer challenges

One has to be constantly aware of changes in the arena of teaching other than the teacher. Reference here is made to both the curriculum and students. While the explosion in new knowledge is allowing for the better integration of material, there is also tremendous increase in the volume. It is necessary here to review curricular requirements in light of newer developments and to redesign teaching material so that the fundamentals and the big picture are complementary to the new details and students are not confronted with something progressively insurmountable.

Students, in recent years, have become something of a concern. Firstly, unlike 20 years ago, the current school grades do not seem to reflect the aptitudes. When a grade 'B' is equated to a fairly capable student some years back, today's straight 'A' students are often seen to struggle. Have schools been training students for grades at the expense of developing learning skills and fostering the spirit of inquiry?

There seems to be a greater expectation for spoon-feeding. Learning seems to be little more than preparation for exams. In spite of improving the learning environment, enthusiasm does not seem to be keeping pace. If one were to treat students as 'customers', with the prevailing attitudes to learning, the feedback system for ranking teachers could become a weapon that will see an erosion of educational standards as teachers adopt styles aimed primarily at pleasing students.

Behavioural changes progressively seem to reflect a lack of connectedness with the wider community manifesting at times as lack of due respect both towards classmates as well as the teacher. Is the class getting too big to foster a sense of group identity? Or is there a weakness in the selection process for admission? Perhaps part of the answer lies in a traditional family environment where strong values were instilled at an early stage in a relatively non-competitive, secure and loving environment. For the average human child, this process went on for many years well into the teens. It may be either too late or mistimed to try and instill values concerning a sense of community, of caring and sharing as well as respect in a school environment where students are essentially competing for the same cake! Is it too late for change?

While the trends in the development of knowledge and emerging new technologies will have a continued impact on



The Centre for Development of Teaching and Learning (CDTL) provides a wide range of services and facilities to promote the teaching, learning and research programmes of the National University of Singapore. These include teaching and learning support, research on educational development issues, as well as instructional design and development.

editorial information

Guest Writers Scott Fritzen; Joel Lee; Zhou Shufeng; Lily Chong; K. Rajendran; Vernon Oh .

Contributors to 'From the Faculties: Teaching & Learning Highlights': Zubair Amin; Kuldip Singh; Chua Siew Beng; GP Rangaiah.

Advisor Daphne Pan

Editors Sharon Koh; Teo Siok Tuan

Graphic Design Ma Lin Lin

Photography Frederick Chew
(unless provided by authors)

© 2005 **CDTLink** is a triannual publication of the Centre for Development of Teaching and Learning. An online version is available through the CDTL website.

The views and opinions expressed or implied in **CDTLink** are solely those of the writers and are not necessarily endorsed by CDTL. The reproduction in whole or in part of any material in this publication without the written permission of CDTL is expressly prohibited.

Contributions on teaching and learning topics, as well as feedback on this issue, are welcome and should be addressed to:

The Editor, CDTLink
Centre for Development of Teaching and Learning
National University of Singapore
Central Library Annexe, Level 6
10 Kent Ridge Crescent, Singapore 119260
Tel: (65) 6874-3052 • Fax: (65) 6777-0342
Email: cdtpost@nus.edu.sg
<http://www.cdtl.nus.edu.sg>

the way teaching develops, it is becoming harder to see how the present day student will impact educational styles in a desirably positive way. The once indispensable ally to the development of teaching seems to have taken on a diminishing role. Meanwhile, the search for directions in teaching continues amidst the changing scenery and is likely to be a lasting challenge to those in the profession. ■