

Teaching Teaching

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During the NUS term break (May–July 2004), members of the Law Faculty’s Legal Writing Team had the opportunity to share their teaching expertise with colleagues in Hong Kong University and National University of Laos.

Legal Skills in Hong Kong

Associate Professor Eleanor Wong, director of the Legal Writing Programme, and deputy directors Helena Whalen-Bridge and Lim Lei Theng, conducted a two-day workshop on “Teaching Legal Skills” to more than 30 law practitioners who were recruited to teach basic legal skills, such as writing, analysis and research at Hong Kong University (HKU). The workshop was held in Hong Kong from 22–23 May 2004. It arose out of an earlier visit by Eleanor to Hong Kong during which she consulted with the deanery of HKU’s law faculty on the NUS experience in launching its Legal Writing Programme. HKU was interested to learn from the NUS Legal Writing Team how HKU could revamp their legal skills course, particularly the way in which legal skills were taught to ensure active learning by students.

The workshop covered topics like how to establish a discussion-conducive environment, how to use group-



Summing up learning points in Hong Kong



Socratic interaction in Laos

work to achieve different learning and behavioural objectives, how to give timely and effective feedback on written assignments and oral presentations, and how to structure learning experiences that stimulate students to form independent opinions, take positions, defend their positions and challenge each other.

Rather than lecture about their experiences, the teaching methodology for the workshop *modeled*

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and *applied* the interactive methods that the trainers were trying to teach. All the sessions either featured a real-time demonstration by the trainers and/or required hands-on participation and application of the principles being discussed. For example, participants learnt how to give effective feedback on oral presentations in an exercise using rotating trios group work in which each group member had to:

1. give an oral presentation on the criteria for good oral presentations,
2. critique an oral presentation, and
3. critique a critique!

Then, in the review session of this exercise, the trainers pulled together the learning points through a Socratic-style question and answer session.

The session was so useful that the NUS Legal Writing Team has been invited back to Hong Kong to consult and train on other aspects of skills teaching.

Interactive Teaching in Laos

Barely a month later, Eleanor and Lei Theng were on a plane again, this time to Vientiane, where they conducted a three-day workshop for more than 40 members of the Faculty of Law and Political Science at the National University of Laos. This workshop was organised under the auspices of a technical aid programme sponsored by the Swedish International Development Agency (SIDA). A representative from SIDA, who visited NUS earlier in the year, had sat in some of the Legal Writing classes and, liking what he saw, invited the team to Laos.

Over three days (23–25 June 2004), Eleanor and Lei Theng shared how to use Interactive Teaching methods. Topics covered included the use of group work and strategies to overcome systemic and cultural impediments to interactive learning. The group also considered how to do more with less in an environment where resources were limited. For example, participants shared how there were very few textbooks and written materials in Lao, and how many teaching aids that we took for granted (e.g. overhead/PowerPoint projectors) were short in supply.

One major challenge of the Laos workshop was that the majority of the participants did not speak English well. The trainers therefore had to creatively adapt their workshop exercises to include the non-English speakers without sacrificing energy, pace, depth of discussion and opportunity for feedback. Some of the

strategies which were effective in teaching this group with mixed language abilities included:

1. encouraging break-out group activity to be conducted in whatever language the participants wished but ensuring that the ‘reporting back’ session be in English so that trainers could engage with rapporteurs, and
2. providing more instructions in writing (even if in English) and allowing more reporting in writing (also English) because this allowed participants to proceed at their own pace without being put ‘on the spot’ as oral reporting/instructing tends to do.

Interestingly, the trainers found translation an ineffective way of conducting any interactive/responsive session. The energy loss (in the time it took to translate from English to Lao, obtain a response in Lao and translate that back to English) was palpable and sapping. At best, translation worked only for straightforward lectures.

Conclusion

In both sessions, the trainers were excited to be able to share what they know. They also felt humbled by the enthusiasm and commitment of their Asian neighbours. In Laos, in particular, bumping down the narrow dirt road that led to the FLP campus, driving past bleating goats and the occasional cow, they were reminded of the paradox—one really doesn’t need very much in order to teach well as long as one is prepared to give everything in the effort.

Armed with these experiences (and some new gastronomic knowledge), the Law Faculty’s Legal Writing Team looks forward to learning and sharing more about teaching whether within Singapore or in locations a little further flung. ■



Giving feedback on stimulated classes taught by our Lao friends

Using Sources Critically; Or, Avoiding Plagiarism

Assistant Professor Lo Mun Hou
University Scholars Programme

It was one of those moments that warmed many a pedagogue's usually-cold heart. For a writing exercise, I had asked my students to compare two paragraphs, both of which grapple with a complex essay by a philosopher who I will, for the sake of convenience, call X. Since we had read and extensively discussed X's essay in the module, I didn't have to familiarise my students with it. In giving them these two paragraphs, which essentially made similar points in different ways, I posed the following two questions to my students. Firstly, which of these paragraph writers is guilty of plagiarism? (At this point, the students are already familiar with Harvey [1998] who explains plagiarism systematically and lucidly). Secondly, which of these writers has done a better job of 'working critically with the source material'?

To each 'individual' question, all the students in my class gave the correct answer. This really wasn't that difficult, since, of the two paragraphs, one was discernibly using X's ideas without proper credit and citation, and that same paragraph also fumbled when it came to expressing its own relation to X's work.

No, what gratified me was the fact that many of my students noticed that my two queries were really one, that the answer to the first—and the *reason* for the answer—was also the answer to the second. For instance, a student wrote:

I feel that Writer #2 not only does a good job [of] avoiding plagiarism, but she also has done a very thorough close reading of [X's] paragraph. She makes close reference to the text and exemplifies [X's] ideas by the analysis of her own examples... Further, Writer #2 expands upon [X's] argument. [An example follows.] Here, we see that Writer #2 does not merely refer extensively to [X's] ideas, but she formulates her own as well.

In other words, Writer #2, as my student points out, (1) cites ("close reference") and rigorously analyses ("close reading") X's work, (2) then builds upon (or "exemplifies" and "expands upon") those ideas, thereby "formulat[ing]" new ones, and because

of this approach, (3) avoided plagiarism. Another student responded along similar lines, ending with this observation: "The irony is that although the second essay has quoted and used much (sic) of [X's] ideas and key phrases, the fact that it gives acknowledgement clearly aids the argument to be more credible and convincing." The writer that my students preferred avoided plagiarism precisely *because* he or she worked critically with the source material.

I did this exercise for a class I teach for the University Scholars Programme, UWC 2101N "Writing and Critical Thinking: Clothing Identities", in which I insist that "using sources critically" is inextricable from any effort to "avoid plagiarism". By "using sources critically", I mean that students should first seek to understand the materials and figure out how their ideas are related to these sources (hopefully, of course, they differ in some ways; otherwise, as I tell my students, there is no reason or motive for their essays). Conceived this way, the important job of getting students to understand the concept of plagiarism is no longer, or at least not merely, a technical matter of making sure that students know where to put a footnote or how many quoted lines need to be indented. Instead, plagiarism becomes the rewarding by-product of being able to think critically and clearly about where you stand in an original relation to an existing body of knowledge (i.e. your sources).

Achieving this objective can, of course, be difficult, but having this aim in mind has helped me develop ways of teaching that guide students towards this goal. For example, earlier on in the module, I lay the groundwork for the above-described assignment on plagiarism through a close reading exercise. Since I see plagiarism as best avoided when a student (1) comprehends and can delineate his or her source materials, (2) then is able to comment on or rethink the source material, it makes sense to prompt students into writing and thinking this way. Thus, in the initial close reading exercise, I ask students to pick out a

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very short paragraph from any essay we have read for class, transcribe it, and then do two things. Firstly, I ask them to write a short section that effectively, concisely and accurately summarises what they have just transcribed (i.e. quoted). This segment tells their readers what the quotation is ‘about’. Secondly, they have to write a separate section that offers a gloss, an explication or an interrogation of the quoted passage. Here, I emphasise, they should be analysing, interpreting or close-reading the passage, showing something in it that isn’t immediately apparent. This gloss, in other words, should not repeat what their quoted writer had just said. Obviously (and perhaps even simplistically), this exercise tries to get students to make a distinction between *grasping* an existing idea and *providing a take* on it. Equipped with this skill, my students are later able to recognise, when we get around to doing the above-mentioned plagiarism

exercise, when someone doesn’t engage well with the material, and when someone plagiarises as a result.

The better a student is able to rigorously understand and express someone else’s ideas, the better he or she will be able to say what he or she is adding to them. From this, almost incidentally, guarding against plagiarism becomes paramount *because no good writing and critical thinking is possible without it*. In short, I have been arguing that “using sources critically” and “avoiding plagiarism” are two sides of the same coin, and recognising this has helped me tremendously in my teaching.

Reference

Harvey, G. (1998). ‘Misuse of Sources’, *Writing with Sources: A Guide for Students*. Indianapolis and Cambridge: Hackett. pp. 23–34. ■

Evidence-based Educational Practice: The Case for Faculty Development in Teaching

Dr Tay Sook Muay

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Introduction

This is the era of rapid globalisation linked with knowledge revolution, economic and triple bottom line accountability coupled with relentlessly exciting advances in groundbreaking medical breakthrough discoveries. The quality and character of the medical students and more importantly, the desired learning outcomes of medical schools and the types of medical school graduates (i.e. future medical doctors) are under scrutiny. And this is rightfully so.

Didactical teaching and rote-learning of yore are inadequate to prepare medical students for the patients’ needs and expectations today. The rate of electronic as well as biomedical technological advances make the acquisition, management and critique of information increasingly pivotal. Yet this dynamic state must be comfortably juxtaposed with a

core pool of ‘fixed’ and familiar knowledge. So how is the medical faculty going to rise to these new needs? Are these needs more or less uniformly recognised? Are the conviction and consensus critical within the medical fraternity strong enough to overcome the administrative and financial scepticism: ‘If it ain’t broken, don’t fix it’?

Challenges and Issues

In considering the evidence for the efficacy of faculty development in medical teaching, one ought to bear in mind that the heterogeneity of faculty development programmes poses a challenge to their evaluation. These programmes can be a one-time (few hours’) course, several days of conference, several months or even one- to two-year fellowships.

Another challenge to evaluating the literature on faculty development in medical teaching is the heterogeneous models of teaching and learning. As Wilkerson and Irby (1998) pointed out, behavioural theory was the dominant model of teaching and learning in the 1970s. Learning was perceived as a change in behaviour from drill, practice and feedback. Hence, faculty development focused on teaching behaviours then. The 1980s saw a move towards the cognitive theory in which learning was viewed as an active construction of meaning. Faculty development then focused on engaging learners and understanding learning styles. The primary focus and desired outcome then were attitudes to teaching questionnaires. Come 1990, the model slanted towards the social learning theory in which learning was viewed as socialisation into a new knowledge community. The focus was on a role model and on outcomes like peer reviews, reflective statements and teaching portfolios.

However, these categorisations are artificial. In reality, the practice is fluid and medical teaching encompasses some of each domain—behaviours, attitudes and knowledge of learning styles, role modelling and reflection. Therefore a positive or negative result based on the outcomes of one model may not necessarily apply to the outcomes of other models.

Another issue is that of selection bias. For most of these faculty development programmes, the participants were motivated faculty who voluntarily sought to develop their teaching skills. Whether these motivated individuals would have improved their teaching without the development programmes is yet unknown.

Importance and Significance of Faculty Development

There is emerging evidence that better teaching results in more learning. Faculty development may also have other less defined benefits—it sends the message clearly to both faculty and learners, the value placed on teaching by funding it. In addition, the experience and encounters of a teacher which can inspire students and colleagues cannot be completely captured in measurable outcomes. All these contribute towards building and nurturing a community of learners through an integrated multidisciplinary approach so pivotal in ensuring holistic medical care for patients.

The best teachers change not only the factual base of students but also the perceptual filter through which they view and process knowledge by teaching

self-renewal and rekindling intellectual passion. All clinicians etch the images of clinical teachers who have left an enduring legacy in their hearts and minds. Since medical teaching is characterised by such a close mentorship-apprenticeship kind of relationship, how can we not invest in leaving an enduring legacy?

The other significant trend is that of having to keep up with the changing demands and evolving needs of patient and medical care. These shifts are brought about in part by globalisation, more knowledgeable patients and revised healthcare funding with pressures exerted by an aging population that is further exacerbated by a shrinking birth rate.

The rate of biomedical advances and the cracking of the human genotype provide a huge potential for genetic engineering. This, coupled with the increasing sophistication in stem cell research and application, not only offers exciting potential for medical therapy, but also opens a Pandora's box of ethical issues. It is therefore imperative that the medical school produces students who are not just scientifically and clinically competent but also rooted in sound human, medical and research ethics. The desired learning outcome must take into consideration the capabilities of being flexible, nimble, collaborative and introspective. The active and reflective learner is part of the desired outcome.

Life, death and dignity are increasingly urgent issues that need to be grappled with as medical practitioners face the world's aging population. A good teacher must be able to demonstrate and show the ropes of decision making processes or at least stimulate the search for the various aspects to be considered.

Conclusion

An increased recognition of the value of faculty development means more resources and attention will be dedicated towards the development of medical faculty's teaching skills. This is most appropriate because the pervading long-held belief towards medical education seems to be 'if it ain't broken, don't fix it'. It is time to challenge the philosophical intent and relevance of the belief in light of the challenges and issues facing the medical profession.

Reference

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Embracing Cultural Diversity and Enhancing Students' Learning Environment

Professor Elsie Chan

Faculty of Human and Social Development,
University of Victoria



Introduction

The student populations of higher education institutions are transforming through global change and becoming more diverse. Hence, it has become important to create an inclusive community of critical, independent learners led by informed, accepting and encouraging educators.

Cultural Diversity Issues

1. Addressing Diversity

When cultural diversity is not addressed explicitly in the classroom, students can easily misinterpret that diversity is not essential to their education or their success in future careers. Educators need to seek a balance between holding high expectations for all students regardless of who they are and using different techniques to teach individuals effectively, helping each student to succeed (Bucher, 2000).

2. The Language Barrier

Language is a major issue for foreign students in any country. It affects student participation in group discussions as well as students' ability to express ideas in front of a class. Since they are not communicating in their first language, students may need extra time to think and process information. Their progress may be stymied by the use of colloquialisms, idioms, academic jargon as well as a lack of vocabulary. Instead of recognising this, teachers and students may assume that foreign students are not good at critical thinking.

One foreign student I interviewed cited the phrase 'twist your arm' as an idiom she did not understand when it was used in the classroom. On another occasion, the teacher asked for her

opinion on the objectiveness of a passage, but the student was unable to answer the teacher's question because she did not understand the word 'objectiveness'. The teacher then assumed that the student had no critical thinking skills.

3. Communication Differences

Effective communication can be hindered by ignoring cultural differences. For example, Asian students generally tend to be quieter than North American students. They have been taught not to speak unless they are asked to as a sign of respect to their teachers and elders. The give-and-take between teachers and students in a North American classroom can thus be intimidating. According to one Japanese student, group discussions were new to her when she was studying at a Canadian university. Hence, when she was placed in such a setting, she felt that she was being put on the spot and did not know what to do.

An individual's attitudes are based on one's values which will in turn affect how he/she will communicate across different cultures. Intercultural communication can be hindered without an understanding of other's values (McArthur-Blair, 1995). By ignoring a student's cultural background, the teacher is not addressing the student's values and therefore hindering intercultural communication.

4. Stereotyping Foreign Students

Teachers tend to stereotype foreign students according to what they know about different cultures and sometimes forget to look at each

person as an individual. For example, in North America, we have created the stereotype that all Asian students are good at mathematics. Because of this stereotype, one student who was afraid of mathematics did not dare speak up in class if he did not understand something; he was afraid of being ridiculed. If students are not comfortable enough to voice their concerns, it is difficult for the teacher to make the necessary arrangements to address their needs and create an appropriate learning environment for the students.

Strategies to Create an Inclusive Learning Environment

1. Empowering Prior Knowledge

As a teacher, I recognise that mistakes are inevitable in the course of learning. Therefore, I choose evaluation methods that provide frequent feedback to help students develop a sense of competence. This will help students with difficulties speaking up feel confident to join in the class discussions. I also use problem-based learning assignments (Chan & Kaufman, 2002) with real-life research examples to foster an active and practical learning approach that is relevant to all students from all cultures.

2. Agreeing to Disagree

Instructors need to employ questioning techniques that involve students on a more personal level. They need to be allowed to respond in a way that not only reflects their diversity but also exposes their fellow students to these differences. In the classroom, instructors can acknowledge differences among students and let them discover what they can learn from one another. This may mean 'agreeing to disagree'.

For example, at the beginning of a school term, instructors can ask students to describe what respect means in their cultures. This will promote an inclusive learning environment where students feel comfortable to take risks and participate in discussions on any topic during the rest of the school term. In order to respect diverse cultures, it is necessary to first have a consensus on the classroom's ground rules.

Challenges of Implementation

It is impossible for instructors to grasp the nuances of different cultures and choose words and phrases that are acceptable in every culture. It is also a challenge to determine when to use jargon when delivering lectures, especially to a group of students whose first language is not English.

When teaching large classes, it is challenging for teachers to create a sense of community—especially in the first few weeks when teachers need to pay special attention to determine what kinds of diversity need to be addressed. It can be difficult to come to a consensus when discussing the ground rules. Moreover, students may become impatient with the teacher if the he/she tries to include everyone's opinions all the time.

Conclusion

Students from different cultures bring with them a set of experiences and traditions that are important to address and honour. Students need to be empowered to learn independently based on their own cultures, and also be given the opportunity to learn about each other's cultural differences. Our goal is to lead the way in addressing and honouring cultural diversity in teaching and learning as much as possible to create an effective learning environment for all students. In this way, we can help students develop skills to cope with an ever-shrinking world.

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TLHE

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1–3 December 2004

**Theme: Individual and Institutional
Self-assessment in Higher Education**

*Individual and Institutional
Self-assessment in
Higher Education*

CDTL will be conducting its first international conference on Teaching and Learning in Higher Education. The conference aims to examine the problems of self-assessment from the points of view of both teachers and institutions. The conference will also cover related topics such as:

- Pedagogy/ Teaching Methodology
- Institutional/ Self-assessment
- Cross-cultural/ Student Learning
- Distance/ e-Learning
- Student Assessment
- Problem-based Learning
- Technology in Education
- Thinking/Creativity
- Professional Development/ Personal Development Planning

Two pre-symposium workshops (<http://www.cdtl.nus.edu.sg/tlhe/preconf.htm>) will be conducted respectively by Brenda Smith and Peggy Maki on 30 November 2004.

Keynote Speakers

Brenda Smith, *Higher Education Academy, United Kingdom*

Peggy Maki, *former Senior Scholar, American Association for Higher Education*

Invited Speakers

Caroline Baillie, *Queens University, Canada*

Jean Michel, *Ecole Nationale des Ponts et Chauss, France*

Joan Collinge, *Simon Fraser University, Canada*

David Dewhurst, *College of Medicine & Veterinary Medicine, University of Edinburgh, United Kingdom*

Lewis Elton, *University College London, United Kingdom*

Lynne Baldwin, *Brunel University, Uxbridge, United Kingdom*

Matthew Gwee, *National University of Singapore, Singapore*

Peck Cho, *Michigan Technological University*

Enquiry

For more information please refer to <http://www.cdtl.nus.edu.sg/tlhe/default.htm> or contact:

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Congratulations to 2003/2004 Excellent Teacher Award Winners

Faculty of Science

A/P Aslaksen, Helmer
Dr Chan Kin Yee
A/P Chan Lai Wah
Dr Chiu Cheng Hsin
Prof Chou Loke Ming
A/P Feng Yuan Ping
A/P Gan Fah Fatt
Dr Goh Say Song
Prof Goh Suat Hong
Prof Koh Khee Meng
Prof Leung Pak Hing
A/P Lim Lee Yong
A/P Ling San
A/P Loh Chiang Shiong
A/P Ng Kee Lin, Peter
Prof Oh Choo Hiap
Dr Singh, Kuldip
Dr Sow Chong Haur
A/P Tan, Victor
A/P Teo Ho Khoon, Edward
Dr Xue Jun Min
A/P Zhou Weibiao

School of Design & Environment

A/P Christudason, Alice
Ms Ho Oi Yee, Belinda
Dr Ling Yean Yng
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Dr Ooi Thian Leong, Joseph
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Dr Ang, Susan
A/P Bishop, Ryan
Dr Chan, Angelique
Dr Chng Huang Hoon
Dr Daquila, Teofilo
Dr D'Cruz, Mark
Dr Dubois, Thomas
Dr Ho Kong Weng
Dr Keck, Stephen Lee
Dr Kenneth Paul Tan*
A/P Lim Teck Neo, Cecilia
Dr Lockhart, Bruce
Dr Martin-Lau, Philippe
A/P Murfett, Malcolm
Miss Niemann, Rita
A/P Patke, Rajeev
A/P Ragurama K
Dr Sim Tick Ngee
A/P Singh, Bilveer
Dr Sridharan, Kripa
A/P Straughan, Paulin
Ms Walker, Izumi

Faculty of Dentistry

A/P Foong Weng Chiong, Kelvin
Dr Mok Yuen Yue, Betty

* nominated by both faculties

Faculty of Engineering

A/P Balasubramanian, Rajasekhar
Dr Chen Chao Yu, Peter
A/P Chua Kim Huat, David
A/P Kawi Sibudjing
A/P Khursheed, Anjam
Dr Lee Chul-Ung
A/P Li Le-Wei
A/P Luo Siao Chung
A/P Ng Chun Sum
Prof Ng Kim Choon
Dr Ng Szu Hui
A/P Panda, Sanjib Kumar
A/P Rangaiah G.P.
A/P Ranganath, Surendra
A/P Seah Kar Heng
Dr Tan Kay Chen
A/P Tan Siew Ann
Prof Teoh Swee Hin
A/P Thong Thiam Long, John
A/P Xu Yong Ping

School of Computing

Mr Anderson, Hugh
Ms Bhandar, Mamata
A/P Kankanhalli, Mohan
Dr Pan Shan-Ling
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Mr Tan, Aaron
Dr Tan, Gary

Centre for English Language & Communication

Ms Chew Moh Leen

University Scholars Programme

Dr Irina Aristarkhova
Dr Kenneth Paul Tan*
Dr Lo Mun Ho
A/P Teo Chu Ying,
A/P Teo Chu Ying, Albert*

Faculty of Law

Mrs Helena M Whalen-Bridge
A/P Kumaralingam Amirthalingam
A/P Lim Chin Leng
A/P Wong, Eleanor

School of Business

A/P Chu-Chun-Lin Singfat
Dr Lim Kwang Hui
A.P Prem N Shamdasani
A/P Teo Chu Ying, Albert*

For more information, please visit http://www.cdtl.nus.edu.sg/towards/eta_winners.htm ■

Announcement

CDTL will be moving to a 5-day work week with effect from December 1, 2004. Our new working hours will be:

Monday–Thursday 8:30am–6:00pm
Friday 8:30am–5:30pm

CDTL will however continue to run some workshops on Saturdays. These updates will be announced and posted on our website <http://www.cdtl.nus.edu.sg/cdtlhome/workshop.htm>. ■

Welcome!

CDTL would like to welcome as Associate Director

Associate Professor John Whalen-Bridge,
Department of English Language and Literature

Goodbye!

We would also like to thank:

Ms Koh Hwee Bee, our Administrative Officer who left in July 2004 for all her invaluable support in the past and wish her the best for her future endeavours. ■

Managing Change in Medical Education

Professor David Prideaux

Head, Department of Medical Education
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Introduction

The late twentieth century and the early twenty-first have been marked by a world-wide process of change in medical education. New medical schools and courses have been developed and significant reforms have been undertaken in existing ones. These include changes in curriculum content, adoption of new approaches to teaching, learning and assessment or changing the length of courses and criteria for student admission. All such schools, whether creating new courses, changing existing ones or developing parallel tracks, have to pay significant attention to the management of change.

Approaches to Educational Change

In the literature two main approaches to educational change have been defined: centralised or 'top-down' and decentralised or 'bottom-up'. The latter approach has been preferred because it claims to build ownership and commitment to the change (Fullan, 1992; Fullan & Hargreaves, 1992; Grant & Gale, 1989; Smyth, 1991). A decentralised approach was used at Flinders University in 1996 when the School of Medicine moved to a four-year graduate entry course with accompanying changes in teaching, learning and curriculum. The main strategy in the decentralised approach was to develop a structure of 18 committees and working parties to ensure staff participation in the change. The change has been successfully adopted but a staff survey conducted in 1999 revealed that the decision-making structure was

time-consuming and that there were issues of long term sustainability. This prompted a comparative study by the author of four international medical schools, two of which were changing existing courses while the other two were developing new ones, to define factors that were important in managing the change process.

Factors Affecting the Change Process

The study revealed four major factors which had affected the change process at the schools (Figure 1). These were:

- the external forces,
- the nature of the change itself,
- the nature of the pre-existing change culture,
- the change mechanisms adopted.

Negative external forces such as threats to survival or accreditation were associated with the two schools that were changing existing courses. The two remaining schools had embraced positive external forces in creating new programmes. This brought both legitimation and resources to their endeavours.

There were similar differences in the change mechanisms adopted. Decentralised approaches to change were associated with the two schools

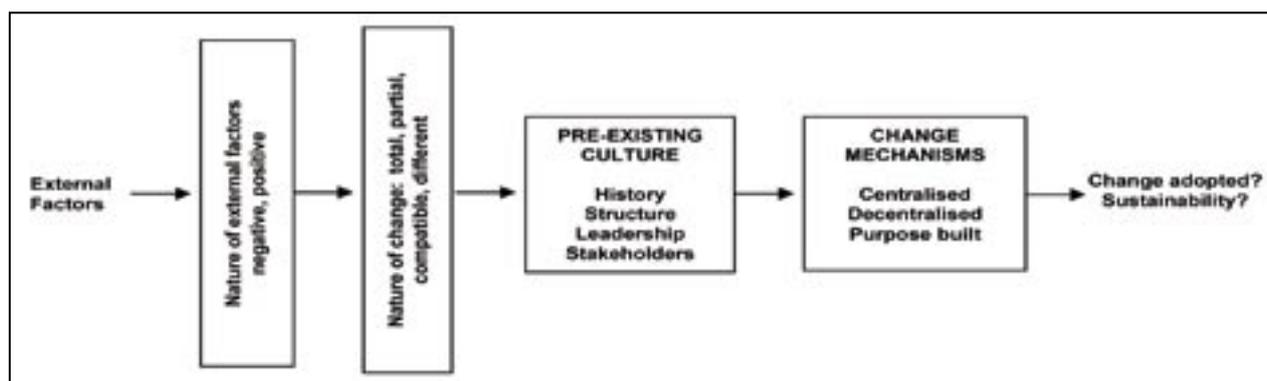


Figure 1. Factors affecting the change process

changing courses. These were necessary to build staff ownership and commitment to the new programmes. More centralised approaches were adopted in the two schools creating new programmes. In these cases, small teams of staff, recruited specifically for the new courses, worked in what were called ‘purpose-built’ structures.

The nature of the change was important too. Total changes required more attention than the partial parallel track undertaken at one of the schools. Not surprisingly, aspects of changes which were compatible with existing practices were the easiest to achieve. More specific and focused change strategies had been adopted where changes were incompatible with existing practices.

In all four schools the nature of the existing culture of change had to be embraced. Traditional cultures required attention to leadership models, complex organisations with multiple stakeholders required attention to communication approaches, and departments had to be engaged where there was essentially no departmental ownership of the curriculum.

Conclusion

The study, although small at this stage, has shown that it is no longer useful to approach the management of change as either being just centralised or decentralised. Rather change should be conceptualised as ‘dynamic, complex and open’ (Wheatley, 1999).

In managing change, the mechanisms need to be sensitive to the nature of the change itself, the culture in which it is to be implemented and the external environment rather than building upon pre-conceived notions of what approaches are effective and what are not. Purpose-built structures are required to match the characteristics of each organisation.

Managing change is also a long term issue. In the approaches taken by all four schools, there were questions about the long term sustainability of the mechanisms used. Fullan (1992), one of the supporters of decentralised approaches, now argues that change must not be seen as a one-off event. If it is to be successful an ‘ongoing culture of change’ built on staff development, then teacher maintenance must be instituted. This is important for all those who contemplate and manage change.

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Using Online Tutorials for Teaching Large Classes

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Teaching a large class is different from teaching a class of moderate size in many ways. Among others, one of the difficulties is that teaching staff may not have sufficient time to give students regular assignments and monitor their progress by going through the students’ work personally. Students also suffer from the lack of timely feedback from the lecturers.

This is particularly true in our teaching of PC1431 “Physics IE” & PC1432 “Physics IIE” to as many as 1,500 first-year engineering students. To overcome this, we have adopted an online tutorial system where students are given weekly assignments to work on. Since the answers are submitted electronically and marked by the system, students can receive feedback instantaneously.

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Teaching & Learning HIGHLIGHTS

Centre for Language Studies

Providing Electronic Self-access for German as a Foreign Language

Self-access has been advocated by educational researchers and practitioners as an excellent means of providing opportunities for greater individualisation in learning and for promoting learner autonomy. 'e-daf' (<http://courseware.nus.edu.sg/e-daf/>), an electronic self-access centre for German language learners, is conceptualised to fulfill these objectives by capitalising on the advantages of current Internet technologies.

Learning objects in 'e-daf' are developed and created by the centre's German language faculty, some with the support from the Centre for Instructional Technology. Supplementing classroom materials, the vast range of learning objects and the various forms of differentiation in the interactive exercises and tasks allow learners to plan and carry out learning activities at their preferred pace, place and time according to their proficiency levels, needs and interests. Resources are organised in study paths, corresponding to the progression of the individual language modules, to provide easy orientation and navigation.

The developmental efforts since April 2000 have led to an increased awareness of and interest in computer-assisted and network-based language learning research among the German language faculty. ■



'e-daf'—A Virtual German Language Learning Environment

University Scholars Office

Building Bridges of Communication between Science and Humanities

Few students who signed up for the University Scholars Programme's "Writing and Critical Thinking: Multidisciplinary Perspectives on Mind" (UCW 2101R) come into the class 'bilingual' in the languages of both science and the humanities. As a way of getting the science and humanities students to 'speak a common language', the students are required to co-create an Online Research Folder on IVLE where they can mutually inform one another about the major terminology and concepts specific to their fields. Their IVLE postings expand on some term mentioned—but not explicitly defined—in one of the class readings and the subsequent research required to supply such explanations provides practice in locating and citing authoritative secondary sources (e.g. standard textbook accounts and encyclopedia entries). The final product not only facilitates their ability to write and think intelligently across various academic disciplines but is also a publicly-shared resource of their joint creation that each co-author can consult to inform their future essay writing as well. As such, it is a genuinely 'multidisciplinary text' in the best sense of the term. ■

Faculty of Science

Practical Demonstrations in Lecture Theatre

Sometimes students are lost in a class due to a lack of perceptual knowledge. This is especially so when the lecture topics are process-related. Part of the lecture contents of ML 3102 “Ceramic Materials” involves ceramic processing, which is rather difficult to follow without visuals of a typical processing set-up for processing ceramic materials. To help students better understand the principles and operations behind processing ceramic materials, some practical demonstrations were conducted on several key processing set-ups for ceramic materials, and at the same time, the underlying theories and working principles are delivered in the lecture theatre. In addition, some real ceramic materials and components were also brought in to stimulate students’ interest. Students have benefited considerably from these demonstrations and visuals of real ceramic materials and components. Furthermore, a laboratory tour was arranged for students to visit the relevant research laboratories, thereby allowing students to build some ideas on the newest development in the subject area. ■

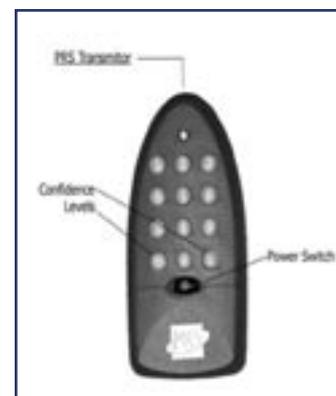
Faculty of Medicine

Try PISER for Interactive and Collaborative Medical Teaching

The traditional lecture is generally thought to be an efficient method of conveying information to large- and medium-sized groups of students. In many medical schools, lectures are still the main mode of formal teaching. Unfortunately, it is difficult to engage students during lectures. Questions posed to students seldom draw a satisfactory response and are usually answered by only a motivated minority. The lecturer is often left wondering if the majority of the students have grasped the main concepts. The other significant problem of the traditional lecture is that there is a lack of constructive interaction among students during lectures. The main form of communication among them is background chatter that contributes little to learning.

The PISER (Peer Instruction & Student Electronic Response) Method

Lectures are given in short segments interrupted by multiple-choice concept-based questions emphasising key principles. Students are asked to answer these questions using an electronic response system (Student Electronic Response). From the instantaneous electronic display of the answer statistics, the lecturer can assess the students’ grasp of the subject. If necessary, they are asked to discuss the question with their peers before answering the same question again (Peer Instruction). The group discussions followed by re-confirmation of answers encourage constructive peer interaction and collaborative learning. ■



The Personal Response System (PRS) is easy to set up and use. Please note that this picture was taken off the internet.

Enriched Science and Engineering Education using the Educational Laboratory Virtual Instrumentation Suite (ELVIS): Sharing Successes across ASEAN

Chandran Nair, Managing Director
National Instruments Singapore

One of the primary challenges facing universities across the globe is the waning interest of the young in engineering and sciences. Several educators and students have indicated that an important aspect missing in science and technology education is the lack of illustration of practical uses of theoretical concepts. The use of virtual instrumentation by leading universities around the world has begun to bear fruit in bridging the gap between theory and practice. Professor Paul Dixon from California State University at San Bernardino conceptualised a system—the Educational Laboratory Virtual Instrumentation Suite (ELVIS) that helped emphasise the practical aspects of theoretical concepts in Physics.

The National Instruments Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) developed in collaboration with Professor Dixon is a LabVIEW-based design and prototyping environment for Science and Engineering laboratories in universities. To spur interest in Engineering and Science, universities strive to provide hands-on and project-based education that encourages creativity and problem solving. However,

educators face significant logistical challenges because instruments in traditional laboratory can be expensive, rigid and fragmented, offering only fixed functions. To overcome these challenges, National Instruments offers ELVIS as a unique, affordable and interactive platform that students can use to apply theory to real-world applications.

NI ELVIS consists of LabVIEW-based virtual instruments, a multifunction data acquisition device, a custom-designed benchtop workstation and prototyping board.

This combination provides a ready-to-use suite of common laboratory instruments including an oscilloscope, function generator, digital multi-meter and programmable power supplies along with a bode analyzer, dynamic signal analyzer and arbitrary waveform generator. Based on LabVIEW, NI ELVIS provides complete data acquisition and prototyping capabilities. The system is also ideal for integrating virtual instrumentation into academic coursework from beginner to advanced project-based classes.

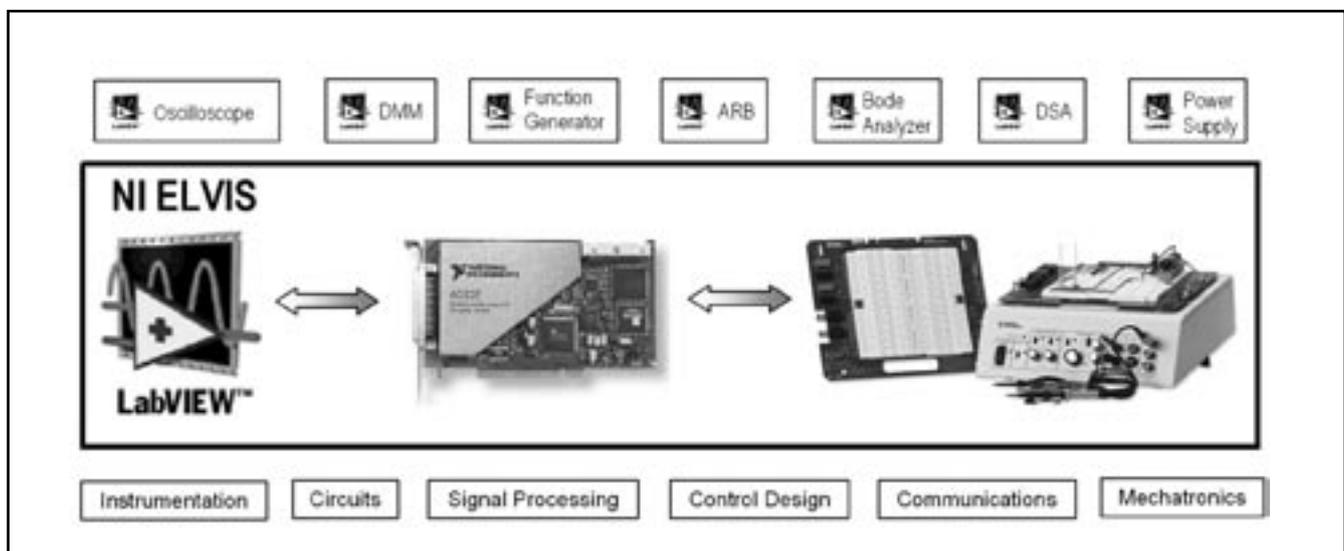


Figure 1. NI ELVIS

The typical applications are in circuit design and learning analog and digital electronics, measurements in mechanical, electrical, biomedical and physics laboratories. Additionally, NI ELVIS has been used extensively in teaching data acquisition and signal conditioning, live demonstration of concepts in a lecture hall, communications and control applications for electrical and mechanical engineering.

The NI ELVIS is also used extensively in many different areas of teaching across ASEAN. It is used in the Electrical and Electronics department of Monash University in Malaysia. The Singapore Institute of Management's Biomedical Engineering laboratory is equipped with NI ELVIS to demonstrate Biophysics concepts. In Singapore Polytechnic, ELVIS is used in the Bio-Engineering laboratories to teach students the fundamentals of bio-sensors.

“As industry adoption of virtual instrumentation for measurement, control and design grows, hands-on training in this area is becoming essential for every engineering and science student,” said Professor Archie Holmes, Department of Electrical and Computer Engineering at University of Texas at Austin. “NI ELVIS helps us incorporate virtual instrumentation into our curriculum by providing multiple capabilities in one compact, affordable system. With this system, we can give our students unique hands-on experience that will help them meet the design challenges they will face after graduation.”

NI ELVIS makes it easy for students to build custom circuits and interfaces. Using the removable prototyping board, students can design their own electronic circuits, signal conditioning capabilities and small electromechanical devices. The NI ELVIS workstation, LabVIEW software and the National Instruments Data Acquisition (NI DAQ) board have extensive applications in the academic disciplines of Engineering, Physical Sciences and Biological Sciences. The system is open not only in terms of software, but also its custom signal conditioning hardware.

Uses for NI ELVIS

The NI ELVIS system is well suited for teaching basic electronics and circuit design to students in electrical, mechanical and biomedical engineering. The suite offers full testing, measurement and data

saving capabilities needed for such training. The removable prototype board offers students the ability to build circuits at home, thus using laboratory time more effectively. NI ELVIS instruments (e.g. bode analyser and curve tracer) offer an opportunity to teach advanced level courses in signal analysis and processing. Students can construct software filters in LabVIEW and hardware filters on the prototyping board and then compare their performance. For the first time, students have the ability to see the effects of hardware anti-aliasing filters on signals.

Mechanical engineering students can learn sensor and transducer measurements in addition to basic circuit design. The prototype board offers an ideal platform for building custom signal conditioning for various sensors and transducers. Custom sensor adapters can also be installed on the prototype board. The programmable power supply can also provide excitation for accelerometers used in strain measurements. NI ELVIS thus offers an opportunity for a mechanical engineering department to standardise its instruments on a single platform for multiple laboratories.

Biomedical engineering departments face challenges similar to those in mechanical engineering departments. A student typically learns basic electronics and builds instruments (e.g. *Elektro-Kardiographie* [EKG] monitor). Along with signal conditioning capabilities for the EKG sensors, the suite of instruments is also ideal for testing circuits as students build appropriate signal conditioning.

The NI ELVIS platform is an ideal electronics and circuit design trainer for Physics students. It offers a photoelectric multiplier or light detector so that students can learn about signal conditioning for common sensors. It is also possible to build high-gain, low-noise circuits on a Printed Circuit Board (PCB) and use these circuits in modern physics laboratories.

Finally NI ELVIS comes with a large number of academic resources and ready-to-use laboratory experiments. Additional courseware information in a wide variety of fields including mechatronics, digital image processing, fundamentals of analog and digital electronics and much more can be accessed from <http://www.ni.com/academic/>. ■

Using Online Tutorials for Teaching Large Classes

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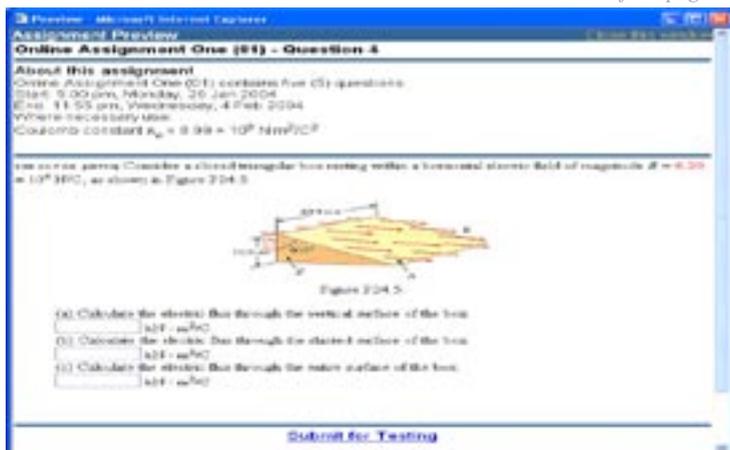


Figure 1. A sample question from WebAssign. Numbers in red (7.00 in the example shown here) font are randomly generated.

The objectives of the online assignments are to prepare students for the week's lecture and to encourage them to review contents covered in the previous lecture. The problems of each assignment are carefully selected and are typically related to contents covered during the week.

We have evaluated a number of online systems before selecting *WebAssign*. In comparison to other similar products, *WebAssign* has the largest database of physics problems and its cost is relatively low. The numerical values in almost all the questions are randomly generated within specified ranges, so that each student sees the same problem with different values. Therefore, different answers are expected from students. This minimises the problem of students copying answers from each other.

To encourage participation, students' performance accounts for part of the module's continuous assessment. As the objective of the online assignments is to enforce student learning, they are given a relatively small weightage in the module's assessment. We have also implemented a unique scheme of awarding marks. Students are allowed to make multiple attempts for all questions. However, for each additional attempt, the mark for each question is reduced by 20% (i.e. if an answer is correct at the first attempt, students are awarded full marks for that question. If the answer is incorrect at the first attempt but is correct at the second attempt, students are awarded 80% of the marks, and so on). This is to encourage students to really think about the question before solving it, rather than attempting it by trial and error. To increase the system's effectiveness, we added hints and suggestions for further reading to the system. These are shown if students enter wrong answers.

We have been using the system for two years. Based on our observations and student feedback, the objectives of the online assignment have been achieved. The weekly online



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.

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tutorial assignment generates a lot of discussion among students, through which they gain a better understanding of the main principles. The system is popular amongst the students as it provides a means for them to confirm their answers and get instant feedback. It complements our normal small group tutorial discussions very well. We are currently working with the Centre for Instructional Technology to make more effective use of the system and to develop our own online tutorial system. ■