## INSIDE

# A New Faculty & Curriculum Structure for the Arts & Social Sciences

**Dean's Office**
Faculty of
Arts & Social Sciences



*Photo supplied by Dean's Office, FASS*

The Faculty of Arts & Social Sciences introduced a new faculty and curriculum structure on 1 July 2001 *(see page 2)*, which seeks to offer a challenging learning experience for its students and to give focus to selected strategic research areas.

The establishment of **Three Divisions** in the Faculty facilitates the introduction of a new **Exposure Requirement** for all fresh FASS students: incoming students beginning from the 2001–2002 academic year are required to read and pass at least one module each from the three divisions. This requirement aims at introducing our students to the rich array of subjects that the Faculty offers in the three major areas of Asian Studies, Humanities, and Social Sciences. With exposure, students would be in a position to make an informed choice of the subject or subjects in which they wish to pursue a major.

In addition to the 18 undergraduate subjects taught by the 14 departments and programmes in the three divisions, students can also offer modules in two cross-departmental programmes— American Studies and European Studies—administered by the Faculty's new **Office of Programmes**.

The Office of Programmes plays an important role in coordinating and developing multi-disciplinary, cross-departmental programmes that draw on the strengths of the Faculty and other Faculties within NUS. Each programme will have its own academic convenor and/or curricular committee to ensure standards and chart development. Free from the encumbrance of having to develop the necessary infrastructure before introducing a new subject, the Office of Programmes can respond quickly to changes in the academic world and introduce courses of study that are innovative and at the cutting edge of research. The Office of Programmes will also be administering the Singapore Studies modules, which are offered as a part of the University Requirements.

Learning a foreign language has been recognised in many leading universities as an important part of undergraduate education. The newly established **Centre for Language Studies** will oversee all language learning and create greater synergies for innovative language teaching in the Faculty. The content of the language learning programmes will be further enhanced as the Centre will stay abreast of emerging technologies and the latest relevant developments in the field. Currently, the Faculty offers language instruction in Bahasa Indonesia, Chinese, Japanese, Malay, Tamil, Thai, Vietnamese, French and German.

Undergraduate curriculum design must strike a careful balance between depth and breath. The new FASS curriculum structure allows students to develop a degree of **depth** in a single major or a shared major. It also allows greater **breadth** in curriculum choices, thus contributing to producing well-rounded graduates who will be adept in confronting change and creating value in a world characterised by globalisation and rapid development.

## A New Faculty and Curriculum Structure...

The Faculty offers a single-major programme and a shared-major programme leading to a B.A., B.A. (Hons), or B.Soc.Sc. (Hons) degree. A shared major offers the curricular flexibility to combine two subjects into a major. This should facilitate cross-faculty collaboration, in line with NUS's drive towards building a borderless knowledge enterprise.

In addition to the Exposure requirement and the Major requirement, there is also a Breadth requirement, where students will read courses from a subject outside their major(s). This complements the University Requirements and further enables students to develop a wider intellectual horizon, as they become active participants in the knowledge enterprise.

With a new undergraduate curriculum structure now in place, the Faculty is examining its graduate curriculum with the view of improving its existing offerings and introducing new programmes. The first step in introducing a new graduate curriculum is the recent launch of two new programmes: Master in Public Management under the Public Policy Programme, and Master of Social Sciences (International Studies) under the Office of Programmes.

These are important initiatives in strategic areas. The International Studies programme focuses on International Economics, International Relations and Development Studies. It provides intellectual as well as practical training to equip students for a variety of careers in these fields, and develops research and scholarship in International Studies. While the programme of study is international in scope, special attention will be given to case studies in the Asian context.

The Master in Public Management programme (MPM) is a one-year programme targeted at accomplished senior officials who hold responsible policy and decision-making positions and whose leadership is acknowledged within their own organisations. Anchored in the Southeast Asian context, the programme offers MPM candidates a curriculum that will enhance their role in public sector leadership. The candidates will not only learn new perspectives about governance but will also gain invaluable practical experience during their attachment to Singapore ministries and agencies. In addition, they go through a seven-week programme at the John F. Kennedy School of Government at Harvard University, with a one-week field trip in Washington DC.

The new curriculum structure should facilitate a dynamic learning experience. The quality of the learning experience itself, however, depends on both students and faculty. In this respect, the Faculty will continue its effort in building a conducive environment for teaching and learning. Innovative teaching methods should be encouraged. This is not to say that 'traditional' teaching methods are necessarily ineffective; instead, the point is that teaching requires careful reflection and constant attention. At the same time, a vibrant research culture is necessary. New research brings excitement and renews passion for the knowledge enterprise. If what academics do can be described as a labour of love, the challenge for the Faculty then is to nurture the love of learning such that it will not become 'laborious', but flourishes naturally in an environment that values scholarship and innovation. ■

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| Division | Department/Programme | Subjects Offered |
|---|---|---|
| Asian Studies Division | Department of Chinese Studies | Chinese Language, Chinese Studies |
| | Department of Malay Studies | Malay Studies |
| | Department of Japanese Studies | Japanese Studies |
| | Southeast Asian Studies Programme | Southeast Asian Studies |
| | South Asian Studies Programme | South Asian Studies |
| Humanities Division | Department of English Language & Literature | English Language, English Literature, Theatre Studies |
| | Department of History | History |
| | Department of Philosophy | Philosophy |
| Social Sciences Division | Department of Economics | Economics |
| | Department of Geography | Geography |
| | Information & Communications Management Programme | Information & Communications Management |
| | Department of Political Science | Political Science |
| | Department of Social Work & Psychology | Psychology, Social Work |
| | Department of Sociology | Sociology |

| **Other New Initiatives** | | |
|---|---|---|
| Office of Programmes | American Studies Programme | |
| | European Studies Programme | |
| | Singapore Studies Modules | |
| | Master of Social Sciences (International Studies) | |
| Centre for Language Studies | Offers language instruction in Indonesian, Chinese, Japanese, Malay, Tamil, Thai, Vietnamese, French and German | |
| Public Policy Programme | Master in Public Policy | |
| | Master in Public Management | |

# Using Writing to Drive Learning

**Assistant Professor Sunita Anne Abraham**
Department of English Language & Literature

If we believe that "students learn best by constructing and evaluating the knowledge that we wish them to acquire" (Mohanan, 2000:3), then we are likely to view students as research apprentices who gain ownership of knowledge by raising their own questions about existing knowledge. What I would like to highlight in this short piece is the key role of language, particularly writing, in the process of student knowledge-construction.

I think most of us would agree that the key to 'knowing' a subject or discipline is understanding its unique ways of knowing. Whatever is known, however, is inseparable from the symbols (mostly words) in which the knowing is codified. It follows then that knowledge of an academic discipline crucially involves the discursive ability to speak, read and write the discourses of that discipline.

Writing, I would argue, plays an especially important role in this equation. Most literacy researchers agree that writing is more than speech written down. And, although saying it first and then writing it down may be the way in which children first learn to write, the writing process associated with knowledge-building tends to be one in which "the thoughts come into existence through the composing process itself, beginning as inchoate entities and gradually, by dint of much rethinking and restating, taking the form of fully developed thoughts" (Bereiter & Scardamalia, 1987:10). In other words, writing has a mathetic[1] potential (Prabhu, 1989; Halliday, 1975 & 1985) which spoken interaction does not quite match because of the different nature of the two processes. In spoken interaction, meaning is usually constructed more collaboratively, whereas writing requires that "shared information among co-present interlocutors…be made more fully explicit for readers distant in time and space" (Haneda & Wells, 2000:432). This struggle to make things clear for one's readers necessitates clarifying ideas for oneself, making writing a powerful means of developing understanding of an idea. Moreover, because of its relative slowness and durability, writing allows for extensive revision, 're-visioning' of ideas.

Thus, while oral interaction offers a useful starting place to sensitise students to the notion of knowledge-construction as a dialogic process (an ongoing rational argument involving multiple voices), the highest levels of knowledge-building clearly call for writing to take its rightful place in the university curriculum—as an integral means of driving deep, independent learning, rather than an optional extra.

Developing syllabi that use writing to drive learning, however, is easier said than done. Subject specialists may feel less than confident when talking about writing in their field, because while they possess both procedural and declarative knowledge of content, they may possess procedural but not declarative/metacognitive knowledge of how writing in their chosen field works. Yet, if students are to receive a holistic apprenticeship, then we clearly need to view learning as an apprenticeship not just to the modes of inquiry/research paradigms of a discipline, but also its writing/discursive paradigms.

Perhaps, as a start, we could do two things. One would be to ascertain whether the writing tasks we set invite students to engage in problem-finding—wrestling with an issue in order to create a viable research space by articulating a worthwhile research question which they then attempt to find rationally satisfying answers to. By inviting students to determine their own questions we would be encouraging them to *author* texts, in the sense of being *authorities* on their chosen topic, which is what expert writers tend to do/be.

Next, in order to 'walk the talk' in terms of conveying the idea of writing as dialogic, and of texts as works-in-progress, we might attempt incorporating peer feedback and discussion of student-writing as a regular feature of the modules we teach. As writing researchers Haneda and Wells (2000:433) point out, "writing creates a more permanent representation of meaning than speech, whatever the field or discipline concerned. Consequently, the text can become the focus of discussion within the community in an effort to understand it, improve it, or respond to it in some way that gives voice to the community's interest and concerns". Such careful reading and constructive response to one another's writing would offer students invaluable practice in writing for colleagues with potentially conflicting value systems, assumptions, background knowledge and, possibly, different purposes for reading—the very task that knowledge-creators the world over are engaged in as they write position papers, journal articles, and reports of various kinds: i.e. have the papers etc. reviewed; then revise them, based on the peer feedback obtained.

In short, the trinity of reading/writing/revising, far from being a cosmetic detail, mirrors the real-life activity of master knowledge-builders, and thus represents a concrete way to actualise the stated pedagogical objective of treating learners as apprentice knowledge-builders. And, situating texts and their producers against the backdrop of a community's values and discourse conventions moves literacy into the real world, where knowledge is capital, and literacy, an integral means of creating it.

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1. Linguist Michael Halliday (1985:7) suggests that every human language is a potential for meaning in two ways: "it is a resource for doing with; and, it is a resource for thinking with". Halliday (1975:3) labels these two functions of language—"language as doing/action" and "language as learning/reflection"—the pragmatic and mathetic functions, respectively. Language in its mathetic function involves "the use of the symbolic system not as a means of acting on reality but as a means of learning about reality" (p. 106) "serving in the construction of reality" (p. 75). Prabhu (1989) argues that this function of language often receives far less attention than the pragmatic function.

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# Facilitating the Shift from '**Tell Me**' to '**Involve Me**' in GER

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The way we learn is summarised by the old adage, "Tell me and I forget, show me and I remember, involve me and I understand." The saying has not changed, but currently the focus of learning and the perception of a 'good' education have shifted from 'tell me' (i.e. the traditional passive absorption of core content) to 'involve me' (i.e. an active process, requiring thinking and understanding by the learner). This is because the required *basic workforce skills* of today's world are broad understanding, critical thinking and life-long learning habits that quickly adapt to new job-skill demands in an ever-changing workplace environment, where specific job skills are not as important as the *basic workforce skills,* which are needed to *work smarter.*

Prior to 1970, the 'tell me' behavioural doctrine (Skinner) of instructing core content and tightly sequencing curricula was the education paradigm of the United States. In April 1983, the publication of 'An Open Letter to the American People: A Nation at Risk, The Imperative for Educational Reform' by The National Commission on Excellence in Education challenged this mode of teaching and called for a pedagogical shift from transmitting a body of expected core knowledge that is largely memorised to one that is largely process-oriented (cognitive and constructive learning). Eleven years later, on the 31st March 1994, the *Goals 2000: Educate America Act* was enacted into law. It mandated the education of students to use their minds well, so that they may be prepared for responsible citizenship, further learning, and productive employment in the nation's modern economy.

General Education Requirement (GER) is the educational strategy adopted by NUS (NUS, 2001) and many research-based universities throughout the world, including the US, to meet the requirement for 'work-smart' basic workforce skills. Central to the GER initiative is inquiry-based learning and 'general' distribution requirements. Through inquiry-based understanding of the procedures and practices in diverse disciplines, GER exposes students to the modes of inquiry in multiple disciplines, and trains them to think in various settings.

Inquiry is an approach to learning that involves the Socratic method (Dye, 1999) of exploring and asking questions to seek cognitive and constructive understanding (Hartshorne & Weiss and Burke, 1997; North Central Education Laboratory, 2001; Piaget). It must be pointed out that a shift in the learning paradigm from 'tell me' to 'involve me' should also involve a corresponding shift in the teaching paradigm from instructing to facilitating. Unlike passive absorption of intact knowledge structures, which is Platonic and common to all (Plato; Skinner), thinking is an active Socratic process that is contextual and unique to each individual. Different things suggest their own appropriate meaning and tell their own unique stories in very different ways with different persons (Dewey, 1991). In the inquiry-based 'involve me' mode of learning, the teacher does not teach thinking. Thinking and life-long learning habits cannot be taught, but can be facilitated in both cognitive and constructive instructional designs. The shift in roles of the teacher from traditional 'tell me' mode to facilitative 'involve me' mode is outlined in Table 1 below.

*Table 1. Leadership roles between 'tell me' and 'involve me' modes of learning*

| Group Element | Traditional Teacher 'Tell Me' Mode | Facilitative Leader 'Involve Me' Mode |
|---|---|---|
| **Group Process** | | |
| Communication | Teacher controls communication. | Leader facilitates communication using ground rules. Students initiate communication. |
| Conflict management | Teacher manages conflicts. | Leader teaches students how to manage their own conflicts. |
| Problem solving | Teacher solves the problems. | Leader teaches the model for solving problems. Leader ensures that students have access to resources to solve problems. Students take responsibility for identifying and solving the problems they encounter. |
| Decision making | Teacher makes the decisions, either alone, or in consultation with students. | Students make many decisions on their own or as a group. Leader and students make decisions by consensus. |
| Boundary management | Teacher is responsible for all interactions. | Leader teaches students how to communicate, coordinate, and solve problems with outsiders. Leader and students jointly determine the boundary management approach. |
| **Group Structure** | | |
| Group norms | Teacher establishes norms. | Leader shares core values, principles, and ground rules with students as potential bases for group norms. |
| Sufficient time | Teacher sets time limits and deadlines for tasks. | Leader teaches students how to plan and manage time. Students use relevant information and support from leader to determine deadlines for tasks. |

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|  |  |  |
|---|---|---|
| Clearly defined roles | Teacher determines role of students. | Students use relevant information and support from leader to define and agree on their roles. |
| Clear goals | Teacher sets goals. | Leader helps students set the appropriate goals. |
| **Organisational Context** | | |
| Resources | Teacher is responsible for supplying all resources. | Leader ensures students have knowledge and skills to access required resources. Students take responsibility for identifying and obtaining required resources. |
| Feedback | Teacher provides feedback. | Leader helps students learn how to provide and seek feedback effectively. Leader and students give feedback to each other and critique their own performances jointly through self-critiques. |
| Rewards structure | Teacher implements rewards. | Leader ensures students understand the reward system, which includes both intrinsic and extrinsic elements. |

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# *Reflections* on *Case Teaching*

**Associate Professor Ter Kah Leng**
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Department of Business Policy

*Photo supplied by author*

*This essay is intended not to add to the abundant literature on case-based instruction, but to offer insights of local relevance to others similarly minded to use cases as a teaching strategy.*

Cases are said to be unique pedagogical tools that require *active learning* and *skilful facilitation*. The former is borne out succinctly in the definition of a case as "any set of materials that can be employed to make students *learn by doing*"[1] (emphasis added). Hence, the following material may qualify as cases: news stories/personal stories, reports, appraisals, studies, case write-ups, case histories, videos/films and simulation activities, etc. A case, however, goes beyond a mere narrative of key facts or controversial events to complex issues and alternative courses of action that decision makers are forced to grapple with.[2] It is these features that distinguish cases from other teaching material.

## Why use cases?

What prompted me to use case teaching is its long association with the training of lawyers and business executives. I have since found that it works equally well in the exposure of business students to the legal environment of business.

Before you embark on case teaching, it is useful to reflect on whether it is appropriate in your module and if so, what it is you are trying to do and why. In my subject, I use cases to achieve the following learning objectives:

- Reflect *real-life situations*[3] which expose and prepare students to face the real world
- Develop *problem-solving skills*[4]
- Become *independent learners*[5] as well as team players[6]
- Be actively engaged in *class participation and interaction* between students and facilitator and between students *inter se*
- Share values, perspectives, executive experience (where appropriate)
- Enhance *critical thinking skills*[7]
- Develop *communication and presentation skills*

# Reflections on Case Teaching

## How do you pick a case?

Cases are discipline specific. I use the following criteria to select what I think is a good case:

- Achieves most of the learning objectives
- Provides good instruction/learning points
- Is novel/breaks new ground
- Is open-ended, allowing various interpretations and solutions

## The facilitator's role in class

In the first class, I would explain the facilitator's role, introduce the case method and state the expectations required. A correct understanding of the respective roles of facilitator and students is fundamental to the success of case teaching. I would emphasise that a facilitator is there to:

- Manage, yet not assume centre stage
- Guide/facilitate[8]
- Clarify or focus (where needed)
- Wrap up the proceedings
- Ensure that the learning objectives are being met

An emphasis on the cooperative roles between facilitator and students as partners in learning is necessary to pre-empt any student misconception of insufficient guidance or input or, if the discussion develops in many different ways, of a lack of crowd-control on the part of the facilitator!

## The students' role

To enable optimum contribution, I usually break up a tutorial or seminar group into smaller sub-groups of three or four members each. The role of each small group is to study the facts of a prescribed case; identify the problems; offer solutions; study the decision made by the decision maker (if provided); evaluate the solutions and discuss the likely impact of that case on commercial (or other) conduct. At the end of the day, each group makes a class presentation or role-plays the case. This provides ample opportunity for audience participation in the form of comment, critique, queries or challenges.

## Evaluating participation

Situations might arise where it becomes obvious that there has been unequal contribution to the so-called 'team effort'. A possible solution is to avoid giving the same mark to every group member irrespective of the effort contributed, but to introduce *self-evaluation* as well as *peer evaluation*: "How much effort do you think you have put in?" "How much effort do others think you have put in?" Another measure is to prevent any group member from making class presentations on more than one occasion.

## Some obstacles to adopting case teaching

These are likely obstacles in the local context:

- Course not suitable
- Lack of case materials
- Case writing/editing is time-consuming
- Cases do not give an overview of the subject—they cannot do everything
- More preparation on the part of students
- Big class size/lack of time

- More content and discussion to monitor
- Case unstructured/low student tolerance for ambiguity
- Resistance to independent learning and active class participation

I have had to work out or around some of these problems before I could confidently adopt the case teaching method.

## Conclusion: Two cases in point

Park and Ngo were executives from non-English speaking backgrounds. They enrolled in the MBA programme filled with expectation until they encountered my module requiring extensive case reading. Far from being daunted, they ploughed through the legalese. After his first presentation, Ngo dropped the module. Park soldiered on to complete the module. But he could not complete the programme: his company recalled him following the financial crises that hit the Asian Tigers. Before leaving, Park emailed me, saying (apart from the course benefits) how much he had improved his English by having to read all those cases. Furthermore, the opportunity to deliver oral presentations and to field questions (from contentious classmates) really gave him the confidence to speak English. With regards to Ngo, he reappeared a semester later. I observed: "I think we have met." He replied: "I took a semester off from your module to master enough English to tackle the cases." At the end of the day, Ngo achieved an excellent grade.

Cases teach learners to learn by doing. What they learn by doing may surpass what anyone can teach.

## Notes

1. Professor Stephen D. Wrage. 'Best Case Analysis: What Makes a Good Case and Where to Find the One You Need'. *International Studies Notes* 19, No. 2, Spring 1994, p. 21.

2. Professor Louis L. Ortmayer. 'Decisions and Dilemmas: Writing Case Studies in International Affairs'. *International Studies Notes* 19, No. 2, Spring 1994, p. 29.

3. Cases illustrate the practical application of principles.

4. This calls for decision-making—the recognition of the issues and the discussion of possible solutions, not necessarily the '*right answer*'.

5. Consistent with the paradigm shift from teacher-centred to student-centred learning.

6. This develops group dynamic skills.

7. Application, synthesis, analysis, reasoning, evaluation and argument; *not rote-learning*.

8. For example: by offering 'jumping off' points or posing challenging, open-ended questions. ■

## Using Writing to Drive Learning

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**6**

# A **New Approach** to
## Teaching Practical Physics

**Associate Professor Alfred Huan &
Assistant Professors Sow Chorng Haur
& Li Baowen**
Department of Physics

*From left: Dr Sow, A/Prof Huan, Dr Li*

The Department of Physics, NUS, has adopted a new approach in the teaching of practical physics to First Year undergraduates. This new method centres on a 45-minute discussion held prior to each practical session during which students are encouraged to explore various ideas and make use of commonplace knowledge towards the planning of a proposed experiment. Instead of readily accepting standard practices, students are engaged in problem solving and the added discussion enhances their appreciation and understanding of physics experimentation.

### The Reasons for Change

We started using this new approach due to the limitations of the traditional physics practical. A traditional lab session usually begins with a brief description of the apparatus and the experiment to be performed. Next, students muddle through a set of written instructions, obtaining and analysing data (that can sometimes be derived from reading their seniors' lab reports) and making feeble attempts at error analysis.

Despite encouragement from teaching staff, the traditional physics practical often fails to motivate and challenge students to learn science by discovery. Instead of concretely grasping the feasibility of their measurements, students tend to leave each session with a vague impression of the apparatus and methods they have used. For instance, First Year undergraduates generally fail to grasp the scale of basic physical quantities such as length, speed, density, etc. They barely know the difference between a micrometre and a millimetre or whether 100 volts is a lot harder to generate than 10 volts, even after they have made measurements with micrometer screw gauges and voltmeters.

In addition, because course work emphasises lectures and textbooks rather than practical work, students tend to regard lab sessions as perfunctory exercises to be performed to satisfy modular requirements. Consequently, learning takes second place to completing measurements as well as becomes a process of assimilating well-established facts that may be applied to a few hypothetical problems. So while teachers may be convinced that the laws of physics are founded on experiments and that experiments are an integral part of a physics education, it takes a great deal of effort to persuade students to be more enthusiastic towards laboratory learning.

### Our Solution

The failure of the traditional physics practical to promote deep learning is not an indictment of educators who certainly do not lack effort or ability. In truth, the problem is a universal, age-old one as experiments that can challenge students to utilise their creativity are very difficult to design, particularly at the freshmen level.

In our attempt to overcome the limitations of traditional physics lab sessions, we have decided to focus on how the broad objectives of an experiment (usually one that measures a physical quantity or verifies a certain law) are to be met with a given set of apparatus. In other words for each experiment, we carefully assess its instructional value and highlight the critical aspects of experimentation that are important for it to work *(see example on page 8)*. We then use these points to outline a discussion plan and rehearse the progression of practical ideas that will be introduced to the students in the course of discussion. The result is that students are confronted with an aim to realise the experiment and a problem to be solved with practical knowledge.

The discussion invariably begins at 'how' to arrive at a general scheme to attack the aim (or how to develop an overall strategy for engaging the problem). This then moves on to consider 'what' can be used in specific components of the set-up and 'why' some equipment are more suited than others for the experiment. Along the way, students are asked to draw upon their daily experiences and practical knowledge (e.g. the size of large mirrors, the highest rpm of rotating wheels, the wavelength of light) and make quick back-of-the-envelope estimates for essential quantities. They are encouraged to think of practical solutions from scratch, without recourse to standard procedures as far as is permissible. Following the discussion, they then perform the actual experiment (i.e. the regular experiment). In this format, the preceding discussion gives students a renewed perspective to perform the practical.

### Feedback

We have been pleasantly surprised by the end-of-semester feedback showing how popular this new approach is among students. Although there are detractors who would rather get on with finishing their experiment quickly, most students indicated they:

- enjoyed the practical sessions (some found the practicals were stress-free);
- were encouraged to participate actively in the discussion because of the relaxed atmosphere;
- gained an appreciation for the magnitude of physical quantities and their measurement;
- found they were more curious and aware of their surroundings;
- felt that the new approach reinforced what they learnt from the lectures.

### Conclusion

We believe that that success of using pre-practical discussions

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## A New Approach to Teaching Practical Physics

depends heavily on the presence of enthusiastic teachers/facilitators who possess the necessary handle on physical problems and strong familiarity with practical instrumentation. When supported with the necessary expertise, the approach can be easily adapted for other experimental sciences.

More importantly, we have realised from this discursive approach that teaching practical physics need not be confined to performing an experiment with a given set of equipment and instructions to follow. Conducting a task-oriented discussion first with the students helps to focus their minds on the actual practical session that follows. In the discussion,



the critical aspects of the experimental set-up are given real consideration and students can express their ideas without reserve. Although colleagues may argue that throwing students into the deep end (i.e. giving them minimal instructions) is the best way for them to learn, our experience thus far seems to indicate that local students do better when provoked into thinking. Hopefully, the benefits that students have gained from our laboratory will stay with them for some time. ∎

*Left & Above: A/Prof Huan and Dr Li, respectively, conducting practical lab discussions on 26 September 2001*

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### An example of a discussion outline based on an experiment on Photoelectricity

The photoelectric effect occurs when light is absorbed by electrons in a material and converted into kinetic energy. The result is the emission of the electrons from the material that can be collected by an electrode facing the emitting surface. Students are asked to imagine themselves as being in the days of Einstein (when he proposed an explanation of the observed effects) and have to think of how to test out Einstein's hypothesis by an experiment. With some guidance from teaching staff, students are systematically made to look at the reasons behind practical considerations such as the following:

- the general layout of the equipment (e.g. light source, emitting material, collecting electrode, current measuring device);
- the light source to be used (i.e. monochromatic and of sufficient quantum energy and intensity);
- a possible material that can emit light energy (i.e. usually alkali metals because of their small work-function values);
- the size, distance apart and geometry of the emitter and collector;
- the need for a vacuum (i.e. to prevent loss of electrons as they travel from emitter to collector and to keep metallic surfaces fresh).

Next, we show the students that data obtained would fall in a range that depends on correct instrumentation and careful analysis. We ask them to carefully assess the likely sources of error that may falsify conclusions and stress on critical points that would determine the success of such an experiment. After the discussion, the students then proceed to obtain their own data using apparatus in the laboratory. ∎

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## Thank You/Welcome

In the past few months, CDTL has experienced some staff changes. We would like to thank:

- A/Prof Tan Cheng Han, who stepped down as a CDTL Associate Director when he assumed the Deanship of the Law Faculty in May;
- A/Prof Wang Chien Ming, who stepped down as a CDTL Associate Director in October to assume the post of Vice-Dean at the Faculty of Engineering;
- Ms Neo Chee Szu, Administrative Officer, who left in August to take up a volunteer posting in Nepal under the auspices of the Singapore International Foundation;
- Ms Mok Leh Woon, temporary Research Assistant, who also left in August to pursue her doctorate in psychology at the University of Minnesota;

for all their invaluable support in the past and wish them well for their future endeavours.

At the same time, we welcome:

- A/Prof Winston Seah, Faculty of Engineering, who assumed the post of CDTL Associate Director in October; as well as
- Mr Alfred Low Hon Loon, Educational Technologist; and
- Ms Teo Kuan Yee, Administrative Officer;

who joined us on 6 August and 3 October respectively. ∎

# Problem-based Learning
## *Symposium 2001*

On 29 August 2001, CDTL conducted a one-day symposium on Problem-based Learning at the NUSS Kent Ridge Guild House. It was attended by 33 NUS staff members and 165 educators from the Ministry of Education, SAFTI Military Institute, Majlis Ugama Islam Singapura, Universiti Malaya, Multimedia University, Ngee Ann Polytechnic, Singapore Polytechnic, Temesek Polytechnic, Serangoon Junior College, Institute of Technical Education, Jurong Institute, various secondary schools and other private organisations. The guest of honour was Prof Chong Chi Tat, Provost, NUS.

As part of the day's programme, A/Profs Grace Ong and Lim Lum Peng (Faculty of Dentistry) and A/Profs Khoo Hoon Eng and Rethy Chhem (Faculty of Medicine), as well as Medical students Ms Cheryl Ngo Shufen and Mr Tay Junmin, shared their experiences of conducting and taking part in PBL. Prof K.P. Mohanan also presented, putting PBL in perspective; and Dr Hendrik Meyer-Ohle (Faculty of Arts & Social Sciences) and A/Prof W.A.M. Alwis (Faculty of Engineering) gave examples of applying PBL in their respective disciplines. (To view the speakers' PowerPoint notes, please go to: *http://www.cdtl.nus.edu.sg/pbl/ fr_pres.htm*.) Interspersed between presentations were opportunities for participants to seek clarifications from each speaker.

How successful the symposium was in introducing PBL to Singaporean educators can be seen in participants' feedback such as the following:

*'Interesting sessions – varied and presented clearly and systematically. The objectives of the symposium of raising awareness of PBL have been met.'*

*'Well balanced in the perspective presented. It had its strong points and yet allowed organisations to decide how to use PBL.'*

*'The symposium provides a lot of food for thought & certainly more reflection about PBL especially its effectiveness in a secondary school context.'* ■

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CDTL will be conducting its Second Symposium on Teaching and Learning in Higher Education to increase awareness of pedagogical issues that enhance teaching and learning. The theme is on the changes in learning processes and outcomes caused by the shift from the instruction to the learning paradigm. The official language of the symposium is English. A pre-symposium workshop will be conducted by eminent educationists on 3 September 2002. An exhibition showing the latest teaching aids/equipment and books on teaching and learning will also be held.

**Call for Papers:** Send 3 copies of abstracts (not exceeding 300 words) to the symposium secretariat by email, fax or post. Indicate clearly the corresponding author's mailing and email addresses as well as telephone and fax numbers. Authors of accepted abstracts will be asked to submit the final paper of 6 pages, including figures, tables and other illustrations. Both abstracts and final papers will be fully reviewed. The symposium proceedings will be published in book-form and made available to all participants. (*NB*: By submitting a paper, at least one author must register for the conference if the paper is accepted.)

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**Important Dates:**

| | |
|---|---|
| Submission of abstracts | 1 Dec 2001 |
| Preliminary acceptance | 2 Jan 2002 |
| Submission of 6-page manuscript *(3 hard copies and 1 soft copy)* | 1 March 2002 |
| Notification of final acceptance | 1 May 2002 |
| Final paper submission *(camera ready)* | 1 June 2002 |
| Early registration deadline | 1 July 2002 |

**Registration:** Registration fee for the symposium is S$400, if the payment is made before 1 July 2002, and S$450 after this date. (Cheques/bank drafts should be made payable to National University of Singapore). The fee will cover a copy of the symposium proceedings, admission to all sessions, lunch and refreshments. The registration fee for the pre-symposium workshops is S$100.

For more information and/or to register online, please refer to *http://www.cdtl.nus.edu.sg/tlhe/* or contact:

Ms Rita Roop
Centre for Development of Teaching & Learning
National University of Singapore
10 Kent Ridge Crescent, Singapore 119260
Email: *cdtrrk@nus.edu.sg*
Tel: 65-874 2071 • Fax: 65-777 0342 ■

# TEACHING&LEARNING highlights

## Faculty of Arts & Social Sciences

### Visual Ethography: Using Digital Video for Social Research

Next semester, a new course in *Visual Ethnography* will open to Third Year students of the Sociology Department and the Information & Communications Management Programme. It will teach students a critical appreciation of film as a documentary medium for social research and provide some hands-on training in digital video making. Because new digital media technologies have made video filming and editing equipment vastly cheaper and easier to use, it has now become feasible to train students in the use of video, which has potential applications in many fields of study. So far, student interest in the new course has been keen, and we hope to expand such courses in future.


*Kidlat Tahimik, independent film maker from the Philippines, speaking about his work*

In conjunction with this new initiative, a workshop was held on 19–20 February 2001, entitled *Visual Ethnography: New Horizons for Social Research Using Digital Media in Southeast Asia*, and organised by A/Prof Roxana Waterson, Dr Aileen Toohey and Dr Leong Wai Teng of the Sociology Department. In this workshop, various highly distinguished international, regional and local makers of ethnographic and documentary film shared their expertise in teaching film or video making. They also generated lively discussion on how digital media practices might contribute to social commentary, civil society, and cultural life in Singapore today. The fifty-plus workshop participants, drawn from across the Faculty as well as from outside the University, enjoyed two very full days of stimulating presentations, film screenings, and enthusiastic debate. ■

## Faculty of Engineering

### Introducing PBL in Transportation Engineering


*Interaction during a PBL session*

A problem-based learning (PBL) project was introduced into the course CE3121 Transportation Engineering in the first semester of 2000/2001. Students were divided into groups of about ten to evaluate the performance of an actual signalised intersection and make changes to improve its operation. With the lecturer and tutors serving only as facilitators, the students were left to organise themselves and acquire relevant knowledge and collect needed data to deal with the ill-defined problem. In the process, students had to contend with less-than-ideal site conditions, non-homogenous traffic, missing data and unique situations. The students were evaluated based on their individual participation in discussion sessions and their group presentation of their findings and experience.

From the feedback survey carried out two months after the project, students indicated strong learning benefits from the experience. Students who functioned as leaders or organisers appreciated learning critical-thinking and decision-making skills while those who acted as researchers gained in knowledge. Despite the positive interest shown in PBL, students still preferred tutorials and lectures because they acquired knowledge and skills faster through these conventional methods. But based on an assessment of their confidence level in solving problems, students appeared to retain better the knowledge and skills learned through the PBL project. ■

### Multiple-choice Questions on the Web

The usage of multiple-choice questions (MCQs) for teaching is often conceived as something that is done only at the last resort. Yet although they do not elicit creative answers, MCQs can go a long way in helping students deepen their understanding of the material covered in lectures. For instance, MCQs can be incorporated in the form of pop quizzes at the end of every chapter of each lesson. Putting MCQs on the Web is not uncommon. However, the facility in the TM1151/TC1412 Materials Science course has been designed to make it more personalised and interesting. Questions are posed randomly from a pool, making the system less predictable than looking through a list of questions. Students are also encouraged to try again until they get it right; a congratulatory message greets them when they do. The


*Sample question from web-based pop quiz*

positive feedback received from students thus far has made the effort of posting MCQs on the Web worthwhile. ■

## Faculty of Medicine

### Family Medicine Programme



*Medical students training with a General Practitioner in an ambulatory setting*

In response to health care needs of having more ambulatory care, a new Family Medicine Programme was designed to provide our students with more experience in primary health care and community medical services. The student is made to recognise that patients have physical, social and psychological dimensions in health and disease. The new programme commences in the second semester of this academic year and spans Years 3 and 4, providing a longer period of experiential learning with general practitioners in private and polyclinic settings. There will also be attachments to Paediatric and corporate practices. The focus will be on general consultation and counselling skills as well as special needs of children and the elderly in the community. Case studies, assignments and presentations will provide the interdisciplinary integration required in such community-based health care. Aspects of Family Medicine will be tested in the new Final Year examination. ■

## Faculty of Science

### Pharmacy Practice Preceptorship Programme: An Update

The Pharmacy Practice Preceptorship Programme was introduced in 1999 to provide an experiential learning platform for undergraduate pharmacy students to imbibe professional ethics and practices under the tutelage of experienced practitioners. A total of 64 Level 2 students participated in Part I (Community Pharmacy) of the programme in May to July 2001 at various NTUC Unity Healthcare Pharmacies, Guardian Pharmacies and the Retail Pharmacy of the National Cancer Centre. During the same period, 61 Level 3 students also participated in Part II (Hospital Pharmacy) at the Tan Tock Seng Hospital, KK Women's & Children's Hospital, Changi General Hospital, Singapore General Hospital, National University Hospital and Mt Elizabeth Hospital. One student



*Student Sylvia Beh with her preceptor, Albert Law, in Alberta (June 2001)*

took up an industrial attachment at the local SmithKline Beecham pharmaceutical production facilities. Two students arranged their own overseas programme—one in Alberta, Canada and another in Aberdeen, Scotland: both reported enriching exposure to the community and institutional pharmacy practices conducted overseas. ■

## School of Design & Environment

### 'Things Different': The First NUS Architecture Mobile Digital Design Studio



*Students taking part in Digital Design Studio*

The design of vibrant places as places of creativity and joy of life is becoming ever more important for architects. To plan them means to understand them. But what makes these places so inspiring and unmistakable? To uncover this secret, the Department of Architecture offered in July 2001 the first mobile digital design studio called 'Things Different', which was three times oversubscribed. The objective of this studio was to look at places differently—analytically—in order to highlight the components and their contribution to the vibrancy. This analytical approach using multimedia to represent knowledge nodes in a different way is crucial for the creative process to design things and places differently. The findings of this studio will be uploaded to *http://www.arch.nus.edu.sg* as a design guide by the end of this semester.

14 Apple Titanium Powerbooks and 4 Sony Digital Video cameras ensured the digital analysis and high-end creative representation of places on the spot; and wireless connection enabled file sharing and dynamic group arrangements and critiques outside the common static desktop computer oriented classroom. Apple and Sony Singapore and NUS CIT contributed to this studio, conducted by A/Prof Milton Tan (Head, Department of Architecture) and Dr Stephen Wittkopf (Leader, Design Computing). ■

*NB: All photos in this 'From the Faculties: Teaching & Learning Highlights' section supplied by respective authors*

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## ✳ *CDTL Brief* Online ✳

Have you checked out the **Interactive** version of *CDTL Brief* **Online**?

For stimulating topics, discussion forums, instant feedback forms, as well as links to web pages and illustrations related to the topics discussed, take a look at *http://www.cdtl.nus.edu.sg/brief*. ■

# Teaching through Testing

**Associate Professor Stephen Hsu**
Department of Preventive Dentistry

There is no doubt that examinations can dictate and shape the outcome of education more than any other form of learning activity. At the university level, students can learn and obtain information from various resources outside of a classroom. As self-directed learning and innovation/creativity are being emphasised in NUS, the design and quality of the examination (and the concomitant grading system) becomes increasingly important.

In this article, I wish to share how one particular assessment given to Second Year Dental students was conducted in 2000. The test aims to identify the weak/strong areas of students' learning in the 'Fluoride' module and to facilitate a self-directed learning process through the preparation of a take-home examination. In this take-home exam, students get into groups of two. Each group selects a topic from a list and then submits a group report (in electronic form) by the end of the first week after the vacation. There are three parts in the take-home exam as described below:

### Part I: Group reflection (30% of the final grade)

Part I is a closed-book cross-examination exercise for each group member to reflect on what he/she has learnt related to the specific topic chosen by the group and identify areas not mastered/learnt. After an unlimited period of preparation, the group members decide on the date/time/venue to cross-examine each other, taking turns to act as 'examiner'/'examinee'. The 'examiner' asks one question at a time and is allowed to help the 'examinee' only when he/she cannot answer correctly. When both students run out of questions, they outline and compile the knowledge they have each obtained in a *'we-know'* section. Then, they itemise what each member is ignorant of at that juncture in a '*do-not-know'* section. All the information is then saved in a *'part-1.doc'* file.

### Part II: Strengthening weak areas and establishing an information bank (30%)

Next, students are allowed to consult books/notes or go to the library to look for the information they lack. They then systemically organise and save the new data in a *'part-2.doc'* file (which incorporates the *'part-1.doc'* file). Diagram and/or charts can also be included with respective references attached. This *'part-2.doc'* file reveals how much and how deep students have learnt during and/or after cross-examining themselves.

### Part III: Expanding one's knowledge base (40%)

After reviewing their notes taken in Part II, students are expected to push beyond their existing knowledge base and raise at least two clinical questions/problems (of a creative nature) that both of them are unable to solve at that juncture. They then look for further information needed to solve these new problems and save their new data in a *'part-3.doc'* file.

The take-home exam moves away from the traditional one-hour sit-down mode of examination and allows students more freedom to assume ownership of their own learning. Hence, students are graded on their creativity and ability in:

- organising knowledge/ideas in a systematic and clear format;
- integrating the learnt information;
- selecting quality information;
- formulating creative questions; and
- self-directed learning/exploring.

I have been greatly encouraged by my three years of working with this special mode of 'teaching through testing'. The set-up/programme enables students to gain vital skills in teamwork, progressive self-learning, critical and creative thinking, provocative inquiring, and organisation-synthesis-application of knowledge learnt. Although some students have complained that their vacation time has been shortened, other students have expressed joy over the freedom and flexibility that this mode of learning affords. Others have also developed more confidence in critical thinking and reasoning skills essential in diagnosis and treatment planning in clinical situations. With some forethought, planning and modification, I am convinced that this method of 'teaching through testing' can also be applied quite successfully in other disciplines. ■

# *Virtual Island*:
# From e-Tools to Computer-aided Education

**Associate Professor W.A.M. Alwis**
CDTL Affiliate/Department of Civil Engineering
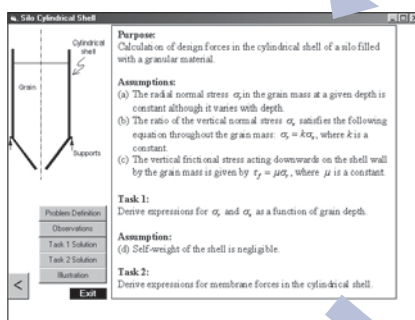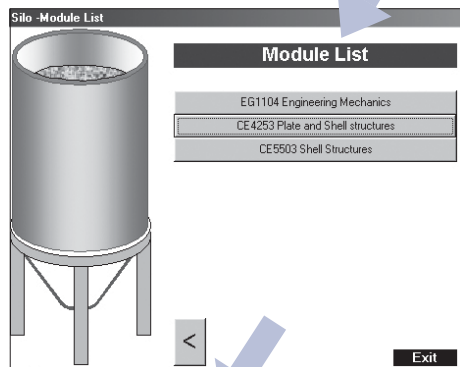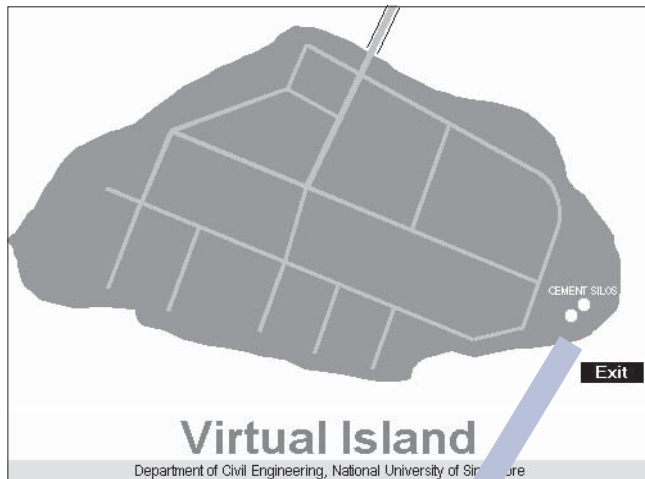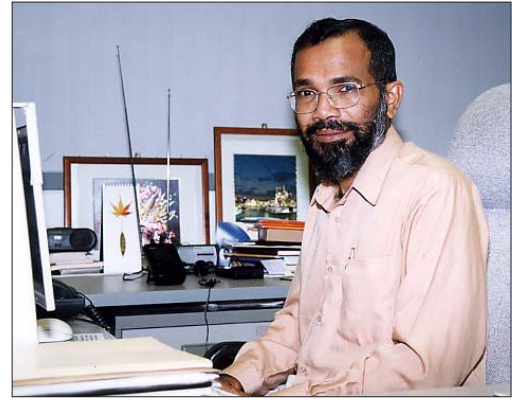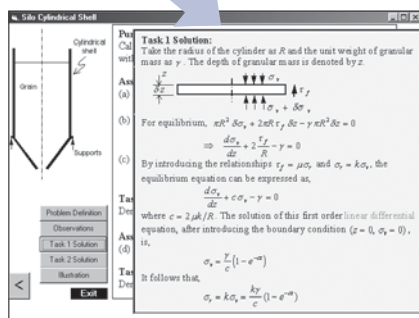
The metaphor 'island' is for the scope of a discipline. In an island there would always be things to explore, beyond 'what one knows', or the plot one occupies. 'Island' also reflects the context of that discipline, as the ever-present backdrop of the knowledge content, giving the content a discipline-specific meaning. In such an island, 'what one knows' has to grow slowly bit by bit, in little strands and small lumps, never in long leaps or large chunks. This construction process always has to be associated with the multitudes of contextual facets the knowledge is associated with. This process also requires active involvement by the learner who has to constantly keep the contexts in view to ensure that each piece of knowledge is meaningfully associated with the rest of the knowledge.

Along this line of thinking, the idea of the 'Virtual Island' was born. Virtual Island, as a concept, is a pedagogical strategy that is based on the belief that context-to-content connections of an integrated knowledge-structure would effectively facilitate the learning process. As a physical entity, it is a computer-based interconnected knowledge system wherein each connection is a context-to-content reference. The contexts in the physical system would be expressed visually where possible. For example, a silo will appear like a real silo with its accessories and supporting structures, not like the isolated abstract shell that usually appears in typical lecture notes. References to the silo and its accessories and supporting structures are made in the content covered in a variety of modules. Multiple references of this nature would ensure integration of the knowledge of anyone exploring the Virtual Island.

An implementation of the Virtual Island is currently being attempted at the Department of Civil Engineering with full support of the Head of the Department. A departmental committee oversees the developmental effort with technical support from a departmental IT support facility and the Engineering CITA.

In this implementation the entire collection of contexts referred to in the very first level of connections represents a civil engineering infrastructure system named 'Virtual Island'. The connections of the second level would typically refer to a context of a specific item of the infrastructure system, such as a building, a bridge, or a

*A chain of connections in the Virtual Island*

## Virtual Island

traffic network. As the chain of diverging connections progress away from the Virtual Island, the contexts would become more specific with references to items (e.g. reinforcing bar), happenings (e.g. hydraulic jump), concepts (e.g. Mises stress), or explanations (e.g. for eigen value). Although all connections can be traced back to the Virtual Island there would also be numerous cross-connections across modules and subject domains. For example a context in a geomechanics module may have a reference to a concept covered under a numerical-methods module, or alternatively, a context of a mathematical process may have a reference to a description presented in an engineering design module.

The fundamental strength of the Virtual Island concept as a practicable strategy lies in its flexibility. It allows multiple and even contradictory interpretations of a context. For example, the same column of a building may be interpreted as a steel column and a reinforced concrete column, with both interpretations co-existing in the Virtual Island. Another strength is the synergetic growth of potential value of the knowledge base with each added cross-connection. There is no minimum threshold coverage for a Virtual Island implementation

to become useful as an educational tool. Even small-scale developments can be useful on their own.

One can expect students to benefit from the Virtual Island in various ways depending on the nature of activity they would engage themselves with. Participation in developing knowledge components of Virtual Island would provide a strong foundation on the diverse nature of cross-connections and a deep appreciation of contexts in engineering work. Studying of theoretical constructs or design methodologies using Virtual Island will be an enriching experience because the visual processes of Virtual Island would complement the verbal/symbolic processes of the conventional teaching methods. In particular, students who have latent visual skills are expected to benefit immensely from Virtual Island. Engagement in any development activity related to Virtual Island will strengthen IT skills of students thereby widening their career prospects.

The construction of the Virtual Island is slowly but steadily progressing. Hopefully one day it will cover virtually the whole knowledge scope of the undergraduate civil engineering programme. ■

## Book Reviews
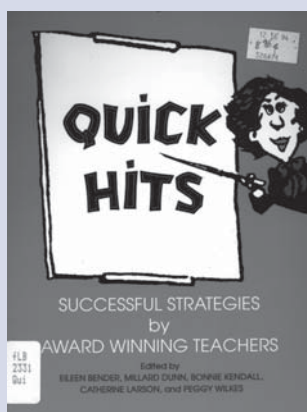
| Title: | *Quick Hits: Successful Strategies by Award Winning Teachers* |
|---|---|
| Authors: | Eileen Bender, Millard Dunn, Bonnie Kendall, Catherine Larson & Peggy Wilkes |
| Publisher: | Indiana University Press, Bloomington, 1994 |
| Pages: | 96 pp (Paperback) |
| Source: | CL Main Shelves |
| Call No.: | fLB 2331 Qui |

*Quick Hits* is a compilation of favourite teaching strategies shared by experienced teachers at Indiana University during retreats organised by the university's Faculty Colloquium on Excellence in Teaching. Contents include how to cope with First Days, Large Classes Motivation, Evaluation, Critical Thinking, Philosophies of Teaching and Learning, Writing, Exams, Teaching Non-traditional Adult Learners, Humour, Class Conduct, as well as Electronic Classrooms. Contributions are not only multi-disciplinary, but are brief and concisely written. Fast and easy reference for the busy teacher who wants to pick up and apply tested teaching tips in his/her own practice. ■
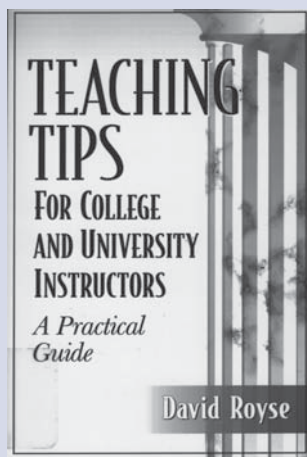
| Title: | *Teaching Tips for College and University Instructors: A Practical Guide* |
|---|---|
| Author: | David Royse |
| Publisher: | Allyn and Bacon, Boston, 2001 |
| Pages: | 346 pp (Paperback) |
| Source: | CL Main Shelves |
| Call No.: | LB 2331 Roy |

Are you a novice teacher seeking guidance or an experienced lecturer/tutor wanting refreshing advice on the craft of teaching? Consult *Teaching Tips for College and University Instructors*, which professes to "[anticipate] questions and problems common to all college and university educators and [offer] practical solutions and recommendations". Writing in an easy-going style, David Royse and his collaborators offer their perspectives on syllabus preparation, classroom strategies, handling small groups, lecturing, use of instructional technology, examinations, grading, troubleshooting, improving teaching performance, values, ethics and much more. Informative but not too theoretical, *Teaching Tips for College and University Instructors* is systematically organised and makes a convenient reference guide. ■

# The **Use of Digital Design Media** at the Department of **Architecture**

**Assistant Professor Stephen K. Wittkopf**
Leader, Design Computing, DRT Unit
Department of Architecture

The Department of Architecture is absolutely dedicated to utilise Digital Design Media for students to create, evaluate and communicate all aspects of architectural design, including industrial and urban design. This commitment follows the need to promote IT that is part of the government's vision to re-invent Singapore's construction industry ('Construction 21').
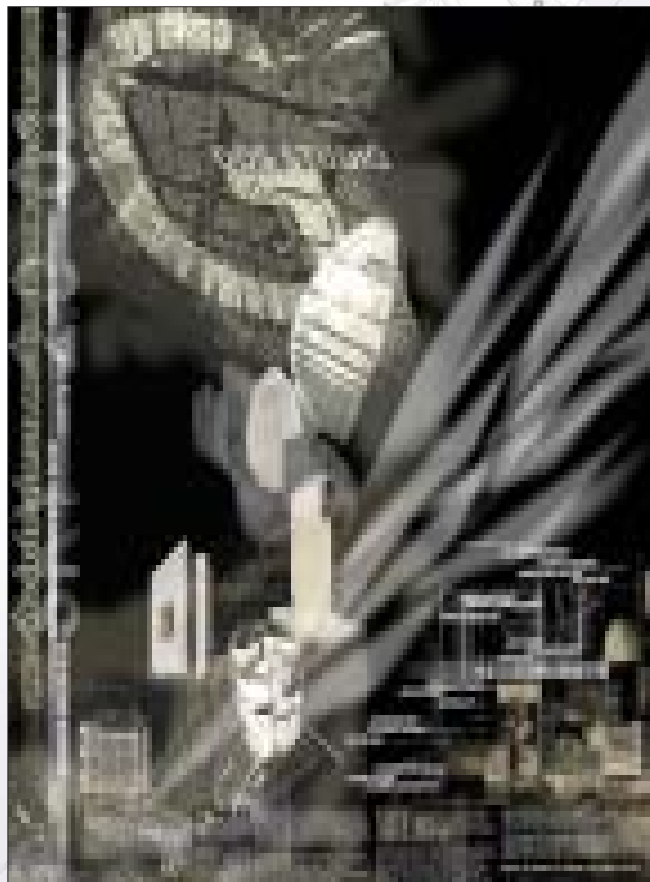


*Design primer for students to study appropriate environmental responsive skyscrapers*

Given the proliferation of IT, the Design Computing component of the Design, Research & Teaching (DRT) Unit at the Department of Architecture has been set up to highlight the interconnection of digital design media (DDM) and design thinking. DDM allows an integrated mode of presentation, where images, movies, drawings, and numbers (qualitative and quantitative design representations) are created as one and can be shared and reproduced easily. As the externalisation of ideas is considered an important part of the design thinking process, any improvement in the media used to externalise ideas or provide a filter for one's thinking can also improve design thinking and should thus be applied *(see page 11: 'Things Different: The First NUS Architecture Mobile Digital Design Studio').*

How DDM is used in the Architectural Department is described as follows. During this past semester, one of the eight Digital Design Studios (DDSs) that was conducted dealt with the topic: 'Small Skyscraper—Vertical Mall'. The first part of the studio work consisted of a design primer (which contained renderings from 3D-CAD models of built and proposed skyscrapers) that allowed students to study appropriate environmental responsive skyscrapers before constructing individual designs. Through the use of various parametric 3D-CAD programmes, students re-modelled the skyscrapers, studied the spatial and programmatic configurations, and responded to the site and urban context. To understand conceptual environmental responsive design, they employed simulation tools, such as lighting simulation, to study the path of the sun and wind and their impact on buildings.

Next, students created their own designs by applying various DDM. Other key portions of the studio included documentation and presentation of the studio work done. To communicate their findings clearly and comprehensively, students used various authoring tools to create dynamic webpages. For documentation purposes, they also digitally video-recorded all of their presentations.

The DDSs were oversubscribed compared to conventional studios. Students showed great enthusiasm and the high quality of their work in using DDM can be seen in the accompanying illustrations. Consequently, there is a long-term obligation to maintain or even increase the amount of DDSs. However, conducting DDSs requires an appropriate curriculum that is quite different from those in conventional studios.

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*A study of spatial and programmatic configuration*

# The Use of Digital Design Media...

*Rendered views of buildings from Flash presentation of design primer by students*

In December 2001, a printed, web-based and DVD documentation of the work accomplished during this first set of DDSs, comprising the primer and the final individual designs, will be published. To obtain samples of how DDM is applied to teaching and learning, please contact me at *akiskw@nus.edu.sg*. ■
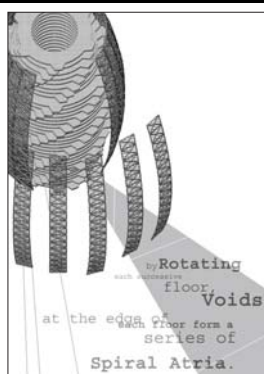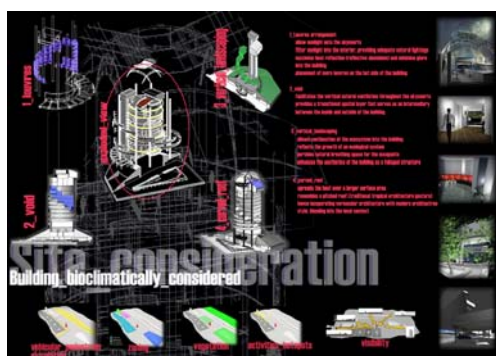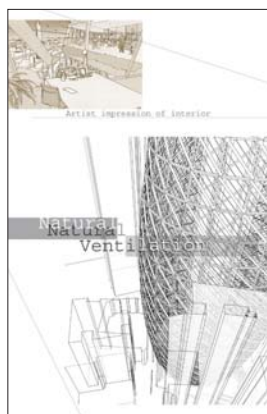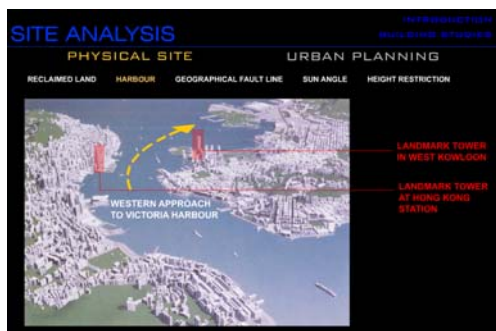


*Assorted poster/Flash presentations of design primers by students*