



On 21 February, CDTL organised a seminar entitled “NUS Strategic Plans: Where are we and where do we go from here?” led by Deputy Vice-Chancellor Professor Chong Chi Tat.

Associate Professor Tong Chee Kiong, dean of the Faculty of Arts and Social Sciences, and Professor Andrew Nee, dean of the Faculty of Engineering, served as discussants. In this first issue of CDTL Brief, we are pleased to bring you the following summary of the seminar presentations and discussion.

PROF CHONG CHI TAT

The publication on NUS’s strategic plan called *University in the 21st Century* was launched in late 1996, the result of the study of a task force headed by DVC Hang. I have identified a few of these strategies for today’s discussion and paraphrase them in the following manner: to encourage or promote cross-faculty teaching and learning, to develop an IT plan, to refine self-assessment and accountability and to improve on our management infrastructure. I will touch on each of these.

Cross-faculty education. Since we started cross-faculty teaching a few years ago, we’ve opened up certain modules—and even designed special modules—for students from other faculties to attend. The direction now is towards a single modular system. We want a basic system in all faculties that includes a common currency or what I would call a modular credit system. Within this system, each faculty will decide on the number of credits required for graduation, the number of modules required for a major and the number of modules a student can take from other faculties.

Currently, many faculties draw up their timetables for tutorials a week or two after classes have started. When students enrol for a course, they have to worry about timetable clashes in examinations and tutorials. Under the single modular system, we are pushing for the publication of a timetable upfront which includes lectures, tutorials and examinations. If we can achieve this, it will be much easier for students to take courses at other faculties.

What else are we doing to instil in students the idea of critical thinking, of creative and lifelong learning? This is indeed, at the end of the day, the desired outcome of a university education. Let me cite an example that came to my notice recently. The Electrical Engineering Department is

developing a number of 1000-level modules which are entirely project based. Instead of exams, continuous assessment and quizzes, students will do projects, be it preparing laboratory reports in a non-trivial fashion or designing robots for competition. In other words, projects that challenge students’ creativity, set them thinking and help them relate ideas learned from standard courses. This is a great way to encourage critical thinking and creative learning.

Is there really a need for all of this? Just to give you an idea of where our students are, let’s look at the results from recent surveys of our senior students in 1997. The results indicate that most students do not read books or newspaper articles related to their course of study, and more than half have never attended a talk or forum, concert or recital. [Results shown.]

While many of the students surveyed have graduated, we can do something about the students to come. As you’ve read in the newspapers, DPM Tony Tan announced the review of the university admissions system. And within the university, we are also revamping our educational system. We are pushing towards broadening the curriculum and requiring every student—except perhaps Medical, Dental and Law students who require separate treatment—to spend at least 20% of their curriculum outside their faculties. So for example, we want Science and Engineering students to study the humanities and Arts students to know something about science and technology.

We want close interaction between students from various faculties. We want to cut down on service courses where a faculty, Engineering for example, introduces a course in sociology by inviting someone from Sociology to conduct the course as a guest lecturer. Instead, we want Engineering students to go to the Faculty of Arts and Social Sciences and take sociology courses with other students from Science, Arts, Law and Business Administration. Our students must know what their friends at the other faculties do. They must be able to interact because this is what real life is about. When our graduates go out to society and work, they don’t just deal exclusively with engineers or scientists. They deal with people from all walks of life.

Information technology. On the IT side, we are introducing a secure plug and play scheme where we will install 8,000 network outlets across campus, in canteens, reading areas, libraries, etc. This will make computer access easier and will cut down on the use of space, which is a premium at NUS. It will also facilitate greater use of IT in teaching and learning. We want students to be able to plug their notebooks into a network outlet in the canteen, communicate with their lecturers, work on assignments and participate in a video conference. With the infrastructure in place, the next step is content and here of course we need staff participation and involvement.

Self-assessment. Education is very closely linked to other issues like quality assurance, self-assessment and accountability. Since 1994, various departments have set up what we call international advisory panels or international review committees. Computer Science set up a panel in 1994, the Engineering Faculty set one up in 1995 and now we are requiring this of all faculties. The idea is to get outside experts to visit us and look at the quality of our research and teaching programmes, staff and assessment procedures, and to get their recommendations for improvements.

Regarding staff assessment, we are moving away from the emphasis on the number of publications because, with research in particular, quality is invariably more important than quantity. So, for example, when a person is recommended for promotion to associate professorship or professorship, we want to know about the staff member's best five or ten publications.

We are moving away from a one-person review to what I call committee or many-person review. Traditionally, the head and the dean had exclusive say—whether that's good or bad depends of course on the quality of the head and the dean. Now, we are requiring every faculty to have a peer review committee consisting of senior people in a faculty to look at promotion cases. The Engineering Faculty instituted this a year or two ago and it has been working quite well. A number of other departments have been doing this (e.g., Mathematics for many years, Computer Science since 1993) and we want to make it happen across the board.

We are also moving towards international peer review rather than only internal peer review; we want both. When it comes to tenure and promotion at US universities, the comments of external peer reviewers are extremely important. Starting from this academic year, the Faculty of Science instituted a policy requiring comments from external reviewers on tenure cases.

Is life getting tougher? In a sense, yes, you can say that life is getting tougher. On the other hand, maybe you can also say that life is getting fairer. But if we're serious about becoming a world-class university, we have to take some serious steps.

Management infrastructure. We are taking steps to make changes but the changes mean extra work for departments and faculties. That's why reviewing our support system and management infrastructure is absolutely necessarily. We are running pilot projects on work flow systems. And within the next few months, many application forms (e.g., leave application forms and annual assessment forms) will be done on the internet to save paper and make work faster and easier. Some processes will be decentralised. For example, conference applications and conference money have been decentralised and Prof Hang is looking into decentralising research student scholarship decisions.

In order to do this, we have to provide additional staff support to faculties and departments. We are looking into the issue of departmental or faculty managers. These would be senior AOs—people with experience who will help run a department so the head and the dean, for example, can concentrate on more important issues. Some departments do a lot of chores that are not making good use of their resources. Academic staff should spend most of their time on teaching and research. If they do administration, it should be something that demands more of their expertise than signing cheques and locking up rooms. We are going to do a pilot project with the Faculty of Engineering and one or two other faculties to iron out these issues.

Successful strategies. To succeed, we must go beyond generalities and mission statements. We need good strategies but we also need specifics. When we have something specific, we have to be realistic. Can what we want be implemented? There are several approaches to this issue. We can look at the problem and say, obviously it cannot be done, and that's it. Or we can say, this is our strategy, this is our objective, at the moment it cannot be done but can we adapt, change, so that eventually we get what we want to achieve?

A key to successful strategies is to have courage because change comes with pain. Every time we want to change things for the better—we hope—there is a cost. We hope the majority of the people will benefit but not everybody will, so change always comes with pain. And it takes courage to introduce changes that are not popular in the beginning.

The final factor of course is involvement. Involvement is the most important factor to the success of any strategy. People whose lives will be affected must be involved and feel that they own part of the strategy. They must identify with the goals and objectives of what the university wants to do. If we are not able to get the participation, identification, sympathy or enthusiasm of our colleagues, then what we set out to do will take a long time, or will be very difficult to achieve.

Teaching. The push towards a broad-based education is central to the development of the university as well as the faculty. We are moving towards training students for jobs and areas of work that haven't been invented yet. To succeed, we have to provide a broad education and the Faculty of Arts and Social Sciences is fully committed to this. Our faculty has one of the largest number of cross-faculty modules. We offer about 180 cross-faculty modules to other departments in the university and about 700 students from other faculties come to our faculty to study.

Similarly, we are very committed to developing the core curriculum. Of the eight areas suggested for teaching in the core curriculum, five of them fall squarely into our faculty. We believe in the importance of teaching process skills rather than content-based learning only, and the faculty is working towards more project work and open book examinations.

The development of postgraduate teaching is particularly important. The intellectual tenor of a faculty rests to a large extent on the quality of the graduate students it is able to attract. The faculty hopes to expand its graduate training from about 600 students currently to over 1,000 students by the year 2002.

We also want to develop the internationalisation of our undergraduate and graduate population. We need to send out a lot more of our students under the student exchange programme because students who go abroad come back qualitatively different from those who don't. They are more independent, more confident in their work and participate more in class. Similarly, we feel that it is important to attract more foreign students to the faculty.

Excellence in teaching is important and we must have a proper reward system within the university and the faculty that inspires quality teaching. And there must be an integral relationship between good teaching and good research. I think good teaching follows good research, good research follows good teaching and, as a faculty, we are looking into that.

Research. As we head towards world-class status, it is important to identify key areas or niches of academic excellence. Hiring should take into account teaching as well as research so we can create a critical mass of researchers working together. We can build up graduate students around that group and bring in top-notch visiting professors as well.

We have recently formed an international advisory panel of three renowned scholars from Australia and the US. International benchmarking is important but it is also important to take into consideration disciplinary differences. Different faculties and departments have different benchmarks. For example, in Arts and Social Sciences, we should not simply be interested in IR journals only. Authored books by reputable publishers have the same degree of peer review and refereeing as a top international journal. So the key is quality through peer review. And it is very important for heads and deans to pay attention to each individual's career development.

Administration. We see this new decentralisation and devolvement to the faculties as a very promising development. It allows a faculty to channel its resources into the key research and teaching areas as needed. I share the view that academic staff should do academic work. We need to create more time for research and I think we can use the modular system in a flexible manner to allow staff to have more time for research.

Teaching and learning. When we talk about teaching and learning, we must know what kinds of graduates we aim to produce. For example, we are aiming to produce *mobile* graduates who not only serve Singapore, but also the region and the world. Globalization is very important and, in this sense, we have to build culture and languages of the region into the curriculum. Of course, we are looking at *all-rounded* graduates. This is what the core curriculum is working towards, introducing topics like the history of Singapore and other subjects to make our graduates more rounded.

We want students who are *flexible, self-motivated* and *self-learning*, people who are capable of learning how to learn and keeping themselves up-to-date. We must teach students to learn how to learn and our teaching methods should encourage *decision making* and *problem solving*. You may say that our students are rarely involved in making decisions. This is not true. And when we look at particular problems, it's not the answer that is important, but the thought process. How did the student arrive at certain assumptions, develop design parameters and, finally, come at the answer?

Of course, *entrepreneurship* and *enterprise development* should also be part of the curriculum, as well as multidisciplinary teamwork in projects that encourage students to be *team players*. We want to put students together and harness the capabilities of other faculties to promote these kinds of results.

Information technology. We all realise that IT has had a tremendous impact on teaching and learning. Video, for example, conveys a lot more information than static words or pictures. But it's very difficult to produce a good video and, very often, videos which are useful to another university may not be so applicable to us. That's one reason why video isn't coming across as quickly as it should.

IT can also be used to run tutorials and assess students. Engineering has started this with help from the University of Western Australia and a

visiting professor, Professor Brian Stone, who was noted the best professor in the whole of Australia. Using Stone's programme, students sit in front of computers and try to solve computer-generated tutorial problems. If they get stuck, they can ask for a hint but, the more hints they ask, the lower the final mark awarded to that question. The student's progress is sent to tutors sitting at master screens where they can tell which students are trailing behind and which problems are difficult for everybody. This is very useful for monitoring the entire class. We're developing this and if it works well, we will hold a seminar and share our experiences with you.

Self-assessment. Peer review is indeed a useful way to assess staff performance. Of course, we should also help our staff, especially the younger ones, plan their career path. There is no point in telling him just before the promotion period: you're no good, you won't get promoted. Three to five years before he/she really gets on the path, we should coach him/her on ways to improve.

Management infrastructure. We've invited the general manager of the Faculty of Engineering at the University of Melbourne to visit us and tell us how administration is carried out in Melbourne. I was absolutely amazed last year when the dean told me they only have three committees in their faculty. We have more than thirty committees and, recently, we've been thinking of setting up another committee to reduce the number of committees. Hopefully that committee will close after the job is done!

Q & A SESSION

■ **Q:** *I would like to ask the university to reinvestigate the question of two career paths for staff. Prof Nee mentioned a professor in Australia who devised a system of tutorial assessment. I'm sure he spent a lot of time on this. And if you do, you're going to sacrifice a lot of your research. So, whilst I agree that sometimes research and teaching can be coincident, in general, I do not believe this is so.*

CCT: Of course, one would like to see both happen at the same time in most of our faculty members but occasionally they don't. I don't believe that good teaching leads to good research. On the other hand, in order to be a good teacher, even if one is not a good researcher, one certainly has to be aware of the state of the art. It is hard to imagine good teaching without some evidence of enthusiasm for scholarship.

The idea of having a two-track system, a purely teaching system and—I don't want to call it a research track because most of our positions do require both teaching and research—another system which involves both teaching and research has come up from time to time and it's something worth looking into but one has to be careful here. The question is: when a person is not a good researcher, how do we measure the quality of his teaching? For example, everybody will agree that relying only on student feedback is not necessarily the best measure of a staff's teaching performance. So we need to have a more careful look.

One suggestion I've received in this regard raises the question: if a staff member doesn't do research, does he publish teaching materials? Does he develop good courseware? Does he do something that enhances the quality of teaching or does he just teach? In the latter case, there's not much argument for creating a special track for that person. On the other hand, if the person is able to develop something really nice, courseware or whatever, spending a lot of time, interest and energy into doing things to supplement his teaching, then I believe there is a case for arguing for a

teaching track for this person. I will personally support the idea of someone who asks, for example, for a semester off to develop courseware as long as, at the end of that semester, he's able to come back to us and show us what he's done.

TCK: While it's true that there may be some researchers who can't teach and some people who can teach but can't do research, most studies have shown that good teaching is tied to good research. Our international consultants clearly stated that in Harvard the best teachers are the best researchers, and the best researchers are the best teachers. A recent study in England came to the same conclusion. Of course, there are outliers at the sides but in general I think they feed on one another. My own view is this. A university is a place where you do research and you teach. A person who can only do research belongs in a research institute. I am not in favour of a dual track because we don't want to create second-class citizens in a faculty.

AN: Most universities worldwide place a heavier emphasis on research. This is mainly because the visibility of a university is heavily dependent on their publications, quality publications. And teaching is a bit more difficult to assess. Sometimes very good student feedback means that the teacher is very popular. He cracks good jokes, throws good hints, buys them a beer after class, is always easy to get along with. They tend to get very good feedback. So the thinking is like this. We can't have staff who have zero teaching or zero research. If a person is very good at teaching, then teaching could be a little bit heavier but by the end of the day he still has to produce something. There is a danger in decoupling research from teaching because research gives you the most current topics. If you only teach, you could be lecturing the same old stuff year after year because you do not inject new ideas—basically your own ideas. I doubt whether someone who is teaching all the time will research other people's papers and include them in his lectures. The easiest thing to do is to include your own research experience in your teaching.

■ **Q:** *First, in the arts and social sciences, there is a very close connection between research and teaching but not every discipline has this close correlation. Second, we mustn't assume that an excellent teacher with no record of publications doesn't research. For instance, I know of a Cambridge professor whose list of publications is very modest. But when you think of the numbers of PhDs he has supervised, the number of ideas given to his students: marvellously impressive. Third, when we talk about teaching, we've got to think about the level of teaching. We have undergraduates and postgraduates and there is this tremendous climb, so when we talk about research feeding teaching, we should keep this in mind.*

CCT: Of course, it is true that many who do research don't publish; also many who publish actually don't do research. [Laughter.]

NUS is at a transitional stage in its development, and our objective to become a world-class university takes time to achieve. During this transition, recognition of research is always a difficult issue. There's a time when a university needs to move from doing nothing in research, to counting the number of publications, to looking at where we publish, until finally—when we reach the stage of enlightenment—we forget about all of these things and just look at Lecturer A and say, "What sort of impact in research has he or she created?" I don't think we've reached

that stage yet. There may be a staff member who, although he's got only one publication over the past ten years, has generated a lot of enthusiastic interest through his work with prizes and awards worldwide. If that's the case, I believe that the person should be promoted immediately to Professor. But by and large, for most people, and for NUS's stage of development, it is still important to look at whether a person publishes—be it books or journal papers or whatever—and where these publications appear. When exceptions occur, it is important that such exceptions be supplemented with evidence of letters from outsiders. Certainly, this is standard practice at US universities.

Q: First, the DVC mentioned the possibility of a peer review committee for promotions. Is it possible to institute job talks and committee hiring as well? Second, is it possible to decentralise exams? Right now, I have to prepare my question paper before I start teaching the course, and then teach the course accordingly which doesn't quite work. Third, we get conflicting cues about things like open book exams and projects. On the one hand, we get statements that it's good to replace exams with projects. At the same time, proposals with projects replacing exams are turned down.

CCT: Regarding job interviews and committee hiring, this is already in practice at a number of places. For example, for over a year, the Information Systems and Computer Science Department, whenever possible and convenient, will fly in a short-listed candidate for an interview. The candidate gives a seminar to the whole department, "interviews" the people in the department—especially those in his field—and staff interview him to decide if there is a match. After that, a departmental committee will discuss the merits of the case and make the appropriate recommendation to the board of selection. This is very good practice and we want to encourage this for all departments. Just write in and tell us that you have certain candidates you want to impress or to have a closer look and the university will provide funding whenever necessary.

Regarding decentralising exams, there are a number of issues we need to resolve including the availability of space. At a number of US universities, especially state universities where they have large classes, final exams are held in lecture theatres where students are seated a row apart so they can't see what their friends write. A number of departments at NUS have tried this for midterm exams and quizzes and I think it has been quite OK. If the departments and faculties can ensure that exam procedures are as closely monitored as what the Registrar's Office is currently doing, then I believe we can move in that direction.

TCK: Part of the problem is with logistics and administration. The exam process currently takes thirteen weeks. The Faculty of Arts is looking into ways to shorten the process, subject to exigencies of service, and provided standards are not compromised. For example, we are conducting a parallel exercise where

Q: Regarding peer appraisal. Members of the peer review committees are said to be senior faculty. This is not really peer; it is senior in that reviewers are one or more levels above the people being assessed. This may also be true for the external peer review. I'm not saying we should move immediately towards same-level peer assessment, which has been found to be very effective, but sometime down the road we might consider having same-level appraisal of people with whom we work and know intimately.

CCT: I did say senior staff members, and for good reason. Let's say a lecturer is being considered for promotion to senior lectureship. To have him or her appraised by fellow lecturers has the danger that personal interests may be involved. I'm not saying every lecturer is suspect but it is important to avoid this possibility. When I started the Computer Science review committee in 1993, we had five to eight staff who were senior lecturers, associate professors and so on. When we considered lecturers for senior lectureship, everybody was involved. But when senior lecturers were evaluated, senior lecturers on the committee left the room. The belief is that a person will give a fairer assessment of a candidate if his or her own interests aren't directly involved. The psychologists can prove me wrong. If that's the case, then maybe we should have another look.

Q: Eventually, we may need to think about training real cross-disciplinary creatures as opposed to the standard lawyer, doctor or engineer; people like Leonardo Da Vinci. Cross-faculty modules may not be enough. We as teachers have to be somewhat like Da Vinci to be able to relate different bodies of knowledge in our teaching.

TCK: The idea of a broad-based education, at least in the Faculty of Arts, is not to replace disciplinary training but to expand the range of training. When Harvard students were forced to do the core curriculum, they were very upset about it during their first few years. But if you talked to them five or ten years down the road, it is that broad-based education that stays with them, more so than specific disciplinary-based education.

AN: At the Faculty of Engineering, we are not emphasising a great deal of specialisation at the undergraduate level. We have some final year electives to allow the students to choose subjects of greater interest to them, but by and large, we emphasise broad-based training. A professional engineers board told us they are quite comfortable with 75% hard core engineering coursework for a four-year undergraduate degree. In other words, we can easily ask our undergraduates to do the other 25 % of their work in other faculties.

we do our own run of the marks. We may implement this and it could trim one to two weeks off the exam process.

Regarding your third point, last year, 48 of our modules were open book exams. This year, almost 100 modules have open book exams and 20–25% of our modules are project based so I don't see a contradiction. Whether a module is approved for open book exams or project work is based on pedagogical considerations, not logistical or structural ones. We consider whether the module can be done on a project basis, whether we can ensure that a certain percentage of the marks will be fairly distributed, etc.

AN: Regarding having to set exam questions before you even start teaching, Engineering staff used to have this problem because we sent exam questions to external examiners for vetting before giving them to students. For two years now, we have given our questions straight to the students. After exams, we

send the questions to the external examiners for feedback and consider their comments for subsequent modules.

CCT: It is no longer necessary for exam papers to be sent to external examiners for approval before final processing. You may want to bring this to your head's attention.

AN: Regarding replacing exams with projects, our MIT review team mentioned that typical in a US university, the final exam only carries 25–35% of the total mark. The rest are quizzes, tests, projects and so on. We found this to be a very good system but are concerned that when our students do projects, they are very cooperative, passing diskettes, referring to each other's materials and so on. Invariably, they end up with similar grades which make it difficult for us to tell them apart. MIT said, why are you concerned? This is the spirit of teamwork: they discuss, they communicate, they come up with a good solution.



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Q: I try to encourage students to read more widely but encounter considerable resistance; students are far from convinced that it will benefit them in any practical way. Could a directive be sent to departments saying that when examiners discuss questions with students, the question in the examiner's mind should be: do our questions stimulate reading?

CCT: My feeling is that we can send a letter or request but the response really depends on individual staff. I believe most people are aware of what a university education should be. When I talk to my colleagues, invariably, everyone voices the concern that our students don't read, aren't interested. I believe that students behave and react according to the reward system. That's why I think the review of the university admissions system will have a great impact on the way our students study. When it comes to curriculum change, we are pushing for July 1998 implementation and we will have to see what sorts of products we actually produce four years from now.

Students have lots of peer pressure to behave in certain ways. In a sense, we are trying to change things against the tides. I believe we can do it but we shouldn't expect miracles. If we bear in mind the limitations of what we can do and what students' thinking patterns are, then we can be more realistic and make progress, maybe not by metres but certainly by inches. I hope to see something different in 2002 when the new batch of students come out. A lot depends on all of us. No number of directives will serve any purpose unless staff members agree and really think it's important.

Q: First, can we consider group advising of PhD students rather than just a single advisor? Second, how much say does the university have in the state of the bookstore? The bookstore doesn't have enough books and, as you say, undergraduates aren't reading enough.

CCT: Graduate supervision. I think all departments should, and some departments have already, establish the practice of a graduate or a PhD committee. Every student reports to a committee consisting of a group of academic staff in the department whose research interests are close to what the student will be doing. The committee will discuss relevant issues with the student and provide advice but there must be one person who is finally responsible for supervising the thesis. At many US universities, there are also weekly seminars where graduate students and other people in the same area present and discuss topics of current interest. This is very educational and important. If we can do that for our graduate students, they will get a higher quality education.

Regarding the bookshop, I share your feelings. Many of us who've been to bookstores overseas feel depressed when we come back and look at our Co-op. I will talk with the people in charge of the Co-op to see what can be done.

Q: Are there any plans to allow students to take examinations online?

CCT: It's a possibility but the first step is to wire up our plug and play scheme, the 8,000 points we are installing. Currently, we have about 400-500 points installed, mostly in the halls. By July, we hope to have about 4,500 computer outlets ready. Online examinations would require dedicated classrooms with 50-100 points for students to come in and write their answers online and to be cost effective, we need to use these facilities for more than just exams (e.g., for classes, taking notes, and other things to do with teaching and learning). I will check with the Computer Centre to see what we can do.

Q: First, can we get feedback on the opinions gathered by the experts from MIT and Harvard? Second, to get to the level of Harvard or MIT, we need to do more at the graduate level of education. Could there be some joint graduate supervision with these universities to help us get there faster?

TCK: Some programmes are already under way. The Faculty of Arts has a joint programme with the Harvard Kennedy School of Government for a Masters in Public Policy. Bizad has programmes with Stanford and Engineering with MIT. But you are right in that there could be more collaboration. The position is very clear. We are as good as the company we keep.