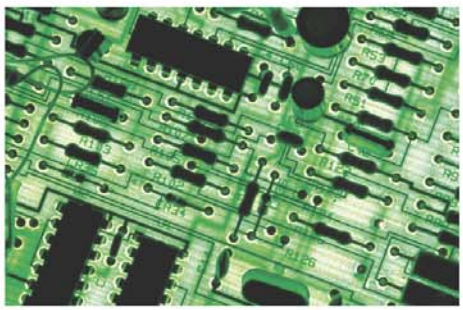
Best practice in outcomes-based teaching and learning

at The Chinese University of Hong Kong



David Kember

The contents of this booklet are based on interviews with the recipients of the Vice-Chancellor's award for exemplary teaching listed below.

David Ahlstrom	Management
Andrew Chan	Marketing
Francis Chan	Medicine and Therapeutics
Chan Hung Kan	Chinese Language
Gregory Cheng	Medicine and Therapeutics
Gordon Cheung	Management
Chu Ming Chung	Physics
Fan Jianqing	Statistics
Patrick Lau	Educational Psychology
John Chi Kin Lee	Curriculum and Instruction
Kenneth Leung	Journalism
Leung Sing Fai	Clinical Oncology
Soung Liew	Information Engineering
Lo Wai Luen	Chinese Literature
John Lui	Computer Science and Engineering
Gordon Mathews	Anthropology
Allan Walker	Educational Administration
Zhang Shuzhong	Operations Research

Other material came from focus-group interviews with students from the following academic units identified as having good records in nurturing desired learning outcomes: Departments of Anthropology, Architecture, Government and Public Administration, Nursing, and Materials Science; Faculty of Medicine.

A case study in outcomes-based curriculum development is from the School of Pharmacy.

Interviews were conducted by Rosa Ma and Celina Hong, who also produced translations and transcripts.

The material was then analysed for common themes and useful advice by David Kember in order to write this booklet.

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Part 1

Introduction
Outcomes-based learning and teaching

Outcomes-based education

The University Grants Committee of Hong Kong recently appointed a consultant to advise on the facilitation of outcomes-based teaching and learning in the universities in Hong Kong. Outcomes-based education implies that when programmes are planned desirable learning outcomes are identified and considered in the formulation of the plans. Course content, learning activities and assessment are designed so as to be consistent with the achievement of the desired learning outcomes. Evidence is then gathered to determine whether the desired outcomes are being achieved. This evaluation evidence provides feedback to ensure that elements in the teaching and learning environment are acting in concert to facilitate the nurturing of the desired outcomes.

In its Strategic Plan, The Chinese University of Hong Kong (CUHK) (8 December 2005) has formulated a set of desired outcomes for its graduates.

> The University expects that its graduates should have acquired an appreciation of the values of a broad range of intellectual disciplines as well as general knowledge, and within that wide spectrum, have gained a depth of knowledge within a specialty, not only as an end in itself but also as a vehicle for experience in serious study and enquiry. They should have a high level of bilingual proficiency in Chinese and English, and a basket of skills including numeracy, analytic skills and IT capability appropriate to the modern age, and above all the ability to continue with life-long learning and professional development. They should have cultivated a habit of reading widely, learnt to be critical and independent; they should be effective in communication and working in a team. Our students are also expected to have a deep understanding of Chinese culture and an appreciation of other cultures, and with that appreciation also a high degree of inter-cultural sensitivity, tolerance and a global perspective. They should have an attitude of compassion, honesty and integrity in relation to self, family and society, and the ability to contribute as citizens and leaders. They should have a sense of purpose, responsibility and commitment in life, a desire to serve, as well as taste in their pursuits.

The strategic plan contains steps to maximise the extent to which these ambitious learning outcomes can be achieved.

Best practice

Best practice in teaching and learning at CUHK has implicitly, if not always explicitly, been consistent with outcomes-based education. Good practices in outcomes-based learning and teaching are, therefore, well established at CUHK. The Integrated framework for Curriculum Development and Review was drawn up with the model of outcomes-based education in mind. The review processes inherent in the Integrated Framework are intended to aid departments in achieving consistency between desired learning outcomes and the realisation of those outcomes.

This booklet is designed to provide guidance to bring teaching and curriculum development in line with best practice. The models of good practice come from recipients of the Vice-Chancellor's award for exemplary teaching. Also drawn upon are programmes with good records in promoting the development of desired learning outcomes, such as those in the above extract from the strategic plan. The models of good practice are, therefore, consistent with the collegial character of CUHK.

Drawing upon the expertise of colleagues identified for their exemplary teaching is a strategy which has been adopted to maximise the chances of local ownership and engagement with quality processes.

Award-winning teachers

The first source of data was interviews with 18 teachers from CUHK awarded the Vice-Chancellor's award for exemplary teaching, in the first three years of its operation. Each of the award-winning teachers was interviewed, at some length, about their beliefs and practices as a teacher. The interviewees were talking about a topic in which they were interested and often passionate, and so the transcripts were rich in detailed descriptions of good practice and insights into why they had been chosen as exemplary teachers. Quotations from the interviews with the teachers have the names of the teacher and department in brackets at the end of the quotation.

Student Engagement Project

The Student Engagement Project is a quality assurance initiative, which aims to give feedback to departments on the programmes they offer. Each year, half of the undergraduate programmes are surveyed. The survey instrument seeks responses from students on their perception of the development of generic capabilities identified as being important learning outcomes. There are also items gathering feedback on aspects of the teaching and learning environment which previous studies had suggested were conducive to their development (Kember & Leung, 2005a, 2005b; Leung & Kember, in press a, in press b).

It was, therefore, possible to identify programmes which were perceived to be more successful at developing generic capabilities. Accordingly, six programmes were selected which had high ratings for perceptions of capability development. Focus-group interviews were then arranged with four to six representative students from the six programmes. The students were generally from the latter years of the programmes, so that they could comment on most of the programme.

The six focus groups were from programmes in Anthropology, Architecture, Government and Public Administration, Medicine, Nursing and Materials Science. At the end of each quotation taken from the focus-group interviews, the student's programme is identified by the abbreviations Anth, Arch, GPA, Med, N and MS, respectively. In addition, each student was given a numerical code.

The interviews had an open format. Semi-structured questions asked the students to indicate what types of generic capabilities they would need on graduation. They were also asked to describe the approach to teaching, the assessment and the curriculum in their department. Prompts were used to seek greater depth and richer descriptions where necessary. Each of the six interviews lasted for approximately 90 minutes.

Analysis

An analysis was conducted of the interview data. The widely used qualitative data analysis technique of grounded theory (Glaser & Strauss, 1967; Lincoln & Guber, 1985) was used. Grounded theory assumes that the research starts without hypotheses or preconceived theories. Instead the researcher searches the data for common constructs or theories. In this way theory is derived from the data and can be said to be grounded in it. Use was also made of the constant comparative method (Strauss & Corbin, 1990) which implies checking thematic phrases against the complete transcript to ensure

that an extract is consistent with the sense of the whole. This provides a guard against mis-interpretation or taking comments out of context.

The aim of the analysis was to synthesise a composite picture of good teaching practice which included common constructs across the six programmes and the 18 award-winning teachers. The analysis concentrated on interview comments which were seen as descriptions of the best practice so that it was possible to describe a composite picture of the type of teaching and learning environment most capable of nurturing desired learning outcomes.

Guidelines

The outcomes of the analysis are guidelines for good practice in outcomes-based teaching and learning. These guidelines have been synthesised from the excellent teachers' narratives of their practices and beliefs, together with descriptions of teaching and learning environments by the students from departments with good records in capability development.

These guidelines are divided into the following parts:

Part 2 Desired outcomes

Part 3 Planning courses

Part 4 Nurturing desired outcomes

Part 5 Assessment

Part 6 Feedback for evaluation

Part 7 Case study in curriculum development

Part 2

Desired outcomes

Student needs

If courses are planned with an outcomes-based approach the initial task is to identify desired outcomes. When best practice is employed, the starting point for determining the desired outcomes of programmes and courses is student needs. What knowledge, skills and capabilities do students need on graduation?

> We have students in our minds when designing courses: What will students want to learn? Why are these skills and ideas useful for them in the future? The courses are primarily designed for students. We want to educate them so that they can go out to the real world and work with the tools and techniques they have learnt. (Fan Jianqing – Statistics)

In professional programmes, such as teacher education, this implies that the students need to graduate as competent professionals in the field. Knowing theories about teaching is not sufficient – the students need to be able to put theory into practice.

> I will select teaching theory that is practical to my students' everyday teaching life. In addition to teaching plain theory, I apply examples of teaching experiences in high school. I would like to integrate theory with teaching experiences. To facilitate better understanding, I also arrange class venues like a real classroom setting. (Patrick Lau – Educational Psychology)

Course planning needs to look beyond the end of a course to consider lifelong learning needs. Most commonly this is by ensuring that courses play a part in developing the intellectual capabilities needed for lifelong learning. In the quotation below, students are referred to readings which will help them in the future.

> Most of my students are part-time students and they hold positions such as high school principals or teachers. They are very busy and seldom have time to read books. In this connection, I think reference materials are important for them. Reference materials are prepared to facilitate students' lifelong learning. Although they may not review the reference materials immediately, well-prepared materials may help them in the long run. Because of the above reason, I put a lot of effort into the preparation of reference materials. (John Chi Kin Lee – Curriculum and Instruction)

Capabilities

The award-winning teachers and the interviewed students cited a wide range of generic capabilities as outcomes which they felt graduates should possess. There was variation in the competencies specified, but it is reasonable to claim that all felt that completing a degree meant more than acquiring knowledge of a discipline. The necessary outcomes of a programme might be specified as knowledge of particular content areas together with a set of core competencies. If a programme is to be successful, its planning needs to identify which outcomes are necessary, and then determine how they are to be nurtured in identified courses.

> Students have to acquire core competencies such as the ability to make decisions; the ability to prioritize, to extrapolate the risky from the less risky; and the ability to communicate. (Leung Sing Fai – Clinical Oncology)

As countries strive to develop knowledge-based economies, these competencies are becoming even more important. The Hong Kong Government and employers have stressed the importance of graduates possessing generic competencies to enable them to cope with a future in which there will be few certainties and the relevance half-life of knowledge will decrease (Education Commission, 1999, 2000).

Desired outcomes evaluated by Student Engagement Project

The initial analysis of the data from Student Engagement Project identified six capabilities as being crucial outcomes important to all programmes. There are, of course, other capabilities, such as creative thinking, which are developed in university programmes. These six capabilities are thus not all-inclusive but they are central to effective university education. They comprise part of a model which will be described and explained in this booklet. In the model there are four capabilities grouped together under a higher-order intellectual capability category. The other two capabilities are a sub-set of the ability to work together.

The students' comments fit well into this formulation. They clearly saw the need for the development of intellectual capabilities. Their comments suggest that these capabilities tend to be related rather than discrete. Their comments often discussed together two or more capabilities which have normally been seen as separate. The formulation of capabilities under two higher-order umbrellas is therefore apt. The set of capabilities is also consistent overall with the interviews with the award-winning teachers. The model of desired outcomes is shown in the diagram below.

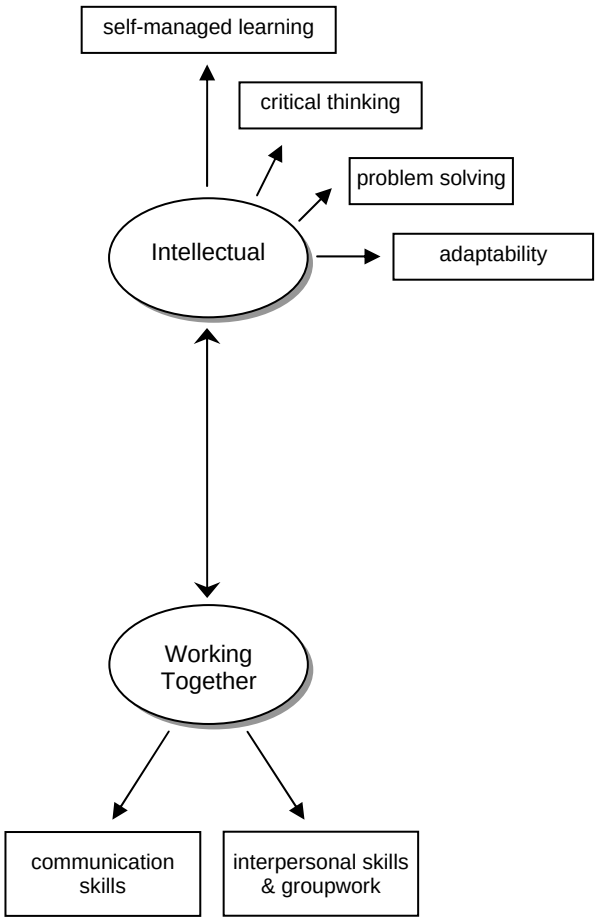

Figure 1: Desired graduate outcomes

The outcomes in this model are a sub-set of the desired graduate outcomes specified in the CUHK strategic plan. The survey instrument for the Student Engagement Project was designed to evaluate the development of capabilities which all major undergraduate programmes could be expected to nurture, and which are important for all graduates. The strategic plan takes a wider ambit by considering the whole-person development to which the Colleges, General Education and other aspects of university life make a major contribution.

The following sections look at the nature of the specific capabilities. Their inter-relationship is made apparent. Suggestions of how they can be nurtured through facets of the teaching and learning environment will be explored in part 4.

Self-managed learning

Perhaps the most important learning outcome is that students learn how to learn for themselves. When they graduate there will be many new topics they will need to learn, and so it is important that their university education develops their capacity to do so. Chan Hung Kan shows how to do this through requiring students to discover the origin of words from first principles. Requiring students to work out problems, rather than just telling them the solutions, provides a training in thinking ability.

> When I am teaching philology, we will encounter some problems investigating the origin of words. For example, 打尖 (da2jim1) means jumping the queue. But how does the second character come to replace the original complicated character which very few people know how to write out? Sometimes, the origin of some words is even more difficult to trace and different scholars have different opinions. How do we deal with this? I teach students to analyse from the structure, sound and meaning of the word. We also need to know its original usage. Never stick with the first opinion and not be able to debate and discuss its legitimacy. They need to read through a lot of references about the historical development of the sound and the written form of a word before forming a sensible judgment. We may have to contrast the present phonological system with the classical one. Students need to spend a lot of time doing exercises such as these so as to strengthen their thinking ability. (Chan Hung Kan – Chinese Language)

In selecting what to teach the excellent teachers were aware of the elements of course planning dealt with in part 3. What is taught is not just a matter of covering the content appropriate for a particular topic, but the desired learning outcomes also have to be considered. Gordon Mathews justifies this conclusion through the nature of his discipline, which is anthropology.

> Anthropology is a discipline designed to make people think about their lives. My teaching is to teach people how to think and make them question everything around them. Anthropology specifically has to do with the ways in which we are moulded socially and culturally by our worlds. For instance, people think that grades are measures of intelligence. Not necessarily. Grades can be seen as ways society filters people into social classes. So what I am trying to teach is ways in which people can question their social moulding. (Gordon Mathews – Anthropology)

By encouraging students to think independently, they will develop the skill or competence needed to learn on their own. On graduation they will need to be lifelong or self-managed learners; so this ability needs to be developed. This desired learning outcome was reinforced by the stress on active engagement in learning which is introduced in part 4.

> I've become more open to my students, let them develop their independent thinking through my teaching and guidance. I would tell them, 'These are the authors and their background; can you put your feet into their shoes and enter into their life through their writings, how they led their lives in their time?' (Lo Wai Luen – Chinese Literature)

Critical thinking

Following are successive quotations from two Anthropology students which arose as the students were discussing critical thinking in the focus-group interview. The essence of their interpretation of critical thinking was the ability to make their own judgements and interpretations, and not necessarily accept the perspective of the teacher, which is one of the more challenging notions of critical thinking. (Other definitions of critical thinking are reviewed by Phillips & Bond, 2004.)

> Don't blindly agree with what the lecturer says … When s/he makes a comment or when s/he teaches something, we have to continuously reflect on what s/he says and then relate this to our own knowledge, to see whether we truly agree or disagree with what s/he says. (Anth6)

> I think mostly that relates closely to our ability to analyse … most of us have our own set of views which are quite subjective. So, how are we able to build our views and, in addition, able to persuade others by using our views, since we believe that our views are reasonable and rational? This process also includes all the things that she [Anth6] has just mentioned. (Anth3)

Accepting this interpretation of critical thinking poses a challenge to many professors in facilitating the development of this form of critical thinking. Professors are appointed because of their expertise in a discipline. Many view teaching as transmitting this expertise to students in lectures (Kember, 1997). This conception of teaching clearly establishes one position as the authoritative one and leaves little room for students to make their own judgements. Other parts of the interview made it clear that most of the Anthropology professors discouraged students from reproducing their own views, while encouraging personal interpretation. Their conception of teaching appears to be consistent with an orientation towards facilitating learning.

To encourage students to form their own positions there needs to be a time for discussion of those views. Part of this is in the classes with the professors and a further part is inter-student discussion in tutorials, where tutors take the role of facilitator. By presenting their own viewpoint and defending it against the challenges of others, students thus engage in critical debate and discussion. This nurtures their critical thinking capability.

Problem-solving

Related to self-managed learning and critical thinking is problem-solving ability. Again this is nurtured through practice. In the following case, this was by asking students to do research to solve problems.

> But I would like to stress that university students should also go into research, shouldn't see university as a place for training them and shouldn't be satisfied with just landing a stable job. I think we should make use of our time at university doing research. … information is forever updating and we don't know everything in our life. If you touch on research, you are truly solving a problem that no one can ever solve in the whole world. If you are to solve a problem, you need to have some kind of an approach. Therefore, I think this part is very important. (Med1)

The development of problem-solving is also consistent with the needs of professional programmes. Students need to develop a way of thinking about the types of ill-defined problems dealt with by the profession. They also need communication skills.

> Patients usually come with some very vague complaints, such as, 'I have headache, or I have stomach-ache'. You'll need to know how to ask questions and what kinds of examinations are needed. It's a doctor's responsibility to judge if their complaints are serious or not and treat them accordingly. Students tend to approach problems by memorising textbook knowledge, the 40 pages about headache, for example. Instead, they should start from understanding the patient's situation, how they can ask the few questions so as to tease out that the symptoms are not related to the first ten cases, nor the last ten cases recorded in the books, and leave with only two possibilities, for instance. (Gregory Cheng – Medicine and Therapeutics)

In business, the analytical power to handle ill-defined problems was described as 'business sense'.

> A lot of students do not have a business sense. For instance, some students will hand in their projects and proposals without mentioning money. I don't mean to be 'money-minded' but all business proposals need to have sound budgeting. That's a real problem. The main difference between business students and students from other faculties is precisely this 'business sense'.
>
> Business students need to acquire good 'business sense' to form an important basis for their analytical powers. They need to analyse a problem with a comprehensive approach rather than a narrow approach. The lack of business sense and a comprehensive approach to problems are not unique to students reading business in CU; it's universal. In fact, CU is doing better because our courses are integrated ones. (Gordon Cheung – Management)

Adaptability

In the interviews, adaptability received less attention than the other intellectual capabilities. It appeared to be seen as something which would develop as a consequence of heightening the other capabilities. This again demonstrates the appropriateness of grouping the four intellectual capabilities under a higher-order category.

> I think […] has touched on an important point, which is how to be able to take initiatives. We have to change ourselves in order to adapt to changes; or else, we will be too slow to make reactions. From a personal point of view, I don't think our curriculum is intended to teach us with such an aspect. Honestly speaking, it is very difficult to do so and put it in black-and-white but the ethos of our university, interpersonal skill, emotional quality, etc. are all part of this issue. If you're able to manipulate well with any one of your skills, you should be able to adapt to changes easily; this is what I think. That is, if you make progress, you won't just progress on one of the skills but will progress and develop on other skills as well. (Med1)

Communication skills

Students from each of the disciplines recognised that communication skills were important. These were closely related to the interpersonal skills needed to work together with others. Again, these were seen as being developed through practice in learning activities. Most commonly this was through discussion in class and by students making presentations. The medical students had a specific course to develop communication skills.

> We have a special course for learning communication skills. There are two aspects here: each individual conveys differently, interacts differently, even their courtesy is different; it all depends on that person. You can't change that person overnight. But our communication skills course stresses certain basic rules for us in how to communicate with others, how to learn listening skills, how to speak with empathy, etc. There is another part where we have to learn how to speak professionally, such as how to break bad news to our patients. (Med1)

The award-winning teachers also recognised the importance of graduates being able to communicate well. Liew Soung Chang felt that this was a learning outcome which was not well developed in

Hong Kong students. The logical corollary of recognising the need for the capability was to find ways to address its development in his teaching.

> Students nowadays do lack communication skills. Compared to students in the western world, Hong Kong students are weaker in presenting their ideas. In the real world, it is very important to be able to articulate yourself. US students articulate very well in presentations. Even if they have inferior solutions, they can talk their way out. In the real world, it is very important to articulate verbally, in speech and in writing. … That's what troubles me the most. As an engineering teacher, I end up being an English teacher a lot of the time! Students may not realize that. I learned from real experience that English is more important than calculus skills in the engineering field. For example, I can say all of the above because I have obtained real life experience in a company. (Soung Liew – Information Engineering)

It isn't just those in professional programmes who need graduate capabilities. Science students also need communication skills.

> Moreover, science students tend to overlook the importance of acquiring communication skills which include the ability to read books and journal papers, and the ability to discuss and question. (Chu Ming Chung – Physics)

Interpersonal skills

Teamwork was recognised as an important capability. There are few professionals nowadays who work as individuals; so the ability to be able to work as part of a team is important.

> I think in university, it is important for us to learn how to work as a team, for our efforts are very limited if we choose to work individually. We may not be able to think diversely; therefore being able to get along with others and group our efforts together is very important. (Med4)

Interpersonal skills are developed through practice in working as part of a team. This occurrs in group projects.

> Various parts will convey the message to you that good interpersonal skill is a must – especially from group work. I know that we have a lot of group work; I noticed that our curriculum runs a lot of group work, whereas the former curriculum didn't run a lot. (Med2)

Part 3

Planning courses

Student needs

This part introduces a curriculum development model which stresses the needs for curriculum planning to be consistent with ensuring that students graduate with the desired learning outcomes. If this is to be achieved it is necessary to know enough about students to anticipate their future needs. Determining the future needs of students means anticipating developments within the discipline or profession. As the pace of change in technology and society quickens, this is not a task to be underestimated.

> We don't stop at the 'here' and 'now'. We have to proactively think of the future trend of this subject five years down the line. Sometimes, things change so rapidly that we'll need to review and project to the future within three years, or even one year, as people's perception may have changed then.
>
> The expected level of student achievement in the subject ought to be clearly articulated. First of all, we must teach our students what these issues are. We must let them become aware of the future trend and what the appropriate approaches will be. (Andrew Chan – Marketing)

Important elements of students' future needs are the graduate capabilities or desired learning outcomes identified in the previous part. In deciding the future needs of students the award-winning teachers did not peer into crystal balls – they took steps to gather useful information. This information could be gathered from alumni, those in the profession and incoming students. In the quotation below Andrew Chan was talking about an MBA; so the students would all be working in the field and well aware of their own needs.

> I collect such useful information by several means: I'll ask them to fill in a questionnaire 'What do you expect to learn in the course?'. Then I'll figure out what kinds of competences are required of them from the real world. From time to time, I'll find out from alumni and business people what kinds of people are currently needed in their fields, and I will aim at developing such competencies in my students. Preceding that, I have to constantly update my literature understanding before designing the curriculum content. Therefore, the final curriculum content is tailored to meet current requirements and future trends alongside with the understanding of prevailing issues in the academic world. I will integrate all this information and share with my students. (Andrew Chan – Marketing)

Elements of curriculum planning

Planning the curriculum then involves a range of aspects. Firstly, the desired learning outcomes need to be addressed. What are the important learning outcomes which need to be achieved if students' future needs are to be met?

The next aspect in curriculum planning is designing learning activities which will promote the achievement of these aims. The next part demonstrates that meaningful learning occurs through active engagement in learning tasks which require students to deploy the capability to be developed. Good curriculum planning includes designing learning activities which are consistent with the aims and intended learning outcomes.

The other element is the content of the programme. For much university teaching this is the only element of planning. Programme plans and course outlines commonly consist solely of lists of content topics. The award-winning teachers had a more holistic approach.

> Course design is taken very seriously and carefully. At a programme level, the programme directors are responsible for identifying or selecting the most relevant courses. We ask ourselves:
> - What are the objectives of the programme?
> - What do we expect the graduates to achieve when they have completed the programme?
> - What is required in the world and what are the future trends?
>
> We will know what key areas are involved. For example, I am teaching Marketing and I will focus on the needs and the trend in the arena of Marketing. What is required of each of the different function areas in business education?
>
> In the process, you have to decide what academic purposes and what activities are desirable. We will design some basic elements for them together with some textbooks, exercises or case studies. Built-in learning activities are essential, such as inviting CEOs to give talks, visiting the PRC, helping them to establish their networks, arranging summer internships, offering free consultations to companies so students can gain solid work experience through their voluntary work, etc. I'll try to aggregate all the relevant elements, and not only concentrate on text-based teaching.
>
> To achieve this, you have to select the content, and appropriate persons for the design and teaching of the course. Previous experience in teaching that particular subject is an important source of reference. We'll look into international practices for teaching approaches and materials. (Andrew Chan – Marketing)

This wider perspective on curriculum design does imply that more aspects are considered in the planning process. This may take a little more time, but the outcomes are worthwhile.

> It's hard work to prepare for a new curriculum and to arrange a series of guest speakers. But I can tell from students' eyes that they really enjoyed it and were deeply moved. They were thankful to all these efforts: different input from different people with different voices. (Lo Wai Luen – Chinese Literature)

Curriculum planning model

The aspects of curriculum planning can be incorporated into a model which shows how they relate together and influence each other. This model is shown in Figure 2.

At the top of the model are the student learning needs which were the starting point of part 2. These lead to five elements of the curriculum which should be incorporated into curriculum plans – desired learning outcomes, fundamental concepts, learning activities, assessment and feedback. As we will see in part 5, assessment has a very strong influence on learning outcomes. These are shown as related to student learning needs by a feedback loop to complete the cycle.

The central part of the model might be compared to the interaction model of curriculum development, one of those commonly cited in curriculum development texts (e.g. Brady, 1990). This consists of the four elements of objectives, content, activities and evaluation, with each element permitted to interact with each other.

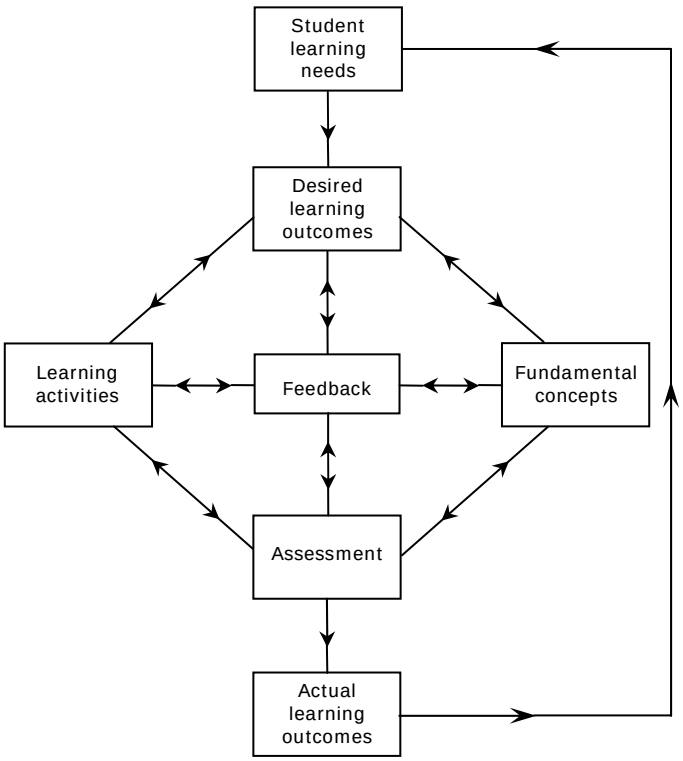

Figure 2: Curriculum planning model

The curriculum model above uses the term desired learning outcomes, rather than objectives, mainly because the award-winning teachers commonly referred to high-level aims or goals, such as generic capabilities or learning to learn. However, there was very little mention of specific lesson-level objectives and no mention of behavioural objectives. In the courses we have run for new teachers, we have found that many academics find writing objectives difficult and not particularly helpful. If you are one of these then dispense with them, but make sure that degree- and course-level aims are taken into account in your planning. If you find writing more specific aims or objectives helpful in your planning, then use them.

The model refers to fundamental concepts rather than content. Considering fundamental concepts in planning courses gives consideration to desired learning outcomes, and so may be a substitute for objectives. Feedback is placed centrally within the other four curriculum elements to imply that feedback should be sought on all aspects of a curriculum and use made of it to iteratively fine-tune programmes and courses. Assessment is included as a separate element because of its strong influence on learning outcomes.

The five central elements are shown as linked and interrelated. In the interactive model of curriculum development, the linking implies that the order of dealing with each element is not pre-determined. In our model the linking is intended to emphasise the importance of achieving consistency between the curriculum elements in the model. For a curriculum to succeed in achieving the intended learning outcomes, each element needs to be related together in a coherent manner.

Part 4

Nurturing desired outcomes

Mechanism for development of desired outcomes

While expounding on the learning outcomes they thought would be necessary, the student interviewees in the focus groups often, directly or indirectly, revealed how they thought the learning outcomes were developed in their programme. It seemed to be a natural corollary to progress from an outcome to its development, in most cases without prompting.

For an outcome to be developed there needs to be an opportunity to practise its use. Generic capabilities are nurtured if programmes and curricula provide learning activities which require the deployment of the capability in question. Developing these capabilities occurs in courses which make intellectual demands upon students. Qualities like critical thinking develop through students engaging in analytical debate about key topics. As a result, well planned courses can be demanding.

Developing these capabilities is consistent with requiring students to practise using the higher-order intellectual skills needed for a discipline. There is no need for courses dedicated to developing generic competencies if they are developed through use within the context of the discipline. The best way to develop critical thinking is to make demands on students which require the practice of critical thinking.

There has been a long history of advocacy of the benefits of active learning for specific learning objectives. Of the families of models of teaching reviewed by Joyce, Calhoun and Hopkins (2002), almost all require some practice or application from the learner; so there should be no problem in accepting that good teaching involves the provision of active learning experiences. However, the principle of providing practice in the deployment of generic capabilities does not seem to have been promulgated as the principal mechanism for their development. Indeed, some of the advocates of generic courses for skill development appear to be taking an opposing position by teaching about the skill rather than providing opportunities to practise it.

The analysis of the mechanisms for nurturing desired outcomes started with an open inductive stance which sorted the interview comments into categories referring to aspects of teaching and learning, such as assessment or the relationship between teachers and students. The categories which emerged were then compared to the elements of the teaching and learning environment in an earlier quantitative model from the Student Engagement survey (Kember & Leung, 2005a, 2005b; Leung & Kember, in press a, in press b). There was a reasonably strong overlap between the qualitative categories and the quantitative model. It was therefore decided to use the more developed quantitative model as a framework for the analysis of the qualitative data. Evidence for the appropriateness of the model comes from the degree of fit of the extensive quotations from the interviews into the components of the model. The following sections show how the model provides an explanatory framework for the interview data.

Teaching and learning environment

The remainder of this part shows how the curriculum and the teaching and learning environment can be configured to ensure that practice is provided in the use of the capabilities, and hence they can be nurtured. The facets of the broad curriculum and the teaching and learning environment are thematically related by the need to exercise the use of the capabilities.

In this study, the teaching and learning environment can also be described with a hierarchical structure. In this case there are three higher-order categories, which were given the labels teaching, teacher-student relationships and student-student relationships. Under these higher-order factors are grouped a total of eight facets describing the teaching and learning environment.

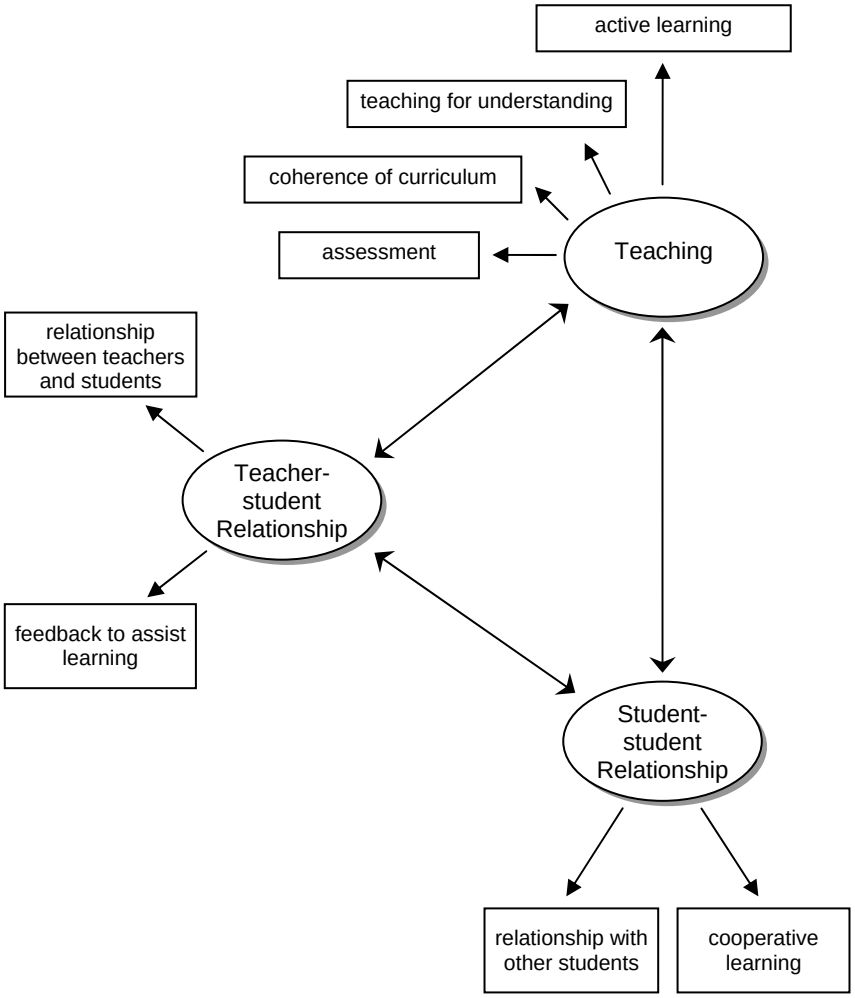

Figure 3: Factors in the teaching and learning environment

The teaching higher-order factor subsumes four variables, namely active learning, teaching for understanding, assessment and coherence of the curriculum. These four elements might be interpreted as the curriculum design, if this term is treated somewhat more broadly than the way it is often treated in higher education as a list of content to be covered in a course. The other two higher-order factors deal with teacher-student and student-student relationships.

The remainder of this part examines the facets of the teaching and learning environment to see how they contribute to nurturing desired learning outcomes. Assessment has a major impact upon whether or not outcomes are achieved, and so part 5 is dedicated specifically to it.

Active learning

One of the most important facets of the teaching and learning environment for promoting the development of capabilities is the provision of active learning experiences. Practice of the capabilities occurs when there is an activity demanding their application. The capabilities are not practised through sitting in a lecture theatre listening passively to a lecture.

Perhaps the most common form of learning activity noted by the students in the focus groups was discussion, which was particularly important for developing critical thinking and problem solving abilities. For discussion to be successful in nurturing capabilities, the professor or tutor needs to take a facilitative and stimulating role. Most of the courses featured student presentations, which required students to research a topic and initiate discussion. The professor could then facilitate in-depth exploration of the topic through searching questions.

> In our programme, we have a lot of tutorials and small group discussion. We have lively interaction with professors. We are engaged in forming and voicing our views, and the professor duly responds to us. They choose topics which are rather unusual, that shock your system and makes you really think. They have prepared a lot of questions that stimulate our thinking. Students are actively engaged in thinking and generating their opinions and answers. (GPA2)

The need for self-managed learning is amply demonstrated by the following quotation. The pace of change in technology and society is now so rapid that graduates need to be equipped to continue learning by themselves. In the medical faculty, self-managed learning is an important capability for students to develop.

> I don't think so; I think 90% of them would remind us that after 5 or 10 years, about 50% of the content in our books will be changed and updated. Some tell us that what they had said would not be true anymore and they often remind us to keep updating ourselves. (Med5)

Developing the capacity to be a self-managed learner comes through student-centred approaches to teaching. These can require students to engage in highly active forms of learning, which many students would have had little experience of at school. In most cases students see the value in these forms of learning and eventually prefer them. There is little truth in the widespread perceptions that Hong Kong students prefer passive forms of learning.

> In the past couple of years, I emphasise more the enhancement of self-learning and arousing interest in students. For instance, we organise a case competition within the faculty. About 10 teams of roughly 100 students participate each year. We'll think of ways which make the competition a fun event. They are given a case on Friday and they have to present their analysis the next day. They will have to burn the midnight oil that night. They all moan but are fully charged and enjoy the whole event to the full, and they ask for more similar events. These kinds of activities are effective in motivating self-learning. (Gordon Cheung – Management)

Developing self-learning ability requires the teacher to be a guide or facilitator rather than a didactic lecturer.

> I've become more open to my students, let them develop their independent thinking through my teaching and guidance. I would tell them, 'These are the authors and their backgrounds. Can you put your feet into their shoes and enter into their lives through their writings, how they lived in their times?' (Lo Wai Luen – Chinese Literature)

Developing self-managed learning skills follows the principle of requiring students to practise the skill they need to develop. One of the main components of self-managed learning is finding appropriate knowledge and information by oneself. Therefore, the capability can be developed by requiring students to search for some material themselves rather than providing them with everything they need. Self-managed learning can be encouraged by not presenting students with a complete set of content; so they have to find some material themselves. This provides practice in learning by oneself, which helps the development of self-managed learning ability.

> Sometimes the notes given do not contain all the information; then we will look in the references for details of the situation, what is happening and the current thinking abroad. (N1)

> We have to search for our own materials. (MS2)

> But I think self learning is very important as well, especially to university students because in the past we were used to being spoon fed. But now there are a lot and variety of resources in a university. If you want the lecturers to lecture everything to you, taking 90 credit hours per semester may not even be enough to acquire everything; therefore to motivate oneself to search for information is important. You will, at the same time, be able to learn something through the process of researching. (Med3)

If desired learning outcomes are to be achieved, curriculum planning needs to address each desired outcome and plan activities in which students will practise their use. The following quotation shows that course planning in physics recognises a need for creativity and flexibility.

> To train students to be creative and flexible, we have introduced a new component in most of our courses, that is, making students read journal papers and present their findings. Students find this component the hardest. … We have to persuade and push them to try harder. However, it is easier said than done. For the bright ones, we have to push them to stretch themselves, whereas the less bright, we have to take them by their hands and walk through the process with them. It is very time-consuming. (Chu Ming Chung – Physics)

Professional programmes need to ensure that students develop the capabilities necessary for the future performance of the professional role as well as the generic capabilities which are the subject of this booklet. Choosing suitable learning activities meant that both could develop in concert. An example is taken from the Architecture programme which featured design projects. Like projects in other courses, these provide practice in all four of the generic intellectual capabilities in addition to specific Architectural design skills.

> In a building technology course, we are asked to build a bridge. You can choose whatever method you want to build this bridge but the length and function is fixed. This is like a small scale design course. The focus is on structure. I discovered that the majority of us directly asked the teacher for comments or feedback. The interactions between teacher and students are great. (Arch5)

Teaching for understanding

Closely related to the deployment of active learning experiences is the need for teaching to promote an in-depth understanding of a topic. Intellectual capabilities are developed through practice in their use. Courses which aim to give students a thorough understanding of key concepts can provide that practice. Those which, intentionally or unintentionally, expect students to remember a mass of detail are unlikely to stretch intellectual capacity.

> The reason we have such a course is mainly to prepare us to learn more difficult things in the future. Such as for mechanical properties, we need to have good a mathematical foundation in order to apply what we have learnt to solving problems. That is, you really need to understand; memorizing is just a meaningless act. (MS1)

This meant that topics need to be explored in depth. As time allocated to courses is finite, this might imply that concentration on dealing with a restricted number of key concepts in depth is needed, rather than shallow coverage of many topics. Understanding comes about through being able to relate to real life applications, rather than learning abstract theory.

> The good teachers give real life examples, the presentation is informal and yet full of intellectual reflections. They show you how to go in depth, into analysing an issue rather than just touching the surface. (GPA3)

This again implies teachers taking a questioning and facilitative stance. Rather than presenting everything students are left to explore part of a topic for themselves. When students ask questions they are prompted by questions in return rather than by being given answers directly. The aim is to stimulate students to practise the higher-order thinking skills in order to nurture their development.

> They won't give you a ready-made answer and they expect you to further explore the topic yourself. They use questions to stimulate you to think deeper into the issue or answers. From the point of view of study, some students might prefer teachers to give them a straight answer. (N4)

Challenging beliefs

To promote learning with understanding often requires challenging students' preconceptions. The most fundamental beliefs which need to be challenged relate to the nature of learning and of knowledge. The Hong Kong school system is highly competitive and examination-driven. To obtain a place at university students have to obtain high grades in the externally set examinations. Schooling sets a high priority on students learning the examination syllabus and remembering model answers is a common strategy. As a result of this conditioning at school, it is common for students to envisage learning as remembering material for examinations. Knowledge is something which is right or wrong. Multiple perspectives or conflicting theories have not been encountered. Such beliefs are clearly incompatible with university study, and so need to be challenged.

> Unfortunately, in Hong Kong education, they are not trained to discuss and debate at primary and secondary levels. It's difficult for them to put down the old mode of learning and pick up discovery. … Students who grow up in Hong Kong, however, are generally frightened as they are so used to having model answers given to them in their secondary school training. 'You just give me the model answers, tell me all about the author and I will memorise so that I can regurgitate during exams'. There were times when students were really frightened and dissatisfied with the fact that I had not given them the absolute model answers. So, it takes rather a long time to convince the students that the teacher is not there to tell me everything or hand down knowledge. It is I myself who need to think independently, analyse, discover and eventually understand. (Lo Wai Luen – Chinese Literature)

Engineering is also not seen as a factual subject. It is only by dealing with ill-defined problems that students can develop the reflective judgemental skills necessary for dealing with the type of messy problems that engineers and other professionals face in real life.

> Ability to think independently in an 'out of box' way. Not just 'problem set, solve the problem, compute the answers' which is a very typical way for an engineering students. But in real life, it is useful but not the most useful. What is important is to think independently, being able to solve an open-ended problem, finding answers by doing research, being able to articulate the trade-off of different answers and weigh their pluses and minuses. In engineering, there are seldom right or wrong answers. There are always multiple possible answers. You have to weigh what is the trade-off of different solutions and try the best one for that particular situation. So, being able to adapt to the environment and find solutions in a very flexible way is important. That comes with communication skills. (Soung Liew – Information Engineering)

Unlearning is frequently necessary in technical subjects. There are two reasons for this. One is the need to change beliefs about learning discussed above. The other is that students often hold inappropriate or out-dated conceptions of fundamental concepts. Unless they go through an often difficult process of conceptual change, they will have a shaky foundation of fundamental concepts on which to build other knowledge.

> I teach astrophysics. I want my students to know that there are plenty of new discoveries in recent years, some of which are beyond the scientists' imagination in the past. Therefore, to keep your mind open and accept new things is vital. Our knowledge is expanding so much that it is impossible for us to catch up with all the new scientific discoveries of today. We should have the confidence that we have the ability to learn new things by ourselves. (Chu Ming Chung – Physics)

The exemplary teachers recognise that they should be helping students develop the ability to evaluate evidence and make judgements. These abilities can be developed through weighing conflicting theories in the particular subject area.

> In every subject, there are always some conflicting opinions or theories which may be confusing at times. Good teaching should be able to show a good system to analyse them and enable students to form their own sound judgements. For example, when teaching the origin of Chinese characters, there is a serious debate as to whether it began three thousand years ago (as the traditional view claims) or seven thousand years ago. My teaching last year and this year differs as there are now more archaeological finds which suggest that it could easily differ by a couple of thousands years. (Chan Hung Kan – Chinese Language)

Thinking processes developed through discipline-based learning equip students to make sound judgements in other areas.

> There is plenty of room for discussion and no standard answer to these questions. That is why journalism is so exciting and will inspire those who are interested. Such a process of thinking, debating and investigating is valuable for students who are eager to learn and apply what they have learned in journalism to other personal decision-making. (Kenneth Leung – Journalism)

Students can find confrontation of deep-seated beliefs a very disconcerting experience. However, if they are to get grips with fundamental concepts of a discipline, challenging preconceptions is important. The process of introducing changes to ways of thinking and learning needs to be gradual. Those who are dropped in at the deep end are more likely to sink than swim. Lessons need to be given at the shallow end until confidence develops.

> So, my teaching will move from a more structured approach at the beginning to a more open-ended one towards the end; the teacher will move away from readily providing answers to giving no concrete answers eventually. This is exactly what the real world is: no definite answers for questions. At the start, they will gain confidence from 'getting the answers right'. This confidence is important to enable them to gradually discover that there are no absolute concrete answers, but rather a logic or framework of thinking, based upon which they can formulate their viewpoints, judgements and predictions. Learning is about developing their own thinking rather than finding model answers. (Andrew Chan – Marketing)

Coherence of curriculum

The whole curriculum needs to have a high degree of internal consistency, which is compatible with providing practice in the desired capabilities. Curriculum design and planning need to include clearly formulated aims for the development of necessary generic and professional/ disciplinary capabilities. The design of the curriculum then needs to ensure that adequate practice is provided in each capability.

Planning a coherent curriculum is illustrated by the Architecture programme. The curriculum is bound together by the studios, which are integrated with subsidiary subjects. The students clearly perceive the intended links and structure. As well as providing a conceptual framework, the planning also ensures that the components of the programme also work harmoniously on the development of the necessary capabilities.

> Our design studio is a vertical studio. Each year has four sections and each section has a cross-year group which forms different studios. There are a few parts in a studio, and each part is led by a different tutor. (Arch4)

> Other courses such as history, structure, how to use materials are useful knowledge being given, whereas you are actively creating something in the studio. (Arch1)

Student-student relationships

Another higher-order factor in the teaching and learning environment is the student-student relationship factor (Figure 3). This includes considering 'relationship with other students' and 'cooperative learning'.

The working together capabilities are communication and interpersonal skills. The former implies the ability to effectively communicate ideas to others and to be able to hold a productive interactive dialogue. Interpersonal skills are needed for the effective functioning of teams.

Once again these capabilities develop through practice. Communication skills are practised when students give presentations and hold meaningful discussions. Interpersonal skills are practised when students work together in teams. For the capabilities to develop courses need to provide this practice.

Student-student interaction

For productive discussion and interaction to take place there is a need to establish a rapport between students in a class. Class coherence can be developed through group learning activities. Students get to know each other and learn how to work together in a cooperative way.

> We get to know each other quite well in our first year. Our social group is then formed and will remain through the years, whereas, academically, we are constantly arranged into different groups for projects, tutorials and clinical practice, and we get to know more students that way. (N4)

Successful development of coherent student groups promotes interaction and learning out-of-class as well as during classes. Architecture prompts good student-student relationships by providing an open studio in which students of all years can discuss their work.

> Among students we discuss a lot, which is really helpful. We'll look at each other's design and gather more opinions that way. Our studio is open without walls. Students from all years are there. There will be MArch Year 2 students sitting next to me (a second year undergraduate student). They are able to give me ideas. We communicate really well. (Arch4)

Cooperative learning

The benefit of good student-student relationships comes through the formation of study groups which work together to make sense of difficult concepts. Collaboration is focused towards members of the group trying to reach a better understanding together; so the students worked together out-of-class using an *engager* approach (Yan & Kember, 2004a, 2004b).

> Co-operative learning out of class is quite important for me. My academic performance in Year 1 was quite poor and I was lucky to have a few students who could help me out. We would continue our discussion right after class which helped me a great deal in understanding the subject and consolidating my memory. We also discussed how we would tackle the paper assignments and met before exams. This has definitely improved the quality of my learning, much better than if I were to do it on my own, going to the library and digging the book out by the author's name. (GPA5)

Interpersonal skills are practised by requiring students to work together in group projects. The following quotation illustrates graphically the way that group projects can foster teamwork skills as well as academic aims. Groups may not always hit it off from the outset, but the process of establishing a way of working together effectively provides the learning experience which promotes the development of interpersonal skills.

> All of us wanted to be the leader. For example, I have a way of thinking and I wanted others to agree with me, to write things that go well with my idea and this is very difficult to achieve. On the contrary I think I have learned the skills of others more. … I can remember that I was once partnered with two students, one from journalism and the other from geography. The questioning skills of the journalism student were very different from that of anthropology; I felt s/he was in a stronger position. Another group mate was from geography; all s/he cared about was the environment. … Our approach was to find someone to interview as soon as possible and his/her approach was very different. Nevertheless we worked; each came up with different sources and the outcome was quite pleasurable. (Anth1)

Teacher-student relationships

The final higher-order factor acts as an intermediate supporting variable to both the teaching and student-student relationship higher-order factors. The factor does not impact directly upon the development of capabilities, but is included in the model because it has an indirect effect by having an important influence on the other two higher-order factors.

Good teacher-student relationships and a high degree of interaction are needed to support the type of teaching described above. The type of facilitative teaching described in the factors under teaching can only take place if there are good teacher-student relationships. Development of close relationships also facilitates the teaching which requires the students to be actively engaged in discussion.

Positive teacher-student relationships also help promote coherence within a class group, which leads to positive peer-student relationships (Yan & Kember, 2003, in press). Teachers have a part to play in promoting good student-student relationships and in designing learning activities which promote practice in cooperative learning

The next three sections refer to the three variables subsumed under the teacher-student relationship higher-order factor. The variables each represent facets of the relationship between teacher and students, namely teacher-student interaction, feedback to assist learning and assistance from teaching staff.

Teacher-student interaction

The teaching factors established that teachers need to take a facilitative stance to promote student-centred learning. This means not always supplying direct answers to students' questions, but probing and prompting so that they work out solutions themselves. Questioning techniques which required students to delve deeper and be more reflective are more likely to stimulate higher-order thinking capabilities.

> Sometimes it feels the more you ask, the more it becomes unclear and lacking direction. From the beginning, based on my own perception of thinking of my design, I feel firm about my idea. Then you go and see them. They will not offer you an alternate idea and tell you that your original one is not good. Rather, they will continuously ask you questions, 'Do you think this is good in this way here?' I recognize that they are trying to make us reflect on our own work. But when they are posing so many questions, this leads me wonder if they want me to do it in a different way. It really depends on their questioning technique. (Arch4)

Taking a critical stance at times is important in promoting reflective thinking. Challenging students to improve their performance may not be comfortable for either party but, if done in an appropriate manner, can result in a more reflective critical stance.

> Very often we would classify our doctors as either being benign or malignant … (Laugh) Actually 90% of them are benign tumours whereas only 10% of them are malignant tumours. Even though 10% of them are malignant, actually their intentions are still for the sake of us. Right at that moment, I would be scared after being heavily scolded but, afterwards, I would use this as a joke and share it with my peers. (Med2)

Feedback to assist learning

Discussion could take place in- or out-of-class. Individual attention is needed at times and is easier to manage out-of-class.

> Sometimes, if you've done a very good piece of work, or otherwise, the professor will discuss it with you in private. It's quite flexible and informal. (GPA2)

Assistance from teaching staff

To generate high levels of interaction, teachers need to be available to talk with students. Students need to feel that they could call in to see their professor when they did not understand a concept or needed help.

> If we do not understand, we can always go back and ask him/her, s/he would not say something like I've mentioned already! That is, when we enter his/her room, s/he would act patiently, pulls his/her chair (beside you) and explain to us again. (MS1)

Effect of teaching and learning environment on learning outcomes

The discussion of the teaching environment has concentrated on showing how practice can be provided in the use of intellectual capabilities. The same type of teaching environment also provides practice in the capabilities grouped under the working together category, namely communication and interpersonal skills. Hence, a suitable teaching environment contributed to the development of these capabilities.

The most obvious mechanism for the practice and development of these capabilities was through the learning activities. Most of these involve discussion among students, and between teachers and students. This provides direct practice in both communication and interpersonal skills.

Figure 4 is the culmination of the model for the development of desired learning outcomes. The teaching and learning environment is shown on the left side of the model, the hierarchical set of desired outcomes on the right. The arrows from the environment side to the desired learning outcomes imply the nurturing effect of the environment on the desired learning outcomes.

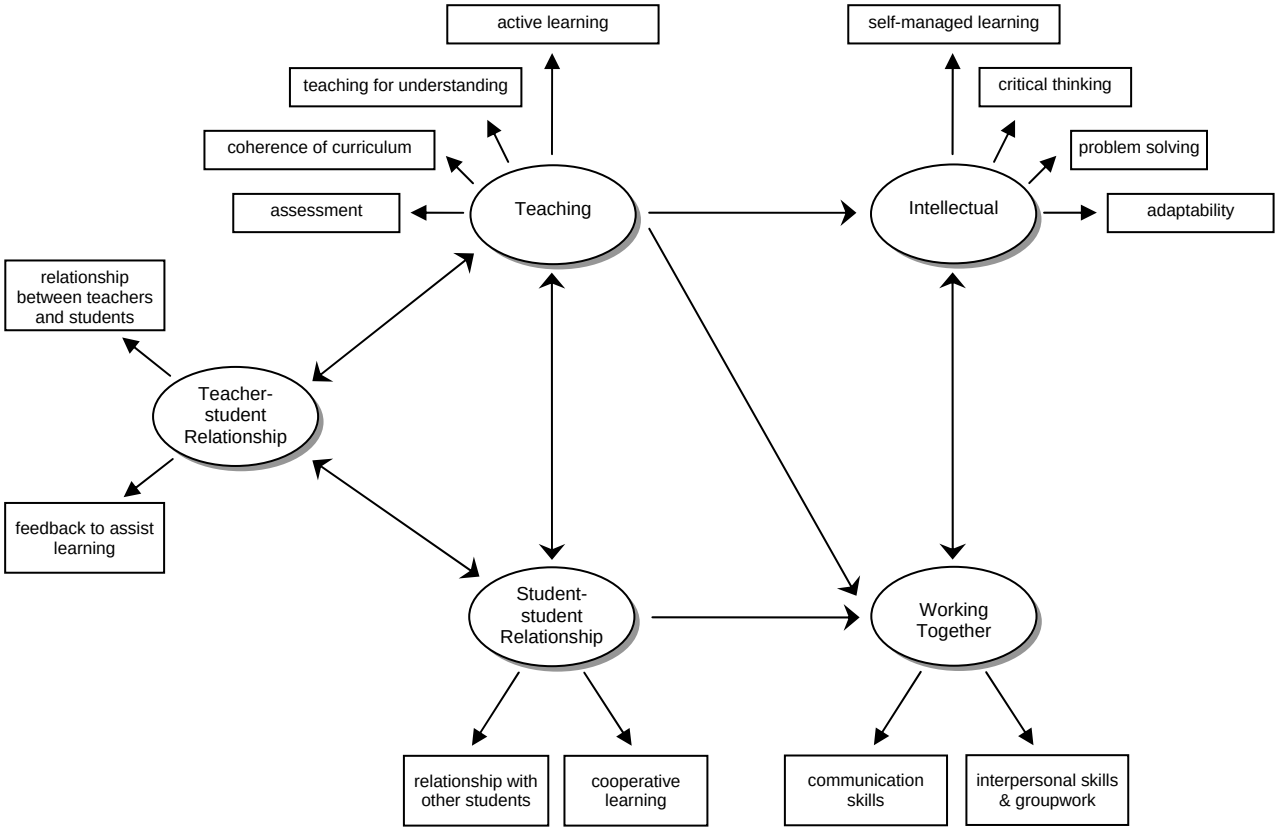

Figure 4: Model of the relationships between factors in the teaching and learning environment and desired graduate outcomes

Part 5

Assessment

Influence of assessment on learning outcomes

Part 3 developed a curriculum planning model consistent with the interviews with the award-winning teachers and the student focus groups. This model (Figure 2) is shown again below, because assessment is an important component of the curriculum model.

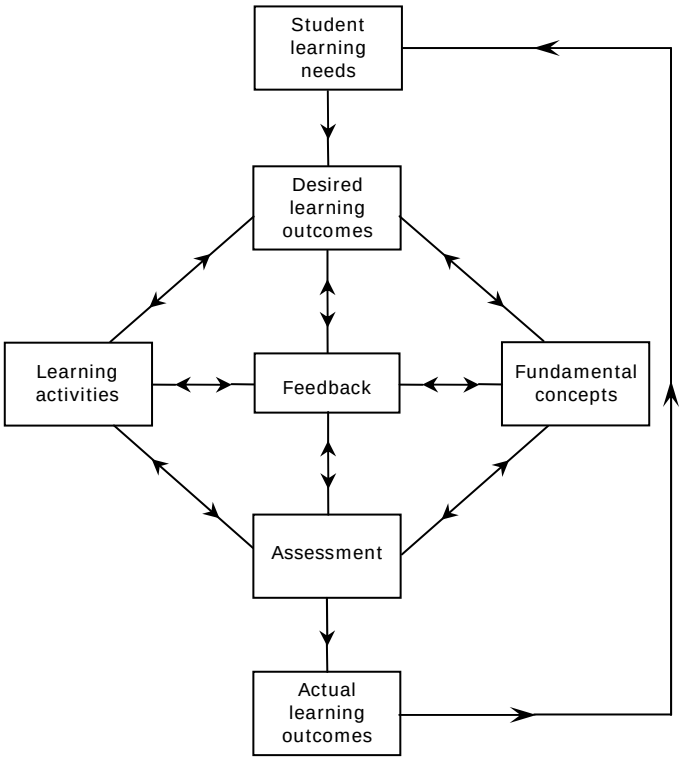

Figure 2: Curriculum planning model

For the desired learning outcomes to be achieved all elements of the curriculum model need to be in concert and consistent with the desired learning outcomes, which in turn need to be compatible with eventual student learning needs. In the model diagram, assessment is shown at the base of the five-elements of curriculum planning. This positioning was deliberate; so that the arrow from assessement appears to impinge directly upon learning outcomes. This was intended to signify the strong influence which assessment has upon actual learning outcomes.

Students tend to be assessment-driven (Biggs, 1999). The learning approach they adopt is normally consistent with what they perceive the assessment requires (Thomas & Bain, 1984). If students are to develop intellectual capabilities through practising them, the assessment, therefore, should require them to deploy the capabilities to complete the assignments.

The implication of this conclusion is that the assessment needs to be consistent with the aims towards active learning and teaching for understanding argued above. There needs to be compatibility between assessment and teaching approaches in class. If there is inconsistency such teaching approaches will be undermined. The implication is that assessment needs to be carefully

designed to encourage the desired type of learning. Students will practise the type of learning they perceive the assessment needs. If this is not consistent with the aims, they will not be achieved.

> I have no objection to an assessment-driven learning style. It's a matter of means and ends. We should use the means, assessment, to make student learn better at the end. Assessment is part of the curriculum. We should think carefully about the function of assessment. (John Chi Kin Lee – Curriculum and Instruction)

Authentic assessment

If assessment is to be consistent with desired learning outcomes and eventual student needs, it needs to be a valid or authentic task. In a professional programme, a significant part of the assessment should relate closely to the eventual professional role. For a pure discipline, assessment should closely replicate the practice of the discipline. This may sound obvious, but it is remarkable how much assessment does not follow this simple dictum. Assessment commonly tests knowledge of a discipline – and all too often recall of that knowledge – rather than the practice of the discipline.

Examinations are not strongly favoured by the award-winning teachers. The NVivo word search facility (NVivo, 2000) was used to search the transcripts of the interviews for terms like 'examinations'. Only one of the interviewees described the use of examinations as a major part of the assessment in their course and commented on it in a positive light. To the contrary, there were reservations about examinations.

> Unfortunately, we rely on examinations a lot. Examinations are still a substantial part of assessment. The University has a committee on assessment which recommends to teachers that a certain percentage of the grade has to be come from examinations. This is very inflexible. I think this is bad practice. … life does not operate in this way. When you graduate and go out to work, you don't have this kind of setting. (Soung Liew – Information Engineering)

The journalism course eschews examinations in favour of projects. The rationale is that projects are better able to encourage and test the desired learning outcome, which in this case was in-depth analysis. If the aim of a course is for students to develop analytical ability some, at least, of the learning activities should give practice in analysis, and the assessment needs to require analysis. The gradings should reflect the level of analytical ability.

> There is no examination in this subject. I just ask students to do projects. Students have to do some analysis in their projects. Then I can examine whether the analysis is in-depth and if the student is able to identify the problem. All these show how much a student has learnt. Therefore, the grade reflects how much students have learnt, and their analytical ability. (Kenneth Leung – Journalism)

There was also no great enthusiasm for multiple-choice questions. A similar word search found no positive mention of them in any of the transcripts. Given the nature of open semi-structured interviews, this does not mean that none of the interviewees used them, but it does suggest that they were hardly a major feature of the assessment employed by the exemplary teachers.

Consistency with professional needs

Professional courses and those which include elements of experiential learning or professional practice should have aims which relate to the development of professional competence and the display of it in the period of practice. The assessment, therefore, needs to relate to these aims.

The intended outcome of a management degree is a competent manager. Assessment should, therefore, relate as closely as possible to the role of a manager. This can be simulated by cases dealing

with the ill-defined problems managers have to deal with in practice. Assessing knowledge of theories of management is not consistent with this aim.

> My exams are mainly case-based. Seldom do I use multiple choice or Q and A which is no more than a memory test of rote learning. The very nature of teaching Business is that we do case analysis which is applied. Therefore, we assess students understanding by judging how well they can carry out that application. (Gordon Cheung – Management)

Reflecting on the application of theory

Most courses teach a number of theories. A good way to test understanding of these is to set assignments which require students to apply the theories to situations they are familiar with by reflecting on their own experience. An example of open assessment which could be related to the individual student situation comes from anthropology. The example asks students to make use of theories they have been taught in analysing situations they are familiar with.

> For *Anthropological Theories*, the final paper for the people to write was, 'Pick any event which is going on in the world today, use five of these theories to explain it.' That gets students to think for themselves with any event or any personal interaction. One person described his experience working for a modelling agency, how that could be explained through these different theories. That makes the theories not abstract but directly explicit to people's life. (Gordon Mathews – Anthropology)

This type of assessment is particularly effective for part-time students who are working in the field they are studying. Those in teacher education courses, for example, can reflect on how theories apply in their own schools or their own teaching.

> I can give you an example of what I want in my assignments. I ask my students to examine organisations using different metaphors, different lenses of understanding it. I don't want them to simply tell me these other ways that we can do certain things. I will say, 'The first part of your paper, you've got to give me two or three pages that tell me about the context of your school. I don't mean how many students or buildings you've got, but the feeling of life in your school. Then you apply the theory to that, and you tell me what these metaphors or lenses tell you about your school.' (Allan Walker – Educational Administration)

Variety of assessment

Achieving consistency between desired outcomes and assessment will often imply having a range of assessment items. Most courses have a number of aims and it can often be hard to devise a single item or type of assessment which tests all of the significant aims. In these cases it is preferable to have several items of assessment of different types.

The nursing and medical programmes use a wide variety of types of assessment. The programmes aim to develop a range of capabilities, both professional and generic. For students to practise each of them, the assessment needs to take a variety of forms to provide a genuine assessment of the capabilities.

> Whatever assessment style you can think of, you can find it in our medical faculty. When I first entered Year 1, I was told by one higher year student that 'just think of all kinds of assessment styles and all these possibilities will exist in our medical faculty'. Such as oral examination; hands-on examination; written examination. And written examination is divided into multiple choices, matching … essays, short questions, so forth. Whatever you can think of. Even to demonstrate or role play. (Med1)

The other advantage of having a variety of assessment items is that some can be related to learning activities. This is another aspect of achieving consistency between curriculum elements.

> Asking students to demonstrate the application of learning theories in term papers is important. Small exercises will be assigned such as the following: 'Reflection papers in personal growth in teachers: Ask students to select two articles distributed in class and express their understanding'.
>
> For in-class activities, students can use some topics discussed in class as a base for reflection. Students can be creative in showing their reflection. For example, I asked students to try something they never tried before. The rule of thumb is that the activity must not violate the law.
>
> As an example of creative activity, some students played the role of picking aluminium cans. They asked those people who have finished playing football to give them the soda cans. The purpose of this activity is to experience the life of various people in society. Students write up the whole process. This is a training method for reflection. The reason for participating in creative activity is to let students know that I don't want students to feel homework is boring. I want students to feel some interest in homework. (Patrick Lau – Educational Psychology)
>
> I am very satisfied with the assessment practice. Based on my combination, I am free to choose to do a term paper and a presentation. I am given the freedom to concentrate and research in-depth into the topic that I've chosen. I like that very much, to be able to do what I am really interested in. The trade off could be that I only know a lot of a very narrow part of the knowledge and not know very well other broader issues. (GPA4)

The Architecture, Anthropology and GPA programmes permit students a significant degree of freedom in choosing an assignment topic. This allows the students to select an area of interest and explore it in depth. By requiring students to set their own topic they become practised in dealing with ill-defined problems and are required to display self-managed learning.

> I still think it is related to our assessment method. Such as we are to set our own topic, we are responsible for asking questions and solving those questions. We have to do everything on our own. Certainly this process has trained our ability to solving problem. Throughout the whole process, since we have to find out the problem. (Arch5)

Part 6

Feedback for evaluation

Feedback in the curriculum development model

Feedback is the central component of the curriculum development model introduced in part 3 and shown again in the previous part. Feedback, principally from students, can inform the development and refinement of each of the other elements in the model. Excellent teachers recognise that there are always ways in which a course can be improved. Initial plans are carefully made and then fine-tuned in the light of student feedback.

> Constantly, your students are offering suggestions to improve your teaching. To resist appropriate changes is an attitudinal problem. If you are open-minded, you can make relevant improvements. Not all suggestions are reasonable. In some cases, you can modify and improve what students suggest. (Andrew Chan – Marketing)

Good teachers should, therefore, be constantly seeking feedback with a view to improve their courses. Even the award-winning teachers were not satisfied that perfection had been reached. Further refinements can always be made. Students' needs change, and so adaptation is necessary.

> I gather feedback from students asking questions, at the end of the class, as they are unwilling to ask questions during lectures. Evaluation forms are very useful, particularly the part where students can write and express their frustrations, e.g. the project is too difficult, etc. These are much more useful than number punching. It gives you good general guidelines.
>
> The Department pays attention to teaching. In our discussion, we talk a lot about how to improve the way we teach: forming smaller class, getting feedback from student representatives on our courses. They do give important feedback based on which we restructure our courses to meet their needs. (Soung Liew – Information Engineering)

Reflection upon practice

The inclusion of feedback as a central component of the curriculum model implies a need for reflection upon practice. The award-winning teachers take time after classes to think about what went well and can guide future practice. They also need to address what did not work well and might be improved.

> My teaching is improving continuously. I reflect upon my practice as I go along. Personally, I constantly reflect upon my teaching and seek to improve my skills almost daily. I think of ways to enhance students' learning so that they can retain the knowledge and skills for a long time and apply them appropriately. It will be great if I can make the learning process enjoyable. (Leung Sing Fai – Clinical Oncology)

Iterative improvement of teaching in this way can be seen as an application of the action learning cycle – planning, action, observation and reflection. It is also akin to the developmental testing cycle used in business and engineering.

> Learning is an internalization experience. I think action learning is important in the context of education. Reflection is also important. … Application of action learning is important. (John Chi Kin Lee – Curriculum and Instruction)

Another way of putting this is learning from mistakes. If something doesn't work, either determine how to improve it or try something else. You can also learn from your successes of course. If you learn from your successes and failures you will find that, over time, you start having more of the former.

Multiple ways of obtaining feedback

Just about all universities now require the use of teaching evaluation questionnaires on a regular basis. Many of the interviewees commented that these did not provide sufficient feedback and described other methods they used. Many teaching evaluation questionnaires were introduced primarily for the appraisal of teachers by giving university administrations simple quantitative measures to compare teaching performance. Instruments designed with this aim in mind often provide insufficient feedback to diagnose aspects which might be improved. Relying mainly on one or two overall satisfaction items is also common, but gives limited feedback on the multi-dimensional aspects of teaching.

Students also become reluctant to provide detailed feedback in response to open-ended questions unless they see action taken on their comments. Students are often asked to fill in questionnaires each semester for every course they take and for every professor and instructor who teaches them. It is easy for evaluation to become a ritual to be completed as quickly as possible.

It is, therefore, not surprising that the formal evaluation conducted by universities often provides insufficient feedback for the process of curriculum development and improvement. Good teachers commonly seek out feedback themselves. This feedback for evaluation comes from a variety of sources including direct conversation with students, information from Teaching Assistants (TAs) and course evaluation questionnaires.

> Generally speaking, students are extremely important in helping shape what a class should cover. And so I listen a great deal to what I am told in the course of the class and what the TA tells me. So they have a fundamental role in telling me how I should proceed. For example, I'd always ask students at the end of a course, 'Which of these books do you most like? Which do you least like? Which would you not want to use next year?'
>
> Course evaluations are helpful to see what things didn't work. In my course evaluations, what is going up is how much and how hard students' worked and those are incredibly high. That's good in that people are really working. They know what to expect. (Gordon Mathews – Anthropology)

Student Engagement survey and curriculum reviews

The Student Engagement survey was used to identify programmes with good records in nurturing desired learning outcomes for the student focus-group interviews. The initiative commenced as a TDG-funded project to provide undergraduate programmes with feedback on programme level issues. Each undergraduate programme is evaluated in alternate years and feedback provided to the appropriate department.

The data from the survey has become part of the information used in the cyclical reviews of the Integrated Framework for Curriculum Development and Review. In the review process the department produces a self-reflection document which draws upon qualitative and quantitative evidence to reflect upon each aspect of the curriculum development model highlighted in the previous parts of this booklet. The review process is facilitated by discussions with a panel of peers. The aim of the review process is to assist the department to ensure that there is consistency between elements in the curriculum model so that the desired learning outcomes are achieved.

Part 7

Case study in curriculum development

Identifying desired learning outcomes

Previous parts have addressed individual components of the curriculum planning model. This part presents briefly a case study illustrating the working of the whole model. The case is the redevelopment of the Pharmacy curriculum.

The model starts with consideration of students' learning needs, which leads to the specification of desired learning outcomes. In this professional course the student needs correspond to the knowledge, capabilities, skills and qualities needed by practicing pharmacists.

The desired learning outcomes were then formulated under the following main areas:

- professional knowledge,
- professional attitude,
- work manner,
- use of information, and
- counselling skills.

In addition to these professionally related capabilities, there was also recognition that graduates would need the types of generic capabilities discussed in part 2.

Revisions to curriculum

The next task is to design content, learning activities and assessment which provide practice in the specified desired outcomes, and so ensure that they are nurtured. It is not necessary to provide full details of the curriculum, but two new courses will be mentioned. The first is *Introduction to Pharmacy*, which gives an overview of the role of pharmacists, what they do and the skills they need. This is a foundation course which helps motivate students by showing them why they need the knowledge and skills taught in other courses.

Another new course was the *Pharmacy clerkship* in the third year. The clerkship takes place in hospital, community and industrial settings, ensuring that the students have authentic experiences. These are important in developing the desired professional learning outcomes.

Evaluation and refinement

The curriculum planning model has feedback as the central element. It also features a feedback loop and interaction between the components. This implies that evaluation and curriculum refinement are on-going processes. Feedback needs to be sought from a variety of sources to inform regular improvements to the curriculum. The Curriculum Committee meets regularly to review feedback and to suggest improvements.

One of the forms of evaluation used by the School of Pharmacy is an annual graduate survey conducted about six months after graduation. The survey was designed specifically to seek feedback from students on their attainment of the desired learning outcomes. The instrument, therefore, has scales for each of the five professional areas listed above, with items relating to facets of competence

in each area. The survey also includes scales from the Student Engagement Questionnaire for the more general capabilities. The graduate survey instrument, therefore, provides measures of students' perceptions of the nurturing of each of the desired learning outcomes.

Administration of the graduate survey started with the last batch of graduates from the old curriculum. The survey has then been administered annually. This has meant that it has been possible to track the effect of changes to the curriculum by monitoring student perceptions of the achievement of the desired outcomes. Graphs of the longitudinal data are shown in Figures 5 and 6.

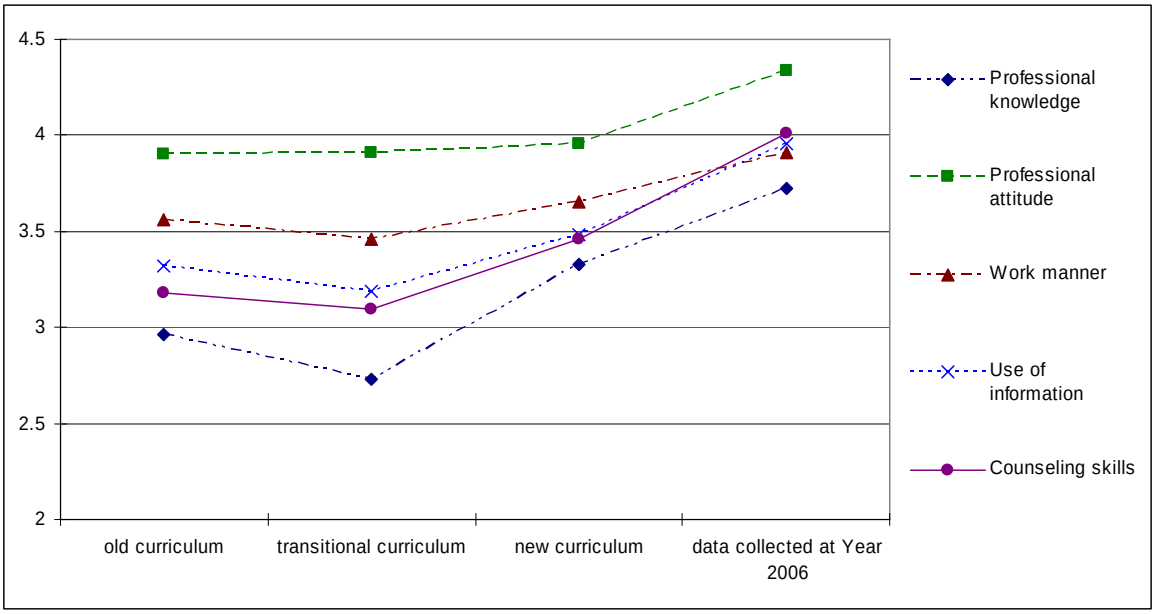

Figure 5: Longitudinal data for professional learning outcomes

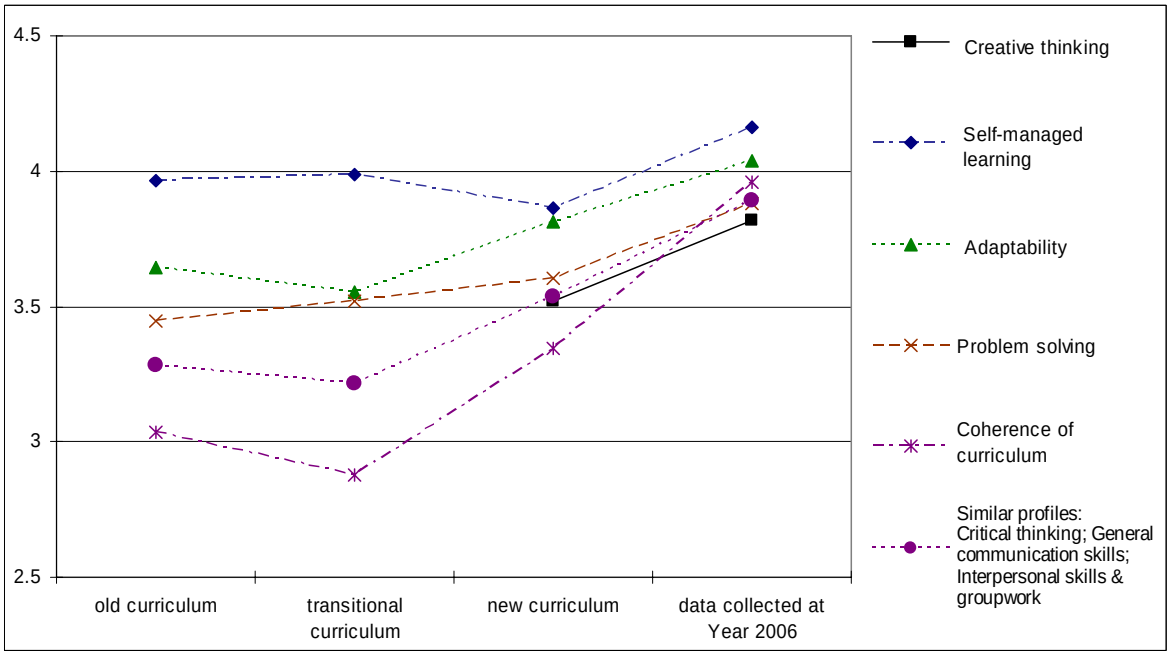

Figure 6: Longitudinal data for generic learning outcomes

It can be seen that the curriculum development process has been effective in improving the development of both professional and generic capabilities. It has taken time for the effect to be manifest. Curriculum changes often do not have the desired effect in the first year of implementation. The processes of cyclical refinement, based upon feedback, inherent in the curriculum development model are important steps to achieving a curriculum which is consistent with achieving the desired learning outcomes.

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