goal to establish 'sustainable, scholarly teaching', this was in the event the right decision.

5 *Change teachers' conceptions first or make them teach differently first?* Here, teachers were required to teach differently, but the reasons, the theory underlying the change, were always upfront. The general answer to this point again lies in the climate created. Teachers weren't just ordered: 'You teach differently!' A rich context was provided in which the difference in teaching from what most were used to, to what was required was fully supported by both physical resourcing and by a change in climate of thinking about teaching.

6 *The faculty climate* was thus a vital part of this context: a supportive Theory Y climate in which both staff and students felt mutual responsibility.

The fact of this transformation in the space of five years from one of the struggling to one of the best institutions for preparing veterinarians and animal scientists in Australia must allay any doubts that constructively aligned teaching is impractical.

Veterinary science

Our first example of an aligned course is from the faculty we have just examined. 'Animal Structure and Functions 3A' (ASF3A) is a second-year course of a four-year degree programme of BAnVetBioSc at the University of Sydney. The number of students in the course in 2006 was 78. The course was designed by a team, the details supplied by Dr Rosanne Taylor and Dr Melanie Collier.

Course aims

The aims of this course are that students will integrate knowledge of structure (anatomy) and function (physiology) and draw on concepts introduced in Animal Science 2 to build their understanding of key systems that are integral to the maintenance of internal homeostasis. These concepts provide a basis for investigating the effect of genes, biotechnology, nutrition and reproductive changes on animal function and production in year 3 units.

Intended learning outcomes (ILOs)

On completion of this unit students will be able to:

ILO1 *Analyse* the contribution of hormones to maintenance of internal homeostasis in animals

ILO2 *Critically analyse* applied animal physiology research articles

ILO3 *Advise* how the natural mechanisms animals use for defence from

foreign molecules and organisms can be manipulated to confer immunity

ILO4 *Advise* on animal management practices that meet the physiological needs of animals (considering the animals' sensory structures, central processing, autonomic and motor responses)

For purposes of illustration, we show alignment of the TLAs and ATs for ILOs 2 and 4 only.

Teaching and learning activities (TLAs)

TLA1: Critical review

The students undertake a critical review of two recently published research papers on pain/welfare/research in animal husbandry/slaughter. They are encouraged to make their own choice as to topic. The specific ILOs of the critical review are that students will:

1 critically evaluate scientific literature
2 relate the principles of neural processing to analysis of animals' responses to husbandry procedures
3 use the structure and characteristics of good scientific writing
4 provide constructive feedback on scientific writing of peers.

It is intended that undertaking this task will develop and demonstrate students' knowledge of central neural processing, sensory processing, pain and consciousness and provide an opportunity for students to integrate and apply these principles to assessment of humane animal husbandry and slaughter methods. As the task is completed, students will also develop key graduate attributes for animal and veterinary bioscientists in information retrieval, information management, critical analysis, written expression and animal welfare, attributes that will be further developed and assessed in their final-year honours/research project. The peer-assessment component provides an opportunity to reflect on their own scientific writing, to develop skills in editing and commenting on the work of peers and to improve on the quality of their own written work prior to final submission.

The students are prepared for the review with a tutorial on scientific writing to dissect and analyse a published paper and a class on how to critically review literature, which is supported by documents and a website showing students how to conduct their own critical review. A literature searching session with the librarians helps students learn how to find and to evaluate other sources of information that may be useful.

TLA2: Peer review

Students are required to review a critical review of their peers. The topic reviewed is completely different from the one they investigated in order to increase their appreciation of the other work in the field.

Students use grade descriptors and criteria to provide constructive feedback to their peers on a proforma by the following week. They frequently write several pages of useful suggestions and feedback on the hard copy (this is very popular with their peers) in accord with grade descriptors in the unit handbook:

1 purpose of research
2 selection and approach
3 quality of evidence
4 conclusions
5 general comments on format, word limit, grammar, spelling
6 suggested mark (/20)

One week later the students submit their revised critical review. The teacher sees the original, student comments, papers and the final submission. Only the final submission is marked; the earlier versions and comments give feedback to students on how they have improved their work to let the peer reviewers know that they have provided good constructive advice.

Assessment task (AT)

Critical review of research papers

(Addresses ILOs 2 and 4.) The critical review used in TLA1 forms part of the assessment of the course. The students are given a list of papers and are encouraged to make their own choice depending on their interest. This task encourages them to read more widely and to include some reviews and alternative perspectives. Feedback from the teachers is provided to students on how their works have improved. The critical review is worth 20% of the course, which is 6/24 credit points of one semester of the whole programme.

This assessment task is the only time where ILO2 is assessed in this unit. ILO4, as broader and encompassing several topics, is also assessed in other ways, including a written examination and project. The grading criteria are based on a combination of students' application of scientific knowledge in their evaluation of the work, as well as their ability to express their ideas effectively in the scientific critique.

Grading criteria for the critical reviews are provided to students in the handbook and are reproduced in Table 13.1.

Online resources

http://www.deakin.edu.au/studentlife/academic_skills/undergraduate/handouts/crit_analysis.php
http://eebweb.arizona.edu/courses/Ecol437/reading1.pdf

Table 13.1 Grading criteria for the critical review of literature in veterinary science

Grade	*Introduction/literature review*
High distinction or mastery 85–100%	The report represents work of an exceptional standard: • is a highly articulate and professional document • includes complex critical comments with extended justification (and appropriate referencing) in all sections that reflect an applied and transposable understanding of key issues • demonstrates initiative and originality in analysis or interpretation Comprehensive and highly professional: • shows a high level of thought, knowledge and reflection • student is able to relate material to other knowledge domains • review critiques literature well, incorporating many sources to develop an argument with little to no summarizing of previous work • may resolve theoretical and/or empirical problems and show evidence of creative or innovative conceptualization • discussion is integrated into a logical, coherent whole: 'tells a story' and leads logically into research proposed • creates a sense of mastery of literature and relevant technical issues
Distinction or high level of achievement 75–84%	The report is of a superior standard: • is well written (as in credit) and free of errors • includes coherent critical comments with substantial justification (and appropriate referencing) in all sections that reflect an integrated understanding of key issues • provides evidence of broader appreciation of the relationships between key aspects of studies in this field • demonstrates complex, deep understanding of the subject matter Effective and comprehensive: • evidence of thought and reflection • often relates material to other knowledge domains • includes critical appraisal, but may also summarize rather than evaluate some aspects of literature • review identifies and attempts to resolve theoretical puzzles • essential content within the domain is successfully integrated

(continued)

Table 13.1 (continued)

Grade	*Introduction/literature review*
Credit good level of achievement 65–74%	The report: • is complete, well structured and well presented • is written in a clear style that communicates points effectively on first reading • synthesizes and applies concepts appropriately to the problem • includes coherent critical comments with justification based on evidence in all sections that reflect a sound understanding of key issues • uses evidence/argument from the literature in the field in analysis Review identifies and defines major issues: • clear and strong arguments are developed within some major issues • some tendency to summarize literature rather than develop an integrative and logical argument • technical issues treated competently
Pass 50–64%	The report: • addresses all four major themes in the analysis but does not integrate or relate key ideas and issues effectively • is presented in an organized manner but may contain irregularities in style, expression that do not interfere with meaning • provides critical comments with justification in some sections that reflect a basic understanding of key issues • demonstrates that the literature in the field has been consulted Review identifies some major issues: • comments are essentially descriptive • minimal critical analysis is attempted • *or* analysis lacks depth • *or* analysis is somewhat confused • main focus is on concrete issues • lack of integrating argument • some technical expertise revealed • may have non-major factual errors
Fail > 50%	The report: • does not address the four major themes of the analysis • evidence of plagiarism or academic dishonesty • presented in a disorganized, incoherent manner • contains no/little or inappropriate critical comments • provides no/little justification for critical comments • does not show any appreciation of the literature in the field

Accounting

'Accounting 1' is a one-semester core course in the first year of a three-year bachelor of business administration (BBA) degree programme offered by the Department of Accountancy of the Faculty of Business at the City University of Hong Kong. The number of students in each class is 200. The course was designed by Dr Olivia Leung of the Department of Accountancy.

Course aims

1 Provide students with technical knowledge in processing, preparing and reporting accounting information in accordance with GAAP (generally accepted accounting principles) for external users in a modern economy.
2 Provide students with general knowledge about internal control procedures and financial ratios.
3 Encourage students to be responsible and active learners.

Intended learning outcomes (ILOs)

On completion of this course, student will be able to:

ILO1 *Record* accounting transactions related to cash, receivables, inventories, fixed assets, payables, shareholders' equity, revenues, costs of merchandise sold and expenses

Prepare financial statements (balance sheets, statements of shareholders' equity, statements of retained earnings, and income statements) for servicing and merchandising companies

ILO2 *Identify* and *explain* fundamental GAAP (generally accepted accounting principles)

Select and *apply* the appropriate GAAP to support accounting treatments in preparing financial reports

ILO3 *Identify* internal control procedures over cash, receivables, inventories and fixed assets

Calculate and *interpret* fundamental financial ratios based on information collected from balance sheets and income statements

ILO4 *Be a responsible learner*: *attend* classes and *submit* assignments on time and prepared, *be attentive* in classes; *follow* teaching schedule closely; be an active learner: *actively participate* in class activities; be *self-motivated*.

Teaching and learning activities (TLAs)

TLA1: Situation: Interactive lecture

Concepts and general knowledge of financial accounting are presented with PowerPoint slides:

- Personal digital assistant (PDA) questions and answers: students respond to questions in lectures using their PDAs and the lecturer provides feedbacks based on students' responses.
- Work-along exercise: students are given exercises and are encouraged to work along with the lecturer and their peers as the lecturer covers each topic. This exercise helps students follow the lecture closely and to visualize the applications of the concepts.
- Concept map: in the beginning or at the end of each lecture, the lecturer uses the concept maps to demonstrate links between various topics presented in the lecture.

Major focus: ILOs 1, 2 and 4; minor focus: ILO3.

TLA2: Situation: Tutorial

Technical procedures and practice questions are covered:

- Weekly tutorial assignments: assignments for each week are specifically assigned to give students opportunity to think through the concepts and to apply the concepts to various business transactions.
- Various in-class activities: students are given various activities such as work-along practice questions, group discussions, self-test multiple-choice questions, ideas sharing and presenting time etc.

Major focus: ILOs 1, 3 and 4; minor focus: ILO2.

TLA3: Situation: Outside classroom activities

Additional help is provided outside official class time:

- Tutor consultation: each tutor provides four consultation hours weekly to help his/her students with technical issues or issues with learning accounting in general.
- SI (Supplementary Instruction) scheme: performing second-year accounting major students are selected to be SI leaders. Each leader will head a group of FB2100 students and to meet with them weekly to provide additional help on self-learning skills in accounting.
- Helpdesk: extra help is provided to students who have difficulties when they are preparing for mid-term test and final examination. Designated helpers provide help to students throughout the week before mid-term test and final examination to answer students' technical questions.

Major focus: ILOs 3 and 4; minor focus: ILOs 1 and 2.

Assessment tasks (ATs)

AT1: Tutorial assignments and participation (15%)

Weekly tutorial assignments are given to students to assess students' understanding and knowledge on topics listed in the weekly teaching schedule.

Major focus: ILOs 1 and 4; minor focus: ILOs 2 and 3.

AT2: Group project (15%)

Students in tutorial classes are grouped into four groups (i.e. each group is made up of four to six students). Each group will be given a project on either internal control procedures or financial ratios. Groups are required to submit written reports.

Major focus: ILO3.

AT3: Mid-term test (30%)

The test is designed to assess students' technical knowledge in analysing business transactions, journalizing and preparing financial statements for external reporting.

Major focus: ILOs 1 and 2.

AT4: Final examination (40%)

The examination is designed to assess students' technical knowledge in analysing business transactions, applying accounting principles to support accounting treatments, journalizing preparing financial reports for external users.

Major focus: ILOs 1 and 2.

Grading criteria

Some examples of grading criteria are shown in Table 13.2.

Engineering

'Engineering principles and design' is a one-semester course in the first year of a three-year bachelor of manufacturing engineering programme in the Faculty of Science and Engineering at the City University of Hong Kong. Usual enrolments are 180 students. The course was designed by Dr Lawrence Li of City University Hong Kong, in consultation with Mark Endean, Open University, Milton Keynes, UK.

Course aims

Engineers plan, analyse, design and build anything that may move and sustain load – products range from toys to automobiles and aircraft. They employ an energy source and convert it into mechanical motions in machines such as robots or pumps. This is the second of two closely linked courses, 'Mechanics' and 'Engineering Principles and Design'. Both courses aim to lay down the foundations of mechanical engineering principles in such a way

Table 13.2 Examples of grading criteria of different assessment tasks in accounting

Group project (AT2)

ILO	*Content*	*Excellent* *A+ A A–*	*Good* *B+ B B–*	*Adequate* *C+ C C–*	*Marginal* *D*
ILO3	Each group is given a case on internal control procedures Each group is required to write a report to study the case and to analyse the business's control procedures	Able to precisely identify and explain both strong and weak existing internal control procedures; able to design internal control procedures specifically for the company	Able to identify and describe both strong and weak existing internal control procedures; able to suggest some commonly used internal control procedures	Able to identify and briefly describe strong and weak existing internal control procedures	Able to identify strong and weak existing internal control procedures

Mid-term (AT3) and final examination (AT4)

ILO	*Excellent A+ A A–*	*Good B+ B B–*	*Adequate C+ C C–*	*Marginal D*
ILO1	Able to journalize accounting transactions in all areas covered with appropriate account titles and amounts; able to project the impacts of the journal entries to financial statements	Able to journalize accounting transactions in most covered areas; able to project the impacts of some journal entries to financial statements	Able to journalize some accounting transactions; able to carry some journal entries to financial statements	Able to journalize some accounting transactions
	Able to prepare all financial reports for both servicing and merchandising companies in an accurate and appropriate manner and format in reflecting a true and fair view of the financial reports	Able to prepare all financial reports for either servicing or merchandising companies in an accurate manner in reflecting a true and fair view of the financial reports	Able to prepare most financial reports for either servicing or merchandising companies	Able to prepare some financial reports for either servicing or merchandising companies

ILO2	Able to identify and clearly explain GAAP in writing; able to demonstrate application skills by selecting the appropriate GAAP in supporting various accounting treatments	Able to identify and describe GAAP in writing; able to discriminate between different principles under GAAP	Able to recall and describe some principles under GAAP	Able to recall some principles under GAAP

that the students can identify the appropriate concepts required in given engineering problems and apply them to formulate the suitable engineering solutions.

Intended learning outcomes (ILOs)

On successful completion of this course, students should be able to:

ILO1 *Apply* the principles of mechanical kinetics to single degree of freedom vibration systems
ILO2 *Outline* the fundamental theory of friction and wear and its applications in engineering
ILO3 *Describe* the basic theories of fluid mechanics and heat transfer
ILO4 *Apply* the basic engineering mechanics principles to the design and implementation of a simple engineering system (such as a projectile machine) and the evaluation of its performance
ILO5 *Work* effectively as a *team* member in a small-scale engineering project

Teaching and learning activities (TLAs)

TLA1: Situation: Large class

This is a typical lecturing setting but efforts are made to insert short questions regarding the lesson so that students have opportunities to discuss with each other. From time to time students are asked to discuss among themselves for a couple of minutes regarding a topic that has just been taught. This is to give them some space to relax between topics and provide a review of the lesson so far.

Major focus: ILOs 1 and 2; minor focus: ILO3.

TLA2: Situation: Small group

Students interact more closely with the teacher than is possible in the large class: much use is made of think-aloud modelling in mathematical problems.

Students likewise solve problems and receive diagnostic feedback. Both large and small class teaching variously address the first three ILOs. Small class – the format is flexible and the teaching context is problem solving. The students are first asked to work among themselves to see whether a solution can come up. If not, the teacher will join one group and solve the problem. After that, the students are encouraged to teach each other regarding the problem before the class proceed to the next question.

Major focus: ILOs 1 and 2; minor focus: ILO3.

TLA3: Situation: laboratory

The lab exercises are designed to supplement the taught materials such as friction, fluid mechanics and heat transfer.

Major focus: ILOs 1 and 3.

TLA4: Student-centred activity (SCA)

SCA is a project that utilizes the subject material of the courses 'Mechanics' and 'Engineering Principles and Design' to design a simple mechanism. The students are expected to work in teams to develop the schematic design, perform the kinematics/kinetic analysis, make an analysis of loading, investigate the behaviour of the components under elastic and dynamic loading and make appropriate design decisions. The students also investigate friction and lubrication aspects of the components and finalize their design.

Major focus: ILOs 4 and 5.

Assessment tasks/activities (ATs)

There are three major assessment situations: final examination, laboratory report and the SCA (project) according to the weighting in Table 13.3.

Examination and laboratory report are numerically marked and grades awarded accordingly.

The SCA (project) is graded using the following criteria.

Group assessment

a Prototype (30%) – the working machine built to given specifications will be assessed based on its design, effectiveness, reliability and workmanship.

b Software (30%) – a simple software programme will be written to determine the control parameter(s) for the machine to perform a given task (e.g. to propel the golf ball for a specified distance). The software can be implemented in any preferred computer languages or application software such as Excel.

c Report (40%) – the typed report shall include:

- sketches of different design and related comments
- calculations behind the final design

Table 13.3 Weighting of the three assessment tasks in engineering with respect to the ILOs

ATs	*Examination*	*Laboratory report*	*SCA*	*Total (%)*
ILO 1	20	5	—	25
ILO 2	10	—	—	10
ILO 3	10	5	—	15
ILO 4	—	—	45	45
ILO 5	—	—	5	5
Total (%)	40	10	50	100

- drawings with clear major dimensions
- calibration data and graphs
- reconciliation between theory and practice
- software algorithm, description and also listing if available
- anything that is useful to explain and promote the project work.

Peer-assessment

Assessment of others is an important skill for a professional engineer. Near the end of the project, each student will be asked to assess different members of the group objectively. This is used to differentiate the project contribution from each group member and their effectiveness as an engineering team player. The results are used to calculate the final project mark for each student.

Information Systems

'Management Information Systems I' is a one-semester core course in the first year of a three-year bachelor of business administration (BBA) degree programme offered by the Department of Information Systems of the Faculty of Business at the City University of Hong Kong. The number of students registered in the course in 2006–2007 academic year is 810, divided into smaller classes. The course was designed by Dr Ron Chi-Wai Kwok of the Department of Information Systems.

Course aims

1 Provide students with knowledge about the technological foundation of business information systems.
2 Equip students with the essential skills to work with common computer applications in today's business world.

3 Familiarize students with business information systems relevant to their professional career and applications in Hong Kong.

Intended learning outcomes (ILOs)

On completion of this course, student will be able to:

ILO1 *Describe* the basic concepts of information systems, their composition, configuration and architecture, including the internet and web-based technologies in particular

ILO2 *Explain* the social, economic, regulatory, political and mainly ethical aspects in the development, implementation and use of information systems in international business settings

ILO3 *Apply* the general knowledge and methodologies of information systems, including the use of hardware and software, to *devise* and *evaluate* effective solutions to international business problems, given the information needs

ILO4 *Design* and *develop* particular constructs and models to support various levels of international business activities using different tools such as Microsoft FrontPage, Microsoft Access and Microsoft Excel

ILO5 *Work* productively as part of a team and, in particular, *communicate* and *present* information effectively in written and electronic formats in a collaborative environment

Teaching and learning activities (TLAs)

TLA1: Situation: Interactive lecture

Concepts and general knowledge of information systems are explained:

- Personal digital assistant (PDA) questions and answers: students respond to questions in lectures using their PDAs and the lecturer provides feedbacks based on students' response.
- Gobbets: showing videos about business cases and scenarios using the e-Organization (e-Org) cases.
- Concept map: the lecturer uses concept maps to conceptualize presented materials.
- Role play: students act as IT technicians and assemble a computer system.
- PDA one-minute note: at the end of the lecture, the lecturer reminds students to use their PDAs to write down the main topic that they find most difficult to understand in the session or the major question that they want to raise. In the next lecture, the lecturer provides feedback based on students' concerns in their one-minute notes.

Major focus: ILOs 1 and 2; minor focus: ILO3.

TLA2: Situation: Computer lab tutorial

Technical aspects of information systems design and development are covered:

- Computer lab exercises: hands-on activities on Microsoft FrontPage, Excel and Access.
- Group project discussion: discussion on various aspects of the group project (setting up a web page and a database for an online store, using Excel for decision support).

Major focus: ILO4; minor focus: ILOs 3 and 5.

TLA3: Situation: Outside classroom activities

Additional help provided outside official class time:

- e-token: a PDA system in which students earn e-tokens by completing some learning-oriented activities such as crossword puzzles that are downloadable to their PDAs. Students can complete the downloaded PDA exercises at any time and anywhere (e.g. in MTR or on a bus).
- Online helpdesk: an online system to provide extra help to students having difficulties with the course outside the classroom. During the assigned periods, students can raise their questions about mid-term test or final examination in the online system. The tutors will answer their questions within four hours during the office hour.

Major focus: ILOs 1 and 3; minor focus: ILO2.

Assessment tasks (ATs)

AT1: Tutorial assignments and participation (10%)

Two assignments (3% each) are given to assess the student's competence level working with Microsoft FrontPage, Microsoft Access and Microsoft Excel.

Major focus: ILO4, minor focus: ILOs 3 and 5.

AT2: Group projects (35%)

The project is divided into three phases; each is designed to assess the student's ability in constructing interactive web pages, working with databases and devising decision support models in a business setting.

Major focus: ILOs 3 and 4; minor focus: ILO5.

AT3: Mid-term test (15%)

The test is designed to gauge the student's grasp of information systems concepts and knowledge, as well as the ability to apply them to solve business problems in various situations.

Major focus: ILOs 1 and 3; minor focus: ILO2.

AT4: Final examination (40%)

The examination is designed to gauge the student's grasp of information systems concepts and knowledge, as well as the ability to apply them to solve business problems in various situations.

Major focus: ILOs 1 and 3; minor focus: ILO2.

Grading criteria

Some examples of grading criteria are shown in Table 13.4.

Table 13.4 Some examples of grading criteria for different assessment tasks in information systems

Group project phase 1 (AT2)

ILO	*Content*	*Excellent* A+ A A–	*Good* B+ B B–	*Adequate* C+ C C–	*Marginal* D
ILO3 **ILO4**	Overall design (sizing, grouping, alignment, colour, look and feel, etc.)	Designed in a professional way: fonts and graphics complement each other, text is in the appropriate size, making it easy to read, appropriate use of colour, easy navigation through the pages	The ability to design a professional webpage is demonstrated in most pages with a few exceptions	The quality in most pages are average (e.g. inappropriate font size/item grouping/font colour/background colour, etc.)	A merely acceptable design in general
ILO4	Creativity	Highly creative design: novel and original, clearly superior to templates or examples covered in class	Design with some creative idea, on top of templates or examples covered in class	Average design with few creative ideas	Little creativity shown
ILO4	Practicability	Extremely practical design: can be considered a usable	Quite a practical design: lacking a few minor	Average design, but not very practical since a few major	Only satisfies a small number of

	product even commercially, since it satisfies all the functional requirements set out	components to be considered complete	components are not implemented	practical needs

Mid-term (AT3) and final examination (AT4)

ILO	*Excellent A+ A A–*	*Good B+ B B–*	*Adequate C+ C C–*	*Marginal D*
ILO1	Demonstrate sound knowledge of most materials covered, able to describe all concepts of information systems and to identify relationship between difference concepts	Able to describe various major concepts of information systems with thorough comprehension of each and able to discriminate between different concepts	Able to recall and describe some important concepts of information systems and able to show some linkages between different concepts	Able to recall major concepts of information systems with simple description, with ability to grasp linkages between a small number of concepts
ILO2	Able to explain impact of information systems from various perspectives and how this determines the use of information systems in international business settings based on sound knowledge	Able to explain information systems' impacts in the various aspects, with well-rounded knowledge in international business settings	Able to explain some of the information systems' impacts in some aspects, with some knowledge in international business settings	Able to explain a few important impacts of information systems, with knowledge limited in local business settings
ILO3	Able to make critical judgments by applying sound information systems knowledge, compare and discriminate between ideas and create unique solutions to business problems	Able to apply various components of information systems to solve open-ended as well as closed-ended business problems using skills and knowledge acquired	Able to apply some components of information systems to solve simple problems using skills and knowledge acquired	Able to apply some components of information systems to form partial solution to business problems using skills and knowledge acquired

Quality enhancement

To facilitate quality enhancement both for the course teachers/programme leader and also individual students, Dr Kwok makes use of the assessment grade results for transformative reflection.

Course-level achievement

Table 13.5 shows the integrated (averaged) grades of all students in a given course, with respect to different ATs and different ILOs. It also shows the overall grades of students in each AT and each ILO, as well as the final grade of students at the course level.

Thus, students in the course are good at ILO4 and ILO5, but just okay in ILO1 and ILO2. Based on these results, the course leader may need to focus more on facilitating students achieving ILOs 1 and 2 in the next semester. The programme leader can think about the adjustment of the curriculum of the year 2 courses accordingly, in order to help students strengthen their ILOs 1 and 2. The year 2 course leaders can also have a better understanding of their incoming students and better prepare the courses on these issues.

Table 13.5 A quality-enhancement measure focusing on the mean results for a given course

The left-hand column lists the assessment tasks, the top row the ILOs. Cell entries are the mean grades obtained in the course

ATs	*ILO1*	*ILO2*	*ILO3*	*ILO4*	*ILO5*	*Total*
AT1				A–		**A–**
AT2				A–		**A–**
GP1			A	A	A–	**A–**
GP2			B+	A–	B+	**A–**
GP3			A–	A–	A–	**A–**
MTT	C+	C	B			**B–**
FEX	B–	B–	B			**B–**
PAT					A–	**A**
Total	**B–**	**B–**	**B+**	**A–**	**A–**	**B**

GP1 – group project 1
GP2 – group project 2
GP3 – group project 3
MTT – mid-term test
FEX – final examination
PAT – tutorial participation

Individual student achievement

Table 13.6 shows how the quality enhancement system works for an individual student's performance in the ATs and in each of the ILOs.

This student is weak in ILO1 and ILO2, but strong in ILO4 and ILO5; weak in mid-term test and final examination, but good in group project. This provides feedback to the student about the sort of areas represented by ILOs 1 and 2 and would help his/her decision making in years 2 and 3 to choose courses that would reinforce their learning in these areas if appropriate.

Table 13.6 A quality-enhancement measure focusing on the results obtained by an individual student

The left-hand column lists the assessment tasks, the top row the ILOs. Cell entries are the grades obtained by an individual student in the course

ATs	*ILO1*	*ILO2*	*ILO3*	*ILO4*	*ILO5*	*Total*
AT1				A–		**A–**
AT2				B+		**B+**
GP1			A+	A+	B+	**A**
GP2			A–	A	B	**A–**
GP3			A	A–	A–	**A–**
MTT	C+	C–	C			**C**
FEX	C	C+	B			**C+**
PAT					A	**A**
Total	**C**	**C+**	**B**	**A–**	**A–**	**B**

Management sciences

'SOM1: Design of Service Delivery Systems' is a one-semester course in the second year of the Service Operations Management degree programme offered by the Department of Management Sciences of the Faculty of Business at the City University of Hong Kong. It is also offered as an elective or an out-of-discipline course to other students. The number of registered students in 2006/07 is 74. The course was designed by Ms Sandy Wong of the Department of Management Sciences.

Course aims

This course provides students with the knowledge of how to address the major issues involved in the design of the service package and the service

delivery system. The strategic role of the supporting service facility and the challenges of delivering exceptional service quality are emphasized in the context of service organizations.

Intended learning outcomes (ILOs)

On successful completion of this course, students should be able to:

ILO1 *Describe* the service concept and the nature of services
ILO2 *Discuss* the competitive service strategy and the role of information in services with examples
ILO3 *Critically discuss* the service delivery including the service process and service encounter
ILO4 *Identify* service quality problems and use the quality tools for *analysis* and *problem solving*
ILO5 *Recommend* the facility design features to *identify* bottleneck operation and *remove* the anxiety of disorientation
ILO6 *Evaluate* the service facility location to *minimize* total flow–distance of a service process layout and to *estimate* the expected revenues and market share

Teaching and learning activities (TLAs)

TLA1: Situation: Interactive lecture

- Lectures: concepts and general knowledge of service operations management are explained.
- PDA questions and answers: students respond to questions in lectures using their PDAs and the lecturer provides feedback based on students' response.
- Peer learning: students will be asked to work in a group of two or three to recap and answer questions of the major topics that they learned in the previous lecture. They are required to share and present their answers to the class.
- Videos: videos about business cases and scenarios are shown and followed with class discussion.
- PDA one-minute note: at the end of the lecture, the lecturer reminds students to use their PDAs to write down the main topic that they find most difficult to understand in the session or the major question that they want to raise. In the next lecture, the lecturer provides feedback based on students' concerns in their one-minute notes.
- Learning log: students have to respond to each of the ILOs addressed in each lecture. Responses and reflection can vary from how they learned

it, what activities reinforced the concepts learned, resources they used to learn the concept etc.

Major focus: ILOs 1, 2, 5 and 6; minor focus: ILOs 3 and 4.

TLA2: Situation: Tutorial

Students are required to team up with their classmates and participate in the following activities:

- Role play: students act as service providers and customers to simulate service encounters.
- Tutorial exercises and activities: students respond to and participate in in-class exercises and activities. They are required to apply real-life examples or their own service experiences to their learnt subjects.
- Group discussion and case study: discussion on various aspects of the assigned major issues or questions as well as the assigned case studies.

Major focus: ILOs 3 and 6; minor focus: ILOs 1, 2, 4 and 5.

TLA3: Situation: Outside classroom activities

Students are required to carry out some learning-oriented activities outside their classroom such as mystery shopping, walk-through audit, servicescape, process flow and layout improvement. Students present their findings and results of work to the class.

Major focus: ILOs 3, 4 and 5.

Assessment tasks/activities (ATs)

Group work (45% AT1, AT2, AT3)

The objective of group work is to equip students with the necessary knowledge, attitude and skills to become a deep learner by means of small group discussion and sharing. Students are required to form a group of 4–5 to work on the group course work, introduce themselves and exchange contact information; give a name to the group and appoint a group leader for coordination; let the teacher have the group name, student ID and names as well as the leader's contact number. Students are also asked to identify their learning expectations of the course.

AT1: Outside activities and presentation (15%)

Teams are asked to carry out some outside classroom activities to apply what they learned in lectures and to present the results of work during tutorial classes in week 9 and 10. Students may use other forms of presentation (e.g. role play, debate etc.). All team members have to show up but it's not necessary for all members to do the presentation.

Major focus: ILOs 3, 4 and 5.

AT2: Tutorial exercises and activities (20%)

Students can team up to a maximum of four to work on the assigned tutorial exercises and activities. Marks will be awarded to those students who demonstrate their familiarity with literature, their preparation and understanding of the topics and, more importantly, their contributions to the assigned activities.

Major focus: ILOs 1, 2, 3 and 5; minor focus: ILOs 4 and 6.

AT3: In-class participation and discussion (10%)

Students are required to critically discuss, share and present the assigned topics. Students can pair up or work individually to participate in the discussion topics and issues. They are expected to think and learn how to engage in an exchange of ideas to construct their understanding of knowledge and not just to memorize it. Students are expected to point out agreements or disagreements, to raise appropriate questions and to brainstorm solutions to problems. Extra marks are awarded to those who can draw relevant implications to apply their daily life examples of service experiences. PDAs are required for the Q&A session.

Major focus: ILOs 1, 3, 5 and 6; minor focus: ILOs 2 and 4.

Individual work (55% AT4, AT5, AT6)

AT4: Learning log (5%)

The purposes of the learning log are to develop students' awareness of all the ILOs and learning processes; to develop their ability to reflect on learning activities; and to encourage instructors to inform students of weekly learning outcomes. Learning logs are submitted via BlackBoard.

Major focus: all ILOs.

Self-reflection on outside activities (5%)

This is the individual work component of AT1. Each student is required to prepare and submit a one-page write-up to report their self-reflection on the assigned outside activities, focusing on (a) their reflection on the subjects/topics they learned during the activities, (b) comments on their feelings about their learning experience and (c) give recommendations for further improvement.

Major focus: all ILOs.

AT5: Mid-term test (15%)

The mid-term test is scheduled during lecture session. It addresses only the first three ILOs for revision purpose and assesses the understanding of key concepts. The format is multiple-choice and/or closed-book short essays.

Major focus: ILOs 1 and 3; minor focus: ILO2.

AT6: Final exam (30%)

The final exam is a two-hour semi-closed-book in-class exam consisting of essay-type questions (both qualitative and quantitative). Students are allowed to bring in one A4-sized study aid prepared by themselves but no additional stickers or labels can be attached. Students are required to quote examples to support their arguments if appropriate.

Major focus: ILOs 5 and 6; minor focus:ILOs1 and 3.

Grading criteria

Some examples of grading criteria are shown in Table 13.7.

Table 13.7 Some examples of grading criteria for different assessment tasks in management sciences

AT2: Tutorial exercises and activities

Excellent *A+ A A–* *4.3 4.0 3.7*	*Good* *B+ B B–* *3.3 3.0 2.7*	*Adequate* *C+ C C–* *2.3 2.0 1.7*	*Marginal D* *1.0*	*Failure* *0.0*
Clearly and correctly state most critical points and important contributions of the assigned exercises and activities Discuss issues critically Draw significant and relevant implications to Hong Kong service sector Good presentation skills Strong evidence of familiarity with literature	Clearly and correctly state some critical points and important contributions of the assigned exercises and activities Discuss issues critically Draw some relevant implications to Hong Kong service sector Good presentation skills	Clearly and correctly state some critical points and contributions of the assigned exercises and activities	State a few critical points and contributions of the assigned exercises and activities	Little or no evidence of contributions to the assigned exercises and activities

(continued)

Table 13.7 (continued)

AT4: Learning log				
Excellent *A+ A A–* *4.3 4.0 3.7*	*Good* *B+ B B–* *3.3 3.0 2.7*	*Adequate* *C+ C C–* *2.3 2.0 1.7*	*Marginal D* *1.0*	*Failure* *0.0*
Strong evidence of developing an awareness of learning expectations and processes as well as the ability to reflect on learning progress	Evidence of developing an awareness of learning expectations and processes as well as the ability to reflect on learning progress	Some evidence of developing an awareness of learning expectations and processes as well as the ability to reflect on learning progress	Sufficient organization of their learning that marginally enables the student to progress without repeating the assignment	Little or no evidence of ability to organize the learning and overall understanding of what the class is all about
AT6: Final examination				
Excellent *A+ A A–* *4.3 4.0 3.7*	*Good* *B+ B B–* *3.3 3.0 2.7*	*Adequate* *C+ C C–* *2.3 2.0 1.7*	*Marginal D* *1.0*	*Failure* *0.0*
Strong evidence of original thinking Good organization, capacity to analyse and synthesize Superior grasp of subject matter Evidence of extensive knowledge base	Evidence of grasp of subject, some evidence of critical capacity and analytic ability Reasonable understanding of issues Evidence of familiarity with literature	Student who is profiting from the university experience Understanding of the subject Ability to develop solutions to simple problems in the material	Sufficient familiarity with the subject matter to enable the student to progress without repeating the course	Little evidence of familiarity with the subject matter Weakness in critical and analytic skills Limited or irrelevant use of literature

Nursing

'Philosophy and Science of Nursing' is a one-semester core course of a two-year part-time master of nursing degree programme in the Department of Nursing Studies of the Li Ka Shing Faculty of Medicine at the University of Hong Kong. The students are practising nurses, 33 in number. The course was designed by Dr Agnes Tiwari of the Department of Nursing Studies.

Course aims

Although nursing is a practice discipline, it cannot solely rely on the accepted theories of practice. For nursing to evolve, it must continually expand its knowledge base, which should be disseminated and applied to practice. As the development of science entails the interpretation of phenomena and events, the context within which nursing science is located must be taken into account. Furthermore, the advancement of nursing science requires its practitioners to have the skills and inclination to reflect on the quality of one's thinking and to use one's critical thinking skills to engage in more thoughtful thinking and problem solving in work situations.

In this course, students will be able to develop and practice metacognitive self-correction (using one's own thinking to improve one's own thinking) while they interpret, analyse, explain and evaluate the philosophy and science of nursing within the western and Chinese context.

Intended learning outcomes (ILOs)

At the end of this module, students should be able to:

ILO1 *Explain* the nature of the philosophy of nursing and *relate* it to the western and Chinese philosophical context
ILO2 *Describe* and *reflect* on the development of nursing knowledge
ILO3 *Explain* the historical evolution of nursing science
ILO4 *Analyse* the metaparadigm of nursing in terms of nursing, health, client and environment
ILO5 *Reflect* on and *evaluate* the contemporary perspectives of nursing
ILO6 *Analyse* and *theorize* the interrelationships among nursing theory, research, practice and education

Teaching and learning activities (TLAs)

TLA1: Mini-lecture

A teacher-led mini-lecture precedes students' discussion activity. The purpose of the mini-lecture is to deliver key concepts and principles pertaining to the ensuing discussion.

TLA2: Small group discussion

Divided into small groups during the discussion activity, students develop and practise higher order cognitive skills as they *explain, analyse, reflect, evaluate* and *theorize* the philosophy and science underpinning nursing, with an aim to advance nursing practice and science from the past and present. Guidelines, framed in a series of critical thinking questions based on the ILOs of the particular class, are provided to help students conduct critical,

interactive and dialectical discussion. Through the process of discussion, not only do students acquire disciplined-based knowledge, they also practise the habit of using their own thinking to improve their own thinking (metacognitive self-correction), which is an important nursing skill as nurses must be able to form good judgment in their professional work based on their own critical thinking. The teachers act as facilitators during student-led discussion by promoting meaningful discussion but not providing answers or solutions. In addition, one of the teachers records the thought processes demonstrated by the students in a selected group using the Holistic Critical Thinking Scoring Rubric (HCTSR) (Facione and Facione 1994) as an assessment of the students' ability to think critically about an authentic issue.

TLA3: Teacher-led think-aloud

After the discussion, a teacher-led think-aloud is used to provide feedback on students' responses to the critical thinking questions in the group selected. The teacher talks through the thought processes as demonstrated by the students during their discussion based on the HCTSR measures. Given the concentrated effort of using the HCTSR in the measurement of critical thinking, only one group can be assessed in each discussion session. The other groups of students are encouraged to listen to the feedback and learn from others' experience.

Assessment tasks (ATs)

Assessment is entirely by portfolio. The student:

1. submits two items of work, each item of which may cover one or more (whole or part) of the ILOs and is limited to 2000–2500 words
2. justifies the selection of each of the items in relation to the ILOs
3. ensures that the two portfolio items jointly cover *all five* of the ILOs specified for this module.

Students are given examples of items that may be submitted but are encouraged to go beyond the list. Examples include: an action plan, book or article review, a case study, a concept map, critical incidents, learning diaries, letter-to-a-friend, reflective diary, reflective report of a group discussion and the like.

Grading criteria

The criteria used to assess the quality of students' portfolio items are given in Table 13.8. Each item is graded holistically, but as the university requires a numerical grade, the grade for each item is converted to a percentage, as in Table 13.8, and the average of the two computed – which is then converted back to a letter grade.

Table 13.8 Holistic grading for the assessment portfolio in nursing

Grade	*Descriptiont*	*Understanding demonstrated*	*Evidence provided (examples)*
A ≥ 70	Excellent	Understanding at an extended abstract level	Theorize about a topic Generalize to new applications Reflect on experience
B 60–69	Good	Understanding at a relational and application level	Apply theory to practice Recognize good and bad applications
C 53–59	Fair	Understanding at a multistructural declarative level	Describe nursing knowledge Explain nursing philosophy Comprehend selected nursing theories
D 50–52	Pass	Understanding at the lowest nominal level	Name the concepts or theories Focus on one conceptual issue
F ≤ 49	Fail	Fail to achieve the stated learning objectives	Miss key issues Demonstrate erroneous understanding

Comments and conclusions

The examples in this chapter illustrate possible ways of implementing constructively aligned teaching, learning and assessment under differing conditions of class size, level of teaching, disciplinary areas, various contextual conditions such as faculty regulations as to assessment and personal philosophy of the teacher. Class sizes ranged from large (over 200 students), medium (70–80 students) to small (around 30 students); mode from full-time to part-time and levels from first-year undergraduate to postgraduate. Most courses were conceived in a qualitative framework for assessment, others in a quantitative; some assessed the ILO, others the assessment task.

What all examples have in common is that the TLAs and ATs were aligned to the clearly stated ILOs on the basis of the learning verbs in each ILO.

Intended learning outcomes

All the course ILOs are derived from the course aims and are articulated in a way that identifies what students are intended to achieve through attending the course. Verbs such as *identify*, *describe*, *explain*, *analyse*, *evaluate*, *apply*, *design*, *reflect* and *theorize* are used to indicate the levels of understanding or performance students are expected to achieve with respect to the content areas. These ILOs include both declarative and functioning knowledge, ranging

from multistructural to extended abstract in terms of their SOLO levels. In several courses, relative importance of the ILOs is reflected in the amount of teaching and learning support in the TLAs and by the weighting of the assessment tasks in deriving the final grade.

Most of these courses also include the more generic ILOs on team work and communication to address appropriate graduate attributes.

Teaching and learning activities

Several different situations were used as contexts for TLAs:

1. *Large classes of hundreds of students in traditional lecture theatres.* Examples from accounting, engineering and information systems show that even this unpromising situation can be made interactive by engaging students in student-centred learning activities such as peer discussion and learning, role play, developing concept maps, using PDA for Q&A and one-minute notes and working on work-along exercises.
2. *Small group situations.* TLAs such as small group discussions on case study and problem solving, working on tutorial exercises, while role play and think-aloud modelling were used in accounting, information systems, management sciences and nursing.
3. *Laboratory.* The laboratory context, supporting discipline-specific learning activities for functioning knowledge ILOs were used in engineering and information systems.
4. *Individual and group projects.* Individual projects were used as TLAs in engineering and group projects in information systems: in both cases, the TLA became the assessment task.
5. *Outside the classroom.* Accounting, information systems and management sciences all required students to engage in TLAs outside the classroom such as peer teaching, helpdesk, tutor consultation, individual work with PDAs, peer tutoring and field trips.
6. *Peer-assessment*, authentic to much professional practice, is used formatively as a TLA in veterinary science.

Assessment tasks

A variety of assessment tasks are used. Where departments had regulations requiring examinations, the latter were used strategically, as in point 1:

1. *Written tests and examinations.* These are used in many of these courses, but mainly to assess declarative knowledge as in such verbs as 'identify', 'describe', 'explain' and 'evaluate'. The danger, mostly avoided here, is that where regulations stipulate that x% of the final grade must be by examination, the functioning knowledge ILOs might be under-assessed.

2 *Project work* is used to assess functioning knowledge in accounting (group), engineering (individual) and information systems (group).
3 *TLA as assessment task.* Alignment is maximized when the TLA becomes the AT: critical review of research papers in the veterinary science; tutorial exercises and assignments in accounting, information systems and management sciences; and the student-centred activities (SCA) project in engineering.
4 *Portfolio assessment.* Nursing used a portfolio of two items that students chose and that had to address all ILOs.
5 *Peer-assessment* was used formatively and summatively in engineering.

Grading

Constructive alignment itself is achieved once TLAs and ATs are aligned to the ILOs. There are two remaining tasks: to turn the student's performance on a task into a grade or mark; and, after assessing individual ATs, to combine the results into a final grade. This may be done in various ways, according to the content area, the context including institutional policies and personal decision:

1 *Assessing individual performances.* Grades can be allocated by judging a students' performance top-down against established grading criteria or rubrics; or by quantitatively accruing marks bottom-up. Most courses here used judgment against grading criteria, so that the difference between grades reflected qualitative differences in performance.
2 *Deriving the final grade.* However an individual performance is assessed, it needs to be combined with other assessments to form a final grade for the student. Where marking the individual task has been done, combining results presents no problem: it is a matter of averaging the obtained results. Where the initial assessments have been made qualitatively, top-down, they can be converted into a number scale which can then be dealt with arithmetically, as in veterinary science, management sciences and nursing (see Tables 13.1, 13.7 and 13.8). Holistic assessment was not used in these examples, but an example appears in Box 11.2 (p. 224).
3 *Assessing the ILO or assessing the task.* We saw examples of both here. Assessing the task occurs in veterinary science (critical review of literature), in engineering (SCA project, examinations) and management science (tutorial tasks and participation, learning log and examination). Assessing the ILO on the basis of a variety of sources occurs in accounting, information systems and nursing. It is interesting to note that this issue is independent of the task. The same task, such as tests and examinations, can be assessed in itself, or as a source of evidence in an ILO.

We are extremely grateful to the designers of the faculty implementation of constructive alignment, and of the courses we have just visited, for allowing their inspirational work to be included here. They nicely demonstrate that,

although so different in content and detail, constructively aligned teaching and learning can be implemented in so many different areas and institutional contexts: constructive alignment is a robust animal that can adapt to a variety of conditions. These courses are not here as models to be emulated in detail. Undoubtedly, they will change as a result of ongoing quality enhancement, as all good teaching does. Transformative reflection is by definition transforming. Our intention in presenting these examples is rather that they will provide ideas to fertilize your own transformative reflection about your teaching and assessment.

A final task (Task 13.1) asks you to revisit the intended outcomes that we have identified at the beginning of this edition (p. xx) and reflect on how well they have been achieved as far as you are concerned.

In the last paragraph of the previous edition of this book, the quality enhancement systems in place in the UK, Hong Kong and Australia were compared. The most staggering difference between the systems lay in the amount of money spent on teaching development. The hope was expressed that 'by the third edition of this book, these figures will have equalized: upward' (p. 289). Sad to relate, this has not been the case in purely monetary terms. There is no doubt, however, that the focus on the quality of teaching and learning has certainly been adjusted upwards in all these countries and elsewhere, as outlined in Chapter 1 of the present edition.

We hope that this trend, for institutions and systems to concern themselves about the quality of their teaching, will continue. We would further hope that the concepts and practice of outcomes-based teaching and learning, and its implementation through the reflective use of constructive alignment, will continue to play its role in this ongoing process of enhancing the quality of teaching and learning at university.

Task 13.1 Your achievement of the intended outcomes of this book

We have identified five intended outcomes for readers of this book (see page xx). We have discussed the theory and practice of designing and implementing constructively aligned teaching and learning and provided task activities for the different stages of designing and implementing constructive alignment. Now that you have finished reading the book, and hopefully have done the tasks, we would like to ask you to undergo some self-reflection and self-assessment of your achievement of these intended outcomes.

Your evaluation on achievement of intended outcome:

1 _____
_____

2 _____
_____

3 _____
_____

4 _____
_____

5 _____
_____

Your overall reflection:

1 Some of the most important things that you have gained from the book:
_____
_____
_____

2 Questions that you still have regarding designing and implementing constructive alignment:
_____
_____

3 Actions that you will take to try answer these questions:
_____
_____
_____

4 What is your intention to implement constructive alignment in your future teaching? Put a cross on the continuum to indicate your position:
_____

No intention to implement — Definitely intend to implement