

Business Management for Geomatics Education

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SUMMARY

Whatever surveyors do in their professional life, the chances are that they will be involved in business management. Therefore, the Geomatics Programme at the Department of Land Surveying and Geoinformatics of the Hong Kong Polytechnic University offers the subject of Geomatics Business Management to students to equip them with the necessary business and management techniques of successfully handling various business and management related issues. And the curriculum, pedagogy and assessment for the subject are described here under the outcome-based curriculum and work-integrated education requirements.

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1. INTRODUCTION

In Year 2004, the University Grants Committee (UGC) of Hong Kong has completed the Teaching and Learning Quality Process Reviews (TLQPR) on the eight UGC-funded universities of Hong Kong, and reported good practices of teaching and learning in (ECEQW, 2005). At the same time, The Hong Kong Polytechnic University revised the curricula of its academic programmes for the triennium 2005-08. These outcome-based curricula have been implemented since September 2005, together with the formalization of work-integrated education (WIE) requirements for all undergraduate programmes. The educational goals are all-round development of students covering:

- Ethics, the intellect, the physique, social skills and aesthetics.
- Biliteracy, that is, Chinese and English; and trilingualism, that is, Putonghua (China's national language), Cantonese (local language) and English.
- The responsibility towards the family, the community, the country and the world.
- The healthy lifestyle.
- The global outlook.
- The life-long learning character equipped with information technology (IT).
- The appreciation of Chinese values.
- The respect to the rule of law.

In the curriculum revision, the new subject of Geomatics Business Management has been added into the final-year study of Programme 34011 (Bachelor of Science in Geomatics). In this paper, the curriculum contents, pedagogy and assessment method are described primarily with the practical activities of teaching and learning. In particular, reflecting current changes in the theory and practice of lecturing technique and in the evaluation of both students' and teacher's performance.

2. WHAT ARE THE AIMS AND OBJECTIVES OF THE CURRICULUM?

This subject addresses the business management issues of engineering surveying, land boundary surveying and geographic information systems (GIS). The objectives of the course will be to familiarise the students with both the scope and functions of managerial operations associated with cost estimation, tendering, contract administration and total quality management within the three main categories of geomatics business. In the pedagogical setting, theories and professional practice of geomatics are reviewed and their applications in business practice are explained. On completion of the course, the students should be able to effectively manage the geomatics business and projects, and communicate with other professionals (e.g., architects, engineers and real-estate developers) concerning the business requirements of geomatics projects.

3. WHAT SHOULD LEARNERS LEARN?

As shown in Table 1, the Subject Lecturer has divided Geomatics Business Management into four parts covering ten subject areas as follows:

- Establishment and forms of geomatics business;
- Strategic, marketing, human resources, financial, knowledge and operations management;
- Managing engineering survey, land boundary survey and GIS projects;
- Professional ethics in business practice.

4. HOW SHOULD IT BE LEARNED, TAUGHT AND ASSESSED?

Strategies of good teaching and learning are adopted in accordance with the University's policies, emphasising student-centred approaches, supportive learning environment, good teaching, application of Information and Communication Technology (ICT) tools to enhance learning and teaching, and organizing 'active classroom' (ECEQW, 2005). Under these policies and strategies, the problem-based learning (PBL) and teaching approach is recommended. Also, from previous teaching experience, the majority of these university learners are 'silent observers' unless the teacher motivates them. Reports also show that PBL is very suited to Chinese learners (Stokes, 2003), and that intrinsic motivation, collective learning, respect for teachers and maintenance of harmony are found in PBL (Ho, 1986; cited by Stokes, 2003). Therefore, PBL is applied in the teaching and learning process of this Subject. Students are required to attend a total of 52-hour lectures in 14 weeks, and read the study materials (e.g., Lam, 2005; Aronoff, 1989; Huxhold, 1994) before attending the lectures.

During the lectures, students are often organised into group discussions, recalling their knowledge and answering the questions given in the worksheets, and actively involved in brainstorming or PBL activities. Attempts are being made to make sure the problem or task for each group is challenging, meaningful and can only be done with group effort. Students are also encouraged to develop their ideas and report back to the whole class under minimum guidelines or hints from the Subject Lecturer. Subject Lecturer would ask short questions from real-life situations to individuals for deep thinking to ensure that everyone contributes to the session and that the theories are to be found or constructed by the students.

As shown in Figure 1, dynamic and formative assessments are frequently organized in the form of oral presentation, quiz, test or group projects which help the lecturer communicate expectations and standards of learning and performance to students (i.e., feedbacks on knowledge level). The formative assessments are criterion-referenced tests and oral presentations used to improve students' performance. A portfolio of assessment results from student presentations is recorded. In the end of the Semester, summative assessment in the form of final written examination is organized to assess the effect of the completed program and compare the performance of students for selecting successful learners to receive awards and scholarships. Learning outcomes are assessed by the criterion-referenced levels of the Structure of the Observed Learning Outcome (SOLO) Taxonomy given in Table 2. It should

be emphasized that the whole assessment scheme is treated as an integral part of the learning process which enables students to become successful learners.

Under the University's policies, the overall learning and teaching performance of the pedagogic settings is assessed by the following methods:

- Obtaining student feedback on each subject in Student-Staff Consultative Meeting between Programme Leader/Coordinator and Student Representatives in the 5th Week of the semester. Feedbacks are then forwarded to the Subject Lecturers for immediate improvements in teaching and learning. In most cases, students complain about workload, timetable and computing facilities.
- Obtaining student feedback on each subject in the Programme Committee Meeting of the Head of Department, Programme Leader, Subject Lecturers and Student Representatives.
- Obtaining Student Feedback Questionnaire (SFQ) on each subject from students by the end of the semester. This is to gather information on students' learning experience as well as their responses to the courses and the teacher(s). The SFQ has been used for some years by the University as a major instrument of teaching evaluation. Many colleagues against using SFQ because its reliability depends very much on the maturity of students. But most of us agree with such policy.
- Teaching Portfolio (TP) by which teachers evaluate their teaching through self-evaluation.
- In considering the biases possible of the SFQ by students and TP by teachers, In-class Peer Evaluation (IPE) is applied in which the Subject Lecturer will be assessed by at least two experienced staff members who are appointed by the Departmental Learning and Teaching Committee and the Head of Department. However, peer assessors' observation would also incur possible bias relating to their own beliefs about teaching effectiveness. However, more IPE will be used in the future, not only in assessing the subject lecturer, but sharing excellent pedagogy among large group of observers from local or overseas.

The teaching and learning quality of the programmes and the subjects is also assessed by external assessors, for examples, Departmental Academic Advisor, Adjunct Professors, and External Examiners representing professional organizations.

5. CONCLUSION AND FUTURE DEVELOPMENTS

This paper has presented the curriculum contents, pedagogy and assessment of Subject LSGI 4211 – Geomatics Business Management. The PBL and teaching approach are implemented so that the majority of the management knowledge is constructed by students. The teaching and learning outcomes are assessed by dynamic and continuous assessment in the form of

both formative and summative assessment. More rigorous assessments on the performance are supported by student-staff consultative meetings, programme meetings, SFQ, TP, IPE and external assessors. For further evaluation of the subject curriculum in the future, the multi-variable statistical models of (e.g., Black, 2002; Nunnally and Bernstein, 1994) are being investigated in an attempt to apply the knowledge of content validity, criterion-related validity and construct validity to obtain a thorough understanding of both the learning and teaching styles of the pedagogic settings.

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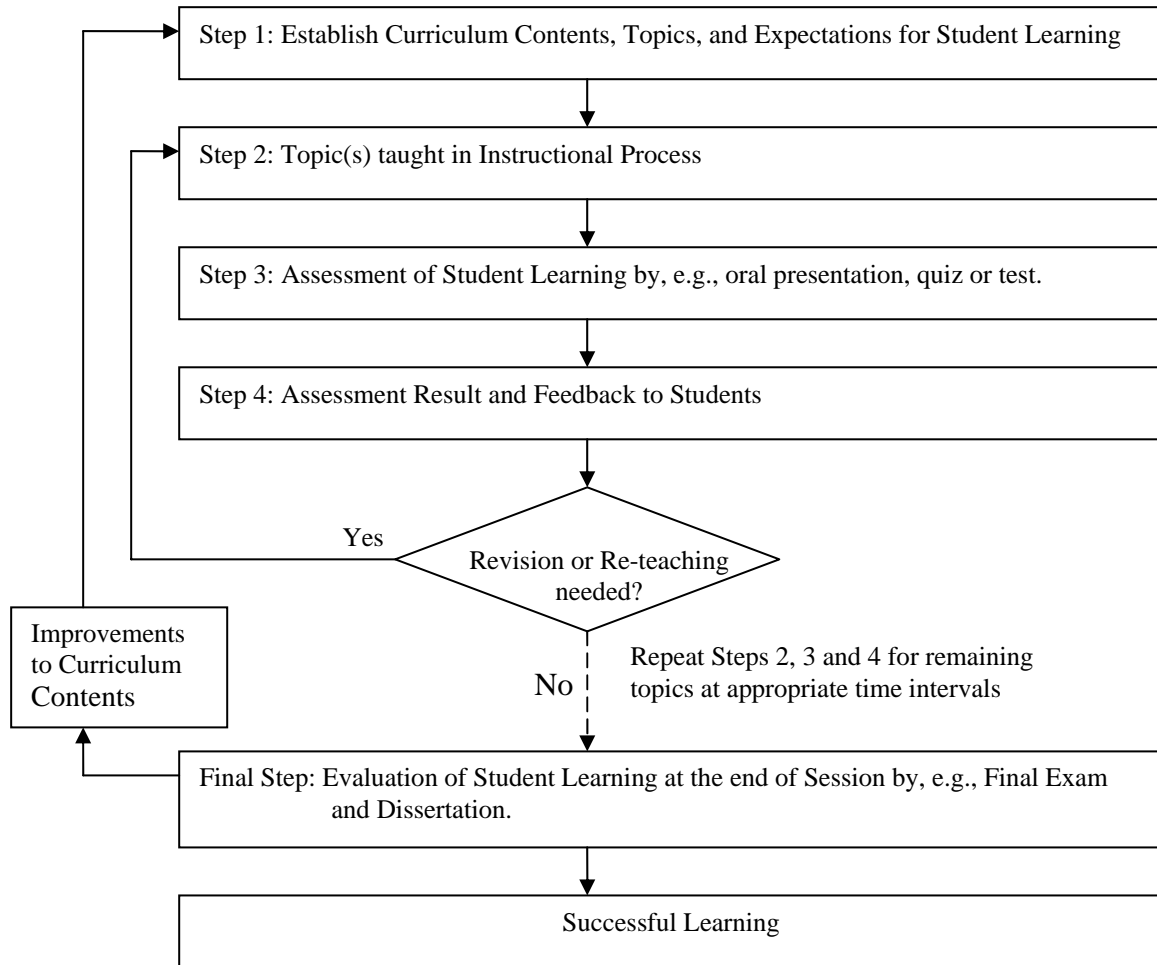


Figure 1: Dynamic and continuous assessment for the learning process.

Table 1: Syllabus and teaching schedule of Subject LSGI 4211 – Geomatics Business Management.

<i>Week No.</i>	<i>Topics</i>
1.	Part A: Introduction to Geomatics Business Introduction to contemporary business environment.
2.	Approaches to establish geomatics firm. Forms of business ownership. Geomatics business plan.
3.	Part B: Scope and Functions of Geomatics Business Management Strategic Management – Understanding the environmental competitive analysis, formulation, planning, implementation and control of strategic management process. Marketing Management – Understanding the principles of marketing for geomatics business.
4.	Human Resources Management – Understanding the organisational behaviour of geomatics firms. Financial Management – Understanding the financial issues.
5.	Knowledge/IT Management – Knowledge capture, codification, integration, sharing/transfer. Operations Management – Managing the geomatics operations and projects.
6.	Part C: Management of Geomatics Projects Managing Engineering Survey Projects – Contract administration, survey operations, and TQM under ISO 9000 Standards.
7.	Managing Land Boundary Survey Projects – Classifications of projects, contract administration, cadastral data, boundary surveys and submissions to land registration information system.
8.	Managing GIS Projects – Geoinformation databases, analysis functions and spatial data quality.
9.	Managing GIS Projects – GIS implementation: planning; needs analyses and requirements; system design; procurement; operations and maintenance.
10.	Part D: Professional Ethics Professional ethics in business practice. Manual of good practice. How to avoid corruption?
11.	Group Presentation of Assignment No. 1 – Business Report on Engineering Survey Project.
12.	Group Presentation of Assignment No. 2 – Business Report on Land Boundary Survey Project.
13.	Group Presentation of Assignment No. 3 – Business Report on GIS Project.
14.	Revision of topics before the final examination.

Table 2: Grades of students' overall performance in a subject. Developed after (Programme 34011 Document; Biggs and Collis, 1982)

<i>Learning Outcomes (Levels of SOLO Taxonomy)</i>	<i>Performance/ Understanding</i>	<i>Grading description</i>	<i>Grade</i>	<i>GPA</i>
Excellent (Extended Abstract)	Construct and generate new approach	The student's work is of an outstanding standard. It exceeds the subject learning outcomes in all regards.	A+	4.5
		The student's work is of an excellent standard. It exceeds the subject learning outcomes in nearly all regards.	A	4
Good (Relational)	Integrate and apply knowledge into practice	The student's work is very good. It exceeds the subject learning outcomes in the majority of regards.	B+	3.5
		The student's work is good. It exceeds the subject learning outcomes in some regards.	B	3
Satisfactory (Multistructural)	Know and discuss content	The student's work is wholly satisfactory. It fully meets all the subject learning outcomes.	C+	2.5
		The student's work is wholly satisfactory. It largely meets all the subject learning outcomes.	C	2
Marginal (Unistructural)	Limited understanding	The student's work is barely adequate. It fails marginally to meet all the subject learning outcomes.	D+	1.5
		The student's work is weak. It fails to meet the subject learning outcomes in some regards.	D	1
Unsatisfactory (Prestructural)	No learning effort, without participation. Misunderstanding	The student's work is inadequate. It fails to meet most of the subject learning outcomes.	F	0