INFORMATION TECHNOLOGY PROJECT

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1 Abstract

We present our experience in designing a course of Introduction to Information Technology (IIT) for the first-year students. The main purpose of this course is to introduce the concepts of computing and computer, and to present a hierarchy of information technology (IT) knowledge from basic to advance through the introduction of syllabus system, research trends of our faculty, IT applications in society, ethics and career potentials in IT. The content of this course is set up to meet the Standard 4 in CDIO. We divide the introduction into two courses and teach the firstyear students in the first and second semesters. The first course is the introduction of computer, computing, internet, ethics, and some technical skills of analysis, design, implementation, and testing. This is an overview of IT from the outsiders. The second is a hierarchy of IT knowledge from basic to advance through education systems and research in our faculty. This is an overview of IT from inside viewpoint. We also present some experiences about the projectbased approach for labs and explain how we train personal skills and professional attitude for our students. Finally, we conclude by providing comments with pros and cons in operating the courses.

2 Keywords

Standard 4, Introduction to Information Technology, CDIO syllabus, Project-based learning.

3 INTRODUCTION

In CDIO standard, the standard 4 [1] plays an important role to provide a general view about curriculum, syllabus system, future career and beginning concepts of CDIO for the first-year students in our university. Many similar works in engineering have been published in the CDIO conference. Ramon Brag´os, et. al. [2], presented a method that they have conceived, designed and implemented "Introduction to Engineering" course at Telecom BCN, UPC, 1

Barcelona using the CDIO syllabus and standards. The basic concepts and professional skills were given to the students through lessons and simple projects. From that, the students were able to recognize problems of which solutions we were going to teach in the following courses of the curriculum. Yingzi Wang, et. al. [3], introduced the implementation of the cornerstone project. They transformed the name of "Introduction to Civil Engineering" into "Introduction to Civil Engineering Design". The difference is that students are put into an environment where they could learn and use knowledge and professional skills to study design actively. Xiaohua Lu, et.al. [4], introduced one approach of multi-disciplinary project for the introduction course. In his class, the students were divided into different disciplinary groups and joined in project-based learning. That project required students to design and build a computer-controlled tower crane at Shantou University. This process helped students to understand the different modules and the input/output of each module. As a result, the multi-disciplinary project is a good approach to introduction courses. Proceedings of the 9th International CDIO Conference, Massachusetts Institute of Technology and Harvard University Goran Gustafsson, et. al. [5], presented his work of engineering education programs. The firstyear introductory course was discussed and shared to improve and increase student motivation. They have identified projects and teamwork as important parts of the first-year courses. With the CDIO approach, a new model for engineering education is developed to be able to implement this projects and professional skills. In many previous works, we rarely see the first-year introductory course to information technology (IT). In this paper, we present our experience in designing a course of Introduction to Information Technology (IIT) for the first-year students. On one hand, the main purpose of this course is to introduce the concepts of computing and computer, and to present a hierarchy of IT knowledge from basic to advance through the introduction of syllabus system, research trends of our faculty, IT applications in society, ethics and career potentials in IT. On the other hand, the purpose of this course will introduce the relationship between the contents of 4 year learning in the university with IT career after graduation to first-year students. The IIT course also shows students the social requirements to IT not only in Vietnam but also worldwide. After studying this course, the first-year student will have another point of view about their role in the development of IT. From that starting point, it will help students to think and navigate their future career in IT. It also influences to students' decision in course selections for undergraduate program at the current time or their intention to enter the graduate program in the future. This course will also help the students to identify the importance of engineering skills and appropriate attitudes for the success in their future career path. From the above motivation, the design and implementation of this course have been considered seriously by our senior lecturers and professors in our faculty. We have already spent more than one year to prepare the learning outcome, syllabus, teaching/learning documents, and workspace for this course [6]. This paper will present our experiences in design, building, teaching, and evaluation of this course to the first-year students in 2012. The content of this paper is presented as follows; Section 2 presents the design and building

2 of course goals and learning outcomes for IIT course. Section 3 presents the approach of projectbased learning to embed CDIO concepts in teaching and training for students. Section 4 presents the meeting and feedback between IT companies and the first-year students. Section 5 presents the assessments and some rubrics for this course. Section 6 is our discussions about pros and cons in operating this course at our faculty. Section 7 is the conclusions.
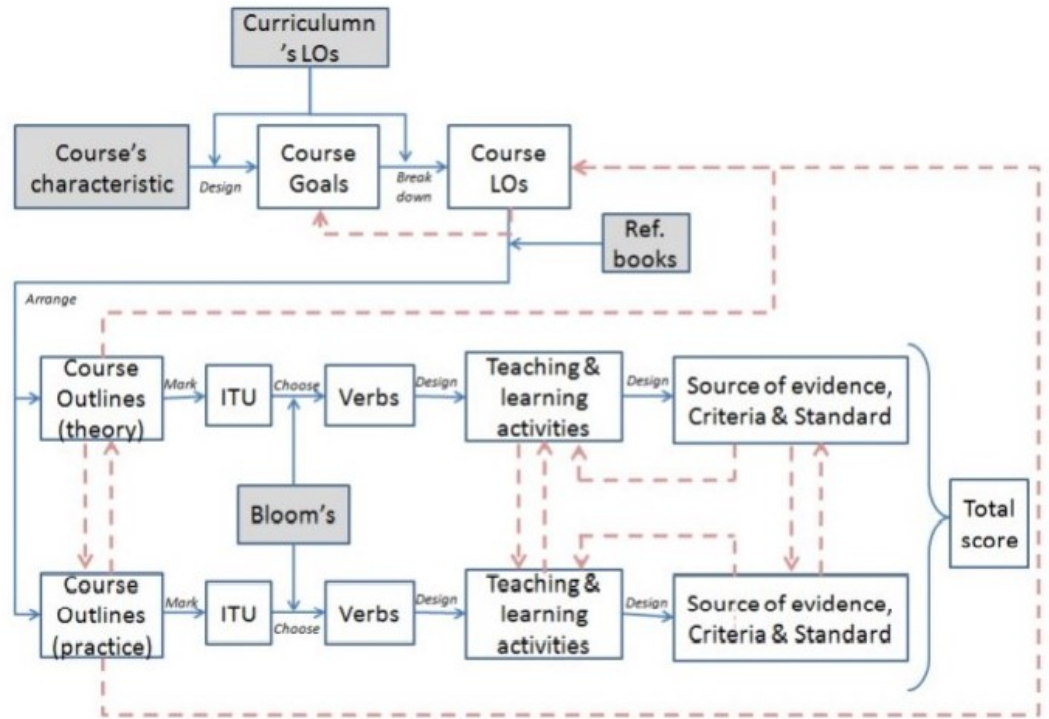
4   Inserting Picture

Figure 1: Workflow to build a CDIO syllabus

Figure 1: Work flow to build a CDIO syllubus

5   Algorithm complexity

The first course is the introduction of computer, computing, internet, ethics, and some technical skills of analysis, design, implementation, and testing. This is an overview of IT from outside viewpoint. The second is a hierarchy of IT knowledge from basic to advance through systems of education and research in

Algorithm	Best	Case	Expected
Selection	sort	O(N2)	O(N2)
Merge	sort	O(NlogN)	O(NlogN)
Linear	search	O(1)	O(N)
Binary	search	O(1)	O(logN

our faculty. This is an overview of IT from inside viewpoint of our faculty. The course goal of Introduction to Information Technology can be written into two stages as follows;

a) The course goals of the first course 1. Explain general knowledge of IT include basic knowledge about counting system, operating system, internet, email, and office applications. 2. Describe the basic values related to professional ethics of those working in IT sector. 3.Describe the work and job position in a company, related to IT, which is one IT student can undertake after graduation. 4.Recognize the importance of self study, teamwork, and communication skills. 5.Recognize the professional attitude, regulatory compliance, and reliability.

6   ASSESSMENT AND FEEDBACKS

Assessment is the main difference between CDIO approach and the conventional teaching methods. We divide 70ratio of final exam and project in the second course is 60assessment of each project is checked monthly in three months. Figure 5 presents some rubrics of project and report evaluation. The detail of assessment has been shown to students at the beginning of the course. During the course, students have been reminded about the assessment and we have also encouraged them to provide a good strategy of learning for each group so that all members of the same group can receive a good result. In practice, the peer review gives objective evaluation. It helps students have a strong responsibility and a serious thinking about their contributions to the final results of their group.

Table 1 presents the feedbacks of 170 students and Table 2 gives the benchmark of score value. We can see that most distribution of feedbacks stays on "Agree" corresponding to the score value of 2. It means that the feedbacks of students are positive toward CDIO approach. However, there are still some complaints about overloaded and stressful because the first-year students have got a lot of project and homework deadlines from the first semester of the undergraduate program in the University.

7   Equatios

$$\int xn.dx = x(n+1)/(n+1) + C \tag{1}$$

Order	Outputs	Evaluation members	Applicants	Ratio
1.	Hardcopy of report	Lecturer	Group	30%
2.	Demo software	Lecturer	Group	30%
3.	Presentation	Lecturer	Group / member	10%
4.	Member performance	Inside group (peer review)	Member	15%
5.	Group performance	Other group (peer review)	Group	15%

a) Project evaluation

Order	Outputs	0	1	2	3	Ratio
1.	Introduction, motivation and survey	None	Unclear	Clear but not enough	Enough and logical	15%
2.	Description of basic concepts	None	Unclear	Clear but not enough	Enough and logical	15%
3.	Formulation of problem	None	Unclear	Clear but not enough	Enough and logical	15%
4.	Experiment explanation	None	Unclear	Clear but not enough	Enough and logical	15%

Figure 2: Figure 5: Some rubrics of project and report evaluation.

8 Reference

This is my first reference[1].

References

[1] Efraim Turban, R Kelly Rainer, Richard E Potter, et al. *Introduction to information technology.* John Wiley & Sons New York, NY, 2001.