A Multi-faceted Approach to Enhance the First Year Experience and Professional Skills of Computer and Information Science Students

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Academic institutions have a responsibility to develop the necessary knowledge, skills and abilities in their learners through relevant course contents and delivery methods. Apart from the quality of instruction, Universities have to reappraise their role and contribution to the total student experience. Student engagement needs to be an explicit, measurable, achievable and rewarded goal, as students have different motives, values and expectations than in the past and need to be actively engaged in their learning. First year students especially need a nurturing environment in which they can develop as active and involved learners. The range of knowledge and skills required of Information Technology (IT) professionals has diversified. The School of Computer and Information Sciences at University of South Australia introduced a new course into the first year Information Technology programs to engage students and develop the non-technical knowledge, skills and attributes as required by the IT profession.

Background

The role of Higher Education

Academic institutions serve several clients, including learners, employers, parents, alumni, lecturers, taxpayers, supporters, governing boards, administrators, staff, research users and society as a whole. The questions that continually need to be addressed are: To what extent has the work environment changed and what is the influence of such changes on the demands made of professionals? Do these changing demands have an influence on the academic institutions and how should they adapt their courses and teaching approach accordingly? Universities must have the resources and be flexible enough to serve the various needs of their clients. Academic managers and lecturers should aim to understand the needs of the industry and the learner after graduation and "transform" the needs into improved programs, courses and delivery methods.

The new kind of student

Lecturing staff at university have to deal with a different type of student today. Light (2006) says that today's students are no longer the people our education system was designed to teach and asks whether students are "wired differently than those in the past". The new generation of students who are beginning their tertiary education are referred to as the "Millennials" (Jonas-Dwyer and Pospisil, 2004). These students have grown up with technology and McInnis (2003)

refers to them as "multitasking, digitally connected students". They are used to receiving information really fast, they prefer to parallel-process and multi-task, prefer graphics to text and they function best when networked (Prensky, 2001). Educators need to be aware of the diverse mix of students undertaking our programs, and consider the implications that come with the Millennial learner.

Transition into University

Students experience a reality shock when they transition from high school into the university environment, especially those from different cultural backgrounds. Students have a different set of expectations and needs regarding their time at university and the support they receive. From the outset, it is necessary to set the scene for the university expectations. Students need to be aware of their obligations in the relationship with university staff members and their peers, as well as their contribution and obligations toward the academic community as a whole.

Student engagement

The Australasian Survey of Student Engagement (AUSSE, 2009 has proven that modern students are not as engaged as before by measuring six areas of Australasian university education: active learning, academic challenge, student and staff interactions, enriching educational experiences, supportive learning environment and work integrated learning. Hu and others (2002) define engagement as 'the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes'. Students appear to be less engaged with university life in general and with study in particular. To meet the challenges of this generation, universities have to understand the motives, values and expectations of the students, but they also have to take responsibility to shape the experience of the student (McInnis, 2003). The new paradigm is to actively engage students with both the material and with one another.

A new undergraduate course for first year students- Information Systems Professional Practice (ISPP)

A key element of the University of South Australia's Teaching and Learning framework is a commitment to student engagement through experiential learning ('learning by doing'). At UniSA the aim is that by 2010, approximately one third of all learning experiences in all programs will be related to any combination of the three elements of experiential learning, namely Practice Based Learning, Teaching-Research Nexus and Service Learning. The aim of experiential learning is to ensure that students are not passive recipients, but active participants in the learning process. The School of Computer and Information Science is currently implementing the changes suggested by the STEP 2010 project for redesigning the School's instructional offerings and implementing experiential learning into its programs. The new IT program structure includes a generic first year with specialization courses in later years.

The generic first year program includes a 9-unit undergraduate course, which is committed to engaging students as active and involved participants in the learning process. The course focuses on academic, professional and information systems literacies, as well as an understanding of the Business-IT interface and its complexities. Upon completion of the course, students should be

able to communicate to a range of audiences using appropriate interpersonal, professional and academic skills; demonstrate the ability to search for, analyse, and evaluate different sources of information to achieve research goals; apply career planning/management skills within the ICT profession; demonstrate an understanding of an organisational structure including context, people and leadership; describe the value and application of ICT in organizations and use various available ICT tools and techniques.

To ensure active participation in the learning process the ISPP course incorporates a combination of innovations and a variety of teaching and assessment methods, such as brainstorming, working in teams, case studies, presentations, role play, storytelling, quizzes, humor, questions and online collaboration. During workshops role plays and active team work are required of students to carry out specific tasks. As part of the creation of a tender document, students visit an indigenous community park as employees of IQ Incorporated[1], a pseudo company which has been established by the School of CIS.

In the ISPP course, students will be exposed to team based tasks through a number of activities. Teamwork is emphasised and practised because it is an effective and meaningful way to learn, share ideas, and negotiate solutions. Students learn to work in a self directed way, work in a range of teams (e.g. discipline-specific or multi-disciplinary), communicate effectively and use logical and rational argument to persuade and negotiate with others. Students who work collaboratively in teams develop cooperative learning strategies, identify the needs of others, build positive relationships and develop the necessary analytical skills for problem solving. They benefit particularly from brainstorming and *bouncing ideas off* each other, learning from each other, discussing work in teams outside contact times and checking ideas and results.

In ISPP the focus in the classroom is shifted from the traditional approach where instructors 'teach' course concepts. Students study the content through prior reading and should come to class prepared for supplication of the content knowledge through various activities and discussions. The level of pre-preparation of students is assessed at the start of the class using a Readiness Assessment Process (RAP) test, consisting of a multiple choice test which is taken individually and then as part of a small team. The practical application of course concepts are now done in student teams. In large classes, in particular, this approach is also effective for motivating attendance, handling discipline problems, enhancing student engagement and supporting active learning (Michaelsen *et al*., 2002).

In terms of content, the ISPP course covers the following knowledge areas:

Academic skills

Learning how to learn is key to success at university and thereafter. The ISPP course brings together several key practices to support oral and writing skills and the aim is to improve students' capacity for scholarly observation, reflection, critique and discourse. Academic skills are incorporated into a multitude of practical activities and discussion sessions within ISPP. In

[1] http://www.iq-incorporated.com/

workshops students are introduced to academic integrity, general and academic writing and oral communication. Students analyze short case studies and answer questions in class and do group presentations using Microsoft PowerPoint and other collaborative technologies. In practical sessions students practice information searches to develop research skills and develop paper critiques and mind maps. Understanding and implementing the requirements of referencing in assignments is an important prerequisite for success in an academic environment and developing students' perspectives on academic conduct is essential for addressing issues related to academic integrity.

Interpersonal skills

The exponential rate of change in the ICT industry has increased the risk of technical skills becoming obsolete. To counteract the effect of skills obsolescence, IT employees have to rely more on learning and less on what they already know and add non-technical skills to their arsenal of technical IT skills and abilities. Throughout the ISPP course interpersonal skills are developed through a variety of activities. Students get the opportunity to identify their personal values, personality profile and learning style in order to work effectively with others. They are required to perform tests based on IS theory as a team and collaborate to arrive at agreed solutions to problems. In workshops active teamwork is required for activities to be carried out on pre-set tasks. Furthermore, students conduct role plays, share their ideas and present their solutions to a business problem in group presentations enhanced by relevant technologies.

Information systems, business and the community

The ISPP course aims to improve students' understanding of business and industry and the role and value of Information Systems in business. The ISPP course therefore also includes awareness of and sensitivity towards the cultural differences in order to prepare students for the multi-cultural world of work[2]. Students are provided with several activities to raise their awareness of Indigenous culture and interact with the business community. The first task requires them to produce a movie about their perception of home and engage with others in a discussion forum about what home means to them. They produce a document of their reflection and learning to indicate how their concept of home has developed. The discussion forum is facilitated by tutors who have a close working knowledge of cross-cultural communication either as Indigenous Australians or people who have worked closely with Indigenous communities.

Students also have the opportunity to act on behalf of the pseudo company to provide a tender for contract for the City of Salisbury. The tender will present viable options for a sustainable and culturally-sensitive information system for Kaurna Park which is under the control of the local Council. This project involves Indigenous stakeholders and a panel representing Indigenous Australians will act as consultants to student groups as they develop awareness of appropriate Indigenous protocols.

[2] http://www.unisa.edu.au/ducier/icup/default.asp

Career paths within the IT profession

The nature, characteristics and styles of technical careers are undergoing fundamental changes and the ISPP course includes career development skills to improve students' readiness for employment in Australia as Information Technology professionals. In the early stages of the ISPP course, Career Management Skills are taught by specialised career development staff of the university[3] to provide students with the skills required to find and secure employment and to proactively develop their own career goals. As part of the course assessment, students are expected to prepare a cover letter and submit a résumé for a mock job application.

Nuts & Bolts session outline

- Outline of the course followed by a discussion on:
  - Embedding academic, careers and professional soft skills into the course
  - How we have incorporated team based learning into the course
  - Discussion of results of student feedback on their experience of the course

- Interactive discussion of the following questions with the audience:
  - How could we convince IT students who want to do e.g. games programming that they will also need personal and interpersonal skills in their profession?
  - Does anyone have experience in team based learning?
  - What is the best way to get feedback on the course from students?
  - How can we engage external students in this type of course?

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[3] http://www.unisa.edu.au/careers/