Professionally speaking: Reflecting on a professionalism-first approach

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In the fast-paced world of the Information Technology industry, employers seek capabilities-driven graduates who possess a set of skills beyond their technical expertise. For students on the Unitec Bachelor of Computing Systems (BCS) programme these capabilities are encapsulated in a set of professional skills that, along with their technical skills, include the ability to be interpersonally effective; capable of an analytical, critical and reflective response to problem solving; proficient in conducting research into a given subject; capable of change and adapting quickly to change as well as being committed to continuous learning. This paper reports on a compulsory first semester course entitled 'Professional Skills for IT Practitioners' and offers an insight into four semesters of teaching where these capabilities are formally taught. The rationale behind the development of this course and pedagogical approaches to the learning activities are explained and aligned to a desirable graduate profile where the learner is being guided to develop a reflective approach to their acquisition of knowledge and ability to reason.

Keywords:

graduate capabilities, professional skills, educational design, reflection

1. INTRODUCTION

As educators and curriculum developers we are constantly being told by industry that they require graduates with good communication skills and these skills are often ranked above technical skills (Young, Senadheera *et al,* 2001). When the opportunity arose to redesign the first year courses of the Bachelor of Computing Systems it was an ideal time to revisit the philosophy and objectives of the degree programme and determine just what graduate profile we wanted our students to achieve. After surveying and consulting with industry, graduates, employers and academic staff it was decided to design and implement a first year first semester course that developed the vital student skills, knowledge and good practice from the outset.

This paper reports upon the design and development of a new Professional Skills for IT Practitioners course of study to meet these needs. We begin by outlining the background to the development of the course and reasons for change. The philosophical assumptions and educational reasoning that underpinned the development of this new paper are then explained with a discussion of the pedagogical framework and approaches to teaching, learning and assessment. The development team considered it of critical importance to change from the previous teaching and assessment style to a student focussed environment. Drawing on contemporary educational theory and allowing for flexible learning opportunities the course has now been taught for four semesters. Over this period of time the teaching team have been able to reflect on their teaching and assessment practices and take cognisance of feedback by students and colleagues.

This has enabled the team to make the necessary adjustments to continue to provide an exciting learning environment for the students.

2. CATALYSTS FOR CHANGE

In 2002, a review of two papers on the BCS (a communications paper and a paper teaching MS Office applications) revealed that neither paper was meeting the needs of future IT graduates. Where, in the late 1990's, formal teaching of various software

applications was necessary for students who lacked basic computer skills, enrolling students were now far more 'tech savvy' and proficient in these skills. In line with an NZQA Level 5 set of capabilities, students now needed to be capable of 'conversations' to define a task and reframe the task to gain meaning and relevancy in order to execute a solution in a computing context; applying and integrating the skills acquired at a lower level of study. Similarly, the traditional communications paper lacked the business context so vital to students who would one day enter the IT industry. The communications paper was heavily theoretical and focused on subject content rather than process. In both papers, learning and assessment activities had the potential to encourage inappropriate recall or recall that resulted in fragmented outcomes and a failure to communicate meaning. In order to promote the students' capabilities to handle a variety of tasks in a range of settings, new approaches to learning activities were called for that would result in a deeper layer of understanding (Biggs, 1999).

Research into a number of professional organisations relevant to the IT industry (New Zealand Computer Society, ACM) led to a team-developed set of core competencies for IT professionals as follows:

- To be industry aware
- To possess leadership skills to achieve goals
- To be interpersonally effective to be able to work with others
- To have a sound level of technological awareness and skills
- To possess a high level of problem-solving skills
- To have systems thinking and understanding
- To have a basic business understanding
- To be able to negotiate, plan and manage time
- To be able to cope under pressure

In response to this review, a development team was selected and charged with the task of creating a paper to meet the needs of the industry and nurture a set of professional skills in students who would graduate as potential IT practitioners.

3. A NEW FOCUS

With the development of the new paper, a set of desirable graduate capabilities for the course was outlined. This set of capabilities focused on the following five competencies:

- Interpersonal effectiveness
- The ability to gather information and filter that information to gauge salient points
- The ability to communicate information in a computing setting
- Problem diagnosis and solution
- Self evaluation and reflection

These were expanded upon to form the following suite of learning outcomes in a new course of study that offered the students an opportunity to acquire a broader set of skills and capabilities than would have been achieved by simply combining a communications and software applications paper:

- Participate effectively in a variety of conversations, to make meaning, hear alternative perspectives and relay information both as an individual and as a contributing member of an Information Technology team across technical, gender, age and cultural boundaries.
- Define a problem, determine, create, seek and retrieve the required information from a variety of sources and utilise this information to effect a solution using information technology to support the outcome.
- Translate information needs into an information search strategy that is adaptable to the wide variety of information sources available.
- Communicate effectively by exploring the integration of contemporary audio-visual communication tools and software applications with written and spoken communication to prepare presentations and technical documentation that achieve both technical accuracy and user friendliness.
- Develop a strategy for evaluating personal efficacy, as well as that of the team, in achieving a goal.

These learning outcomes formed the framework for the following list of essential course topics that underpinned the final course prescription: as shown in Table 1.

Table 1: Topics in curriculum

E-communication	Email, internet and chat rooms
Communicating across boundaries of gender, age, race, culture and technological currency	Intercultural communication at an electronic global level
Technical Writing and Research	APA Referencing
Internet Searches	Problem solving
Software skills in MS Office suite	Effective Presentations, including use of IT media
Effective teamwork	Code of conduct and ethics
Networking and interviewing	Training in IT

The aim of this course of study was to develop students' professional competencies using relevant Information Technology software to enhance their interpersonal and research skills in creating, retrieving, using and disseminating information in a range of settings. The approach to learning and subsequent learning activities focused on a set of authentic tasks that are common in the IT industry; for example, software training, presentations, research and report preparation.

Placed in a business context, Gremler *et al.* (2000) suggest that experiential learning in an authentic setting is more likely to develop students' interpersonal and communication skills, their ability to work in teams and groups, and sharpen their critical, analytical and problem-solving skills. Should a reflective process, where students interact with each other or simply engage in their own personal evaluation, follow the assignment then learners will benefit even more from the insights they have gained during that learning activity (Williamson & Nodder, 2002). Authentic experiences include learning activities that emulate real life situations, problems and tasks - activities that the learner considers to be important.

4. PEDAGOGICAL FRAMEWORK

Schunk (2000) comments that effective teaching requires that we determine the best theoretical perspectives for the types of learning we deal with and draw on those perspectives for teaching, thus encouraging educators to find value in each perspective. In order to move students beyond being receivers of information to become constructors of knowledge (Belenky, Clinchy, Goldberger & Tarule, 1986), a constructivist approach to course development was taken. This approach aimed at ensuring a student-centred, cooperative learning environment and flexible mode of delivery and assessment methodology in order to engage the students and enhance the meaning-making process. The focus was on devising a set of active student learning activities, fostering opportunities for dialogue and creativity in a rich, safe and engaging learning environment.

Five stages of classroom social activity were particularly relevant to the aims of the course and related learning activities and were taken into account in designing course activities and assessment:

- Engagement
- Exploration
- Transformation
- Presentation
- Reflection

(Green & Reid, 1990)

Within this framework, opportunities were created to encourage students to construct knowledge and understanding with the lecturer's role being that of facilitator rather than knowledge-bearer (Zemelman, Daniels & Hyde, 1993). Towards this end, rather than being relegated to passive receivers of information, the students were to be actively engaged in their learning experience as much as possible (Negroponte, 1995; Cunningham, 1992; Kraft & Sakofs, 1989). By specifically relating the course material to situations graduates might face in the IT industry, students could see value in the new approach to learning.

The constructivist approach encourages learning through problems and exploration of possibilities. Educational goals are set that promote problem-solving skills and require research. Group work and collaborative efforts are seen as integral to students

achieving goals. Assessment is less structured; questions are open-ended and may require research development or are answered through the presentation of learning portfolios. Real-life scenarios are used in conjunction with problem-solving skills. In this way, the design of the learning activities aimed to achieve a deeper layer of understanding and promote the students' capabilities to handle tasks. This aligns well to Laurillard's (1993) conversational framework that engages students by giving meaning through structure, which in turn encourages a deep approach to learning. Students gain understanding through discussion and can then relate their understanding to an authentic task and/or context and gain feedback through further dialogue.

Constructivism views student cooperation and mutual exploration as a high priority for effective learning, enabling students to bounce ideas off one another and develop learning-in-dialogue skills as opposed to the learning-in-isolation model (Lewis, 1993; Brown & Palinscar, 1985). Students are thus able to base their learning on enquiry leading to deep understanding of the new concept and the development of mental content models to be applied elsewhere (Spiro et al, 1992a, 1992b). The benefits of a constructivist learning environment would be achieved in the new Professional skills course by facilitating holistic learning opportunities, enhancing collaborative and cooperative skills and allowing for metacognitive reflection (Brooks & Brooks, 1993; Resnick & Klopfer, 1989).

5. INITIAL COURSE STRUCTURE

It was decided at an early planning stage that the new course would be offered in three 1.5 hour sessions as follows:

- A theory lecture for all students in a lecture theatre with good technological media support
- A practical computer lab session for individual streams
- An online session to be conducted using Blackboard software

The rationale for this structure was to allow students a varied, flexible curriculum with the opportunity to participate in a dynamic, interactive online learning environment in their own time and at their own pace. The online course component was considered a vital link to today's IT industry, providing a real-world balance between the face-to-face interaction of theory and practical sessions and the virtual communication environment.

5.1 In Theory

In the theory sessions lecturers not only conveyed the theory content for the course but in addition demonstrated effective presentation delivery supported by engaging technological media. To offset the formal lecture theatre learning environment, interactive and group activities and discussions were utilised whenever feasible in order to create a stimulating, fun learning environment. A dynamic, entertaining guest lecturer and panel of visiting experts also contributed to the theory content as well as acting as excellent presentation role models.

5.2 Practice makes Perfect

The previous focus on basic software skills development in a formal lecturer-dominated environment was reviewed in order that the students could share their existing knowledge and experience with their peers in a student-centred, highly interactive group-training environment. As a valuable adjunct to this process, the vital team-building student learning aspect of the course was also developed.

5.3 A Flexible Online Approach

One third of the course content was delivered online, using Blackboard software. Student feedback in the first semesters of delivery highlighted a need for a strong student learning support structure and workshops and one-on-one assistance was made available to students. Online course materials were also reviewed and amended as necessary in response to student feedback. Student discussion board contributions required constant monitoring in the initial stages of the course when some students were grappling with a new learning methodology.

5.4 Assessment

The assessment for this paper was designed to be ongoing, student-centred, holistic, integrated and aimed at developing student metacognitive understanding through reflection and iteration.

Student assessment was melded into the theory and practical class sessions in a very practical way with students being given as much opportunity as possible to make their own choices of topic and

Table 2: Assessment

Group Assignment 1	Interpersonal Presentations	35%	Theory
Individual Assignment 2	Training in Information Technology Skills	30%	Practical
Individual Assignment 3:	Online Log and Portfolio	35%	Online

delivery dates. A technical writing component as well as practical performance aspect was included in both of the two first assignments to ensure that those dual aspects of the course objectives had been met.

Three assignment assessment items were developed, each covering elements 1-5 of the course aims and aligned to the theory, practical and online course sessions as shown in Table 2.

6. THE LOGISTICS OF INNOVATION

6.1 Benefits

The informal and formal student course feedback has been very favourable, with particular emphasis on the advantages of the flexible learning opportunities afforded by the online course component. In addition, students comment that they appreciate "being forced" to give formal presentations to an audience as this has resulted in a very positive confidence-boosting "real-life" experience for them. Students working in industry have also advised that the skills they have learnt (for example technical writing) have been very useful in their work environment.

In an evaluation of the course, one student commented:

> *"Most of the time we weren't reading books, you were teaching us how to talk, how to act and work professionally with others. Guest speakers were brought in to explain how important these things are in the real world. Sometimes in a school environment, it's hard to see how what you're learning applies to the real world. Professional skills had no problem with this; you can see the lessons actually changing your personality to suit the IT industry expectations".*

Most of the students were young males and found a busy and purposeful atmosphere appealing:

> *"The teaching methods and the program layout was pretty good…doing the assessments in front of an audience gave me that 'experience' feeling …Meeting deadlines, speaking in front of audiences, using the software needed, leadership and teamwork, and knowing how to be 'professional' are all necessary to make something of yourself in the IT industry."*

The lecturers teaching on this course are finding the paper stimulating and rewarding, and in particular more meaningful and appropriate for BCS students than the previous separate courses. The lecturers place great value on the course's flexible delivery and assessment opportunities and holistic, integrated, student-centred learning approach.

6.2 Challenges

The development team encountered some academic staff resistance to the concept of this course, and in particular its learning and assessment methodology, from the early planning stages and throughout the development and implementation stages. The assessment methodology was unpopular in some quarters because of its holistic, integrated approach and its focus on developing metacognitive awareness and ongoing student reflective practice rather than reliance on teaching and testing knowledge of basic skills or concepts.

A further challenge for the development team was the fact that a course such as this can be seen as a vehicle for teaching somewhat rudimentary student skills/attributes that other academics may perceive as necessary for an IT Professional; for example, the ability to use correct spelling or make appointments. These are often competencies which would be mastered as part of a high school education and are thus difficult - indeed often impossible - to inculcate in a one semester tertiary course with a higher level, technical and reflective problem-solving learning approach.

7. FINE TUNING DELIVERY

Teaching, learning and assessment activities for this course are interrelated. Evaluation, amendment and review are cyclical and reflect the pedagogical approach to the course. As students are being schooled in the process of self-efficacy, so too are

the teaching team engaged in a process of reflection and fine tuning of course delivery.

7.1 Theory Course and the Presentation Assignment 1

The theory course method of delivery has required little amendment since initial conception. The group presentation assignment, assessed in theory sessions, has been engaging for both students and lecturers, particularly when students are inventive in their topic selection and methods of delivery. However, the complementary technical report aspect of the presentation assignment has been cause for concern because it is a group project and it has been difficult to ensure equitable individual students' contributions, despite completion of student work record forms. This has been addressed for 2004 by removing the group technical report aspect from the presentation assignment and substituting an individual technical report with a reflective component as a new assignment 3.

7.2 Practical Course Delivery and Training Assignment 2

In the first two semesters of course delivery students had worked within a collaborative learning environment culminating in lecturer-assessed group peer-training in software skills in the last six weeks of the semester. This had been effective in making the best use of the students' research capabilities and developing their training skills. However, students did not always attend the practical sessions when they were not directly being assessed and seemed to lose some measure of motivation in those weeks.

In order to address this for semester 1 2004 a revised practical class process was devised incorporating ongoing formative peer assessment together with one opportunity for formal lecturer assessment. This was viewed as an effective method of maintaining an active student learning environment and motivating students to sustain class attendance and involvement.

The following is an overview of the revised practical class learning and assessment methodology:

Assignment Two - Training Simulation Project

- Each week in practical sessions students are allocated a training activity (based on a variety of MS Office applications) that must be prepared for delivery to a group of students the following week.
- In weeks 3-12 students are assigned to a training group of four people for a 15-minute software training session. The composition of groups changes each week so that students are not always training the same people.
- Students complete five peer-assessed training sessions worth 50 marks and one lecturer-assessed session worth a further 50 marks. Other training sessions attended in addition to the five student-selected assessment opportunities can be used as practice activities.

The peer-assessed training assessment requires clear training session notes and exercises for the trainees. The lecturer-assessed session requires training materials for the student trainees and lecturer, including a session outline, a 1-2 page 'user guide', training data on disks and practice exercises.

7.3 Online course and online log assignment 3

Student feedback in the first semester of course delivery related to difficulties with the online course delivery, assessment requirements and workload. To answer these concerns, the lecturers gave a great deal of individual and collective assistance to students to support them in what was, for many, an unfamiliar learning experience. The teaching team also re-evaluated and amended the online delivery resources and online log assignment each ensuing semester to facilitate student understanding and competence. Various online log assessment submission methods were tried; weekly, fortnightly and bi-semester. Following ongoing improvements to the online learning materials, systems and assignments, student evaluations were more positive but continued to express concern regarding the heavy workload. The lecturers also found the online log submissions an onerous marking load, especially as they had two or more classes each. For example in the second semester of 2003 the lecturers were each faced with marking individual multi-page reflective essays and a portfolio of practical tasks from 100 or more students every fortnight.

In order to address these issues with the online and reflective assessment for semester 1 2004, it was decided to remove the complementary technical report aspect from Presentation Assignment 1

and develop a new technical report assignment to replace the Online Log assessment. This was aimed at combining assessment of technical writing skills with developing a metacognitive, reflective student learning component. The new Training Simulation Report focuses on the following course aspects:

Assignment Three - Training Simulation Report

■ A full technical report is required, discussing the following aspects of the training simulation experience.

■ The report must show a clear integration with the course theory and online topics.

Part 1: Process and Investigation

a. Students describe how they went about planning for and creating their completed training simulation assignment. They record their investigation and research methods, training plans and note how they implemented the training.

b. They then recommend how someone could go about doing a similar project in the future.

Part 2: Reflective Learning

The aim of this part of the assignment is for students to reflect on the lessons learned from having carried out and completed the assignment. By examining what they felt, and how they carried out the assignment, they should be able to identify ways that you can improve their process of learning, innovating and creating.

It is envisaged that this continual cycle of evaluation, review and fine-tuning will create further opportunities for students to develop the set of non-technical skills so necessary in the industry setting.

8. CONCLUSION

In this paper we have explained and reflected on the philosophies, theories and practice adopted in developing a stimulating course that is seen by industry as developing the key skills required in computing and information technology graduates. Student evaluations and feedback indicate a high level of satisfaction with the course. This success has provided the development and teaching teams with the view that they were correct in their original ideas. And yet the team were still able to reflect on their own teaching and assessment, be aware of the students' experience, and were able to adapt and change as required to continue to provide the best learning environment for information technology professionals of the future.

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