

Developing a New Curriculum for 1st Year Students of Information Technology

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Abstract

This paper presents a new design for studies in Information Technology at a large Australian university. This work is grounded in recommendations of several IT curriculum documents. The paper briefly presents the range of first year units designed to ensure that the student of Information Technology has an effective base of technical and personal skills demanded of IT professional by industry. The paper's focus is to detail two units that are specifically designed to develop interpersonal skills, communication and team skills, through developing products for the web. The paper is closes by mapping these latter units to IS2002 and ISCC'99.

Key Words:

IS Curriculum, Generic Skills, Web-Application Development

INTRODUCTION

There has been much debate on the skills required of Information Systems graduates in the 21st century. Identifying these skills has dominated the curriculum committees agenda over the last decade as evidenced by Information Systems Centric Curriculum 1999 (Lidkte et al 1999), and the IS'97, IS'99 and IS2000 curriculum documents (Longenecker et al 1999).

In addition to the acquisition of technical skills, industry is asking for graduates to have developed skills in team work, written and oral communication, project management and time management (Snoke and Underwood 2000, Lidtket et al 1999). Many universities are responding to these requirements through revising their curriculum and through publishing the expected skill of graduates. These latter skills have been termed 'generic skills' or 'graduate capabilities'.

This paper presents the issues confronting a large Australian university in revising its curriculum in order to effectively respond to these changing demands. We first define the outcomes of an IT education at this university and then examine the issues of generic skills. We then examine a range of first year units that are designed to position the student to study Information Technology, and discuss in detail two units that are specifically designed to develop generic skills. We close by showing the detailed design of the units supporting the development of personal and interpersonal skills in the context of web-applications development and map these units into the IS2002 and ISCC'99 curriculum documents.

THE IT PROGRAM AT THE QUEENSLAND UNIVERSITY OF TECHNOLOGY

All students in the Faculty of Information Technology at Queensland University of Technology undertake eight compulsory units in their first year. These units are Software Development 1, Software Development 2, ICT Systems, Introduction to Databases, Systems Architecture, Networking Systems, Professional Studies 1, and Professional Studies 2.1

Students at this university in the undergraduate program tend to have the following demographics: school leavers 25%, mature age students 45%, international students 30%. The first year course has about 40% school leavers, 50% mature age and 10% international students. The reason for this disparity in distribution is due to international and local students gaining advanced placement due to completion of another sub-bachelor qualification.

On completing the compulsory first year units, students can select to major in one of 5 areas: Software Engineering, Data Communications, Information Systems, Electronic Commerce or Emergent Technologies. Students may also elect to undertake a double major (IS and Data Communications, or IS and Software

¹ These are the names of the units from 2004.

Engineering, or Software Engineering and Data Communications). Some students are enrolled in a double degree (IT and Business, IT and Law, IT and Engineering, IT and Health, IT and Creative Industries).

The faculty has about 2200 undergraduate, 450 post-graduate course work students and 100 academic staff. The academic staff are distributed in two schools: the School of Software Engineering and Data Communications (61 staff) and the School of Information Systems (39 staff). The schools have roughly equal number of students (with SEDC having about 200 more students enrolled in their units). Table 1 shows the number of students in each major at the beginning of 2003. Note that 573 students had yet to declare their major by March 2003.

Major	Number of students
Information Systems	257
Software Engineering	254
Electronic Commerce	107
Data Communications	303
Computer Science and Data Communications	224
Data Communications and Information Systems	117
Emerging Technologies	26

Table 1 Number of Students per Major in Faculty of Information Technology, Queensland University of Technology

DESIGN ISSUES FOR THE IT PROGRAM

Table 2 lists the capabilities to be developed in our graduates (QUT Graduate Capabilities web site 2003)

Knowledge and skills pertinent to a particular discipline
Critical, creative and analytical thinking and effective problem solving
Effective communication in a variety of contexts and modes
The capacity for life-long learning
The ability to work independently and collaboratively
Social and ethical responsibility and an understanding of indigenous and internal perspectives
Characteristics of self-reliance and leadership

Table 2 Graduate capability focus of Queensland University of Technology

The key question is how to design activities within each unit that builds to capabilities in each of these domains. Guidance on the knowledge and skills pertinent to a particular discipline can be obtained through the relevant curriculum documents. Source documents include the Information Systems Centric Curriculum Document by Lidkte and Stokes (1999), IS 2000 (Longenecker, Davis, Feinstein and Gorgone 1999) and Computing Curricula 2001 Computer Science (IEEE and ACM 2001). The next portion highlights key capabilities identified in these areas.

The industry expectations of graduates were identified in the Information Systems Centric Curriculum 1999 (Lidkte et al) as shown in table 3 and 4, together with the mapping to graduate capabilities of Queensland University of Technology.

Area	As evidenced by		Queensland University of Technology Graduate Capability
Personal Skills	Systemic-thinking skills Problem-solving skills Critical-thinking skills Risk-taking skills	Personal-discipline skills Persistence Curiosity	Critical, creative and analytical thinking and effective problem solving The ability to work independently
Interpersonal Skills	Collaborative skills Conflict resolution skills	Communication skills including oral, written, listening and group	Effective communication in a variety of contexts and modes The ability to work collaboratively

Table 3 Industry-Defined Attributes Of An ISCC '99 Graduate (Lidkte et al 1999)

Area	As evidenced by	Queensland University of Technology Graduate Capability
Technical Knowledge and Skills	Information abstraction, representation, and organization Enterprise computing architectures and delivery systems Concepts of information and systems distribution Human behavior and computer interaction	Knowledge and skills pertinent to a particular discipline

Table 4 Industry-Defined Attributes Of An ISCC '99 Graduate (Lidkte et al 1999)

The Computing Curricula 2001 Computer Science document produced by a joint task force from the IEEE Computer Society and the ACM specify three global areas of capabilities and skills for computer science graduates: cognitive capabilities; practical capabilities and transferable skills (CC2001 : 64). Within the transferable skills component, they list communication, teamwork, numeracy, self management and professional development (life long learning) as key outcomes. In the cognitive domain is listed knowledge and understanding of facts, modelling, requirements specification, critical evaluation and testing, use of appropriate methods and tools supporting the specification, design, implementation and evaluation of computer-based systems and professional responsibility as key outcomes. Finally, the practical domain lists design and implementation, evaluation, information management, human-computer interaction, risk assessment, use and deployment of tools and operating computers and software as key outcomes.

We thus see a similar set of expectations articulated in both disciplines, with a clear set of expectations of effective interpersonal and personal skills and an ability to work in teams as critical outcomes.

Snoke and Underwood (2001) identified the knowledge, skills and attitudes are expected of graduates in the national context. These qualities are summarized in Figure 1 below. We see a similar emphasis on the need to acquire personal and interpersonal skills.

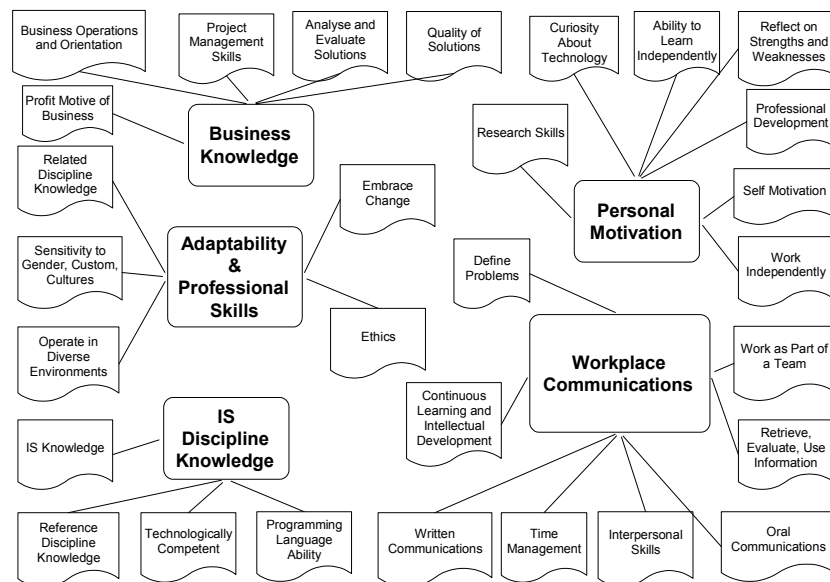


Figure 1 Grouped Generic Skills Set (Snoke and Underwood 2002)

During our curriculum development work, we sought to operationalise some of these elements. In particular we asked: How could the personal skills component be implemented through the learning experiences in each unit? How could we formally develop the interpersonal skills (also known as Workplace Communications)?

In the technical domain, we sought to ensure that after first year, IT students would have a common minimum understanding of the key elements in Information Systems, Database Design, Programming, Computer and Network Architecture, and be able to apply these concepts and skills in developing simple IT products working in teams.

A working party² consisting of academics from each school within the Faculty, representatives from partner Faculties and Teaching and Learning consultants within the university developed the following proposed key learning outcomes for students³ : develop IT problem-solving capabilities; develop self-directed learning capabilities; develop core technical knowledge deemed to be that expected from all graduates in IT, irrespective of their specialisation; develop an appreciation of IT in the social context and develop communication skills needed by all practitioners in the IT profession.

From these learning outcomes, it was agreed that: procedural programming would be the primary focus of learning to program in 1st year; mathematics would be taught at the point of need; all units should develop problem solving and self-directed learning elements; four of the eight units should address the client-user perspective and appreciation of the social context of IT and the communication unit should be integrated within a professional studies units.

Our analysis also showed that, though we had an expectation that student could work effectively in teams in many of the units in second and third year, no formal courses actually were tasked to develop these competencies. This paper presents and discusses the two units in which these competencies are developed. The units are called Professional Studies 1 and Professional Studies 2. The next section introduces the design of these units.

PROFESSIONAL STUDIES

There are two units in the compulsory first year called Professional Studies. We believe that students are motivated by a desire to build products. In the first Professional Studies unit (PS1), students work in a team to build a web site for the organisation described in a detailed case study. The web site is to be an information portal for this representative organisation or business. In the second Professional Studies unit (PS2), students again work in teams to enhance the useability and interactivity of this portal and make it dynamic. Each unit is structured to be delivered in a one hour lecture, two hour workshop and one hour practical in a PC lab.

PS1 introduces the student to working in teams, with formal material on team dynamics, project management, conflict resolution and negotiation. In addition, the unit should also introduce students to effective professional communication. The students develop design documentation, analysing user requirements and validating their design. From the technical viewpoint, the unit introduces the student to the role of information systems in organisations and discusses the technological, social and professional aspects of business systems. The students' final presentation is a market demonstration of their product, seeking to 'win the contract' for enhancing their prototype web site. In addition the unit provides students with an opportunity to begin to understand their personal learning, decision making and information gathering styles.

These skills are to be developed further in PS2 and subsequent units. In PS2, the students extend the information portal developed in Professional Studies and make it dynamic, through the inclusion of reports, data input facilities and supporting ad hoc queries. Further work on communication focusing on user documentation, persuasive speaking and marketing are covered. Students again work in teams, and develop more reflective and sensitive strategies in working in teams. The notions of high performing teams are introduced and developed through a series of exercises and role plays. Students gain further insights into their decision making and information gathering styles, and their 'natural' team role orientation through the use of management profiling instruments.

These units were developed through collaboration between two faculties: Information Technology and Creative Industries. The approach was one of consensus building leading to the evolution of tightly integrated units. There is coupling between Professional Studies 1 and 2 in the flow of material and the reuse of the case study upon which the practical skills are developed.

The Creative Industries faculty supplied expertise in Web Design, Communications and Team Dynamics. Three people were involved (to differing extents) in the design, development and delivery of PS1. One person is a specialist in organisational communication, another is a web-developer, and the third person is a management consultant.

² This team is listed in the acknowledgements.

³ Extracted from Blueprint Document from 1st Year Working Party Queensland University of Technology 2002

The Information Technology faculty supplied expertise in Information Management, Information Systems (including analysis and design, database design and database application development), Web Application development and educational theory. Two people were involved in the detailed design, and development of the unit from this faculty: the team leader and the person who would lead the delivery of the unit. Both had significant industry and professional experience, with one person being extensively involved in the professional development programs of the Australian Computer Society and experience as an IT management consultant.

The PS2 design was lead by the same team leader, with the same personnel from Creative Industries. Additional specialist knowledge was sought in the web application development area, with two people with extensive industry experience in this domain selected to develop and ultimately deliver this unit. These people are within FIT.

The first unit to be designed, developed and delivered was PS1. A series of workshops were held to progress the design. The design phase for this unit took three months, followed by four months of content development. All personnel undertook this development as an additional task to their normal teaching and research duties. This unit is now in its second delivery, with enrolments of over 400 students in semester 1 and 100 students in semester 2.

The second unit was developed in the first part of the year and is now in its first delivery. This was done through a series of design workshops which led to the material being presented in a three day training and development workshop for the tutors (called learning facilitators) just prior to the commencement of the semester. This workshop was essential so that all teaching staff became familiar with the content and trained in the approaches. Again, staff developed this material as an additional task to their normal duties. There are 231 students undertaking this unit in semester 2, 2003. The next section details the structure of each unit.

STRUCTURES OF PS1 AND PS2

Professional Studies 1

There are five key themes for PS1: Organisational Information Systems and related topics; Portal Analysis & Design; Professional Practise; Technical Skills and Team Work. Each theme has a workshop component and most have a practical component.

The key elements covered in Organisational Information Systems include topics such as: Introduction to Organisational Information Systems; E-business use of an Information Portal; Enterprise Requirements for Information Portals; and Organisational Information Systems supporting E-Business. The workshops cover Elements of e-business information gathering and the practical focuses on reviewing Organisational Information Systems Needs

The key elements covered in Portal Analysis and Design are covered in two lectures, three workshops and one practical. The lectures cover concept mapping as a planning and design tool, and web site design elements. The workshops cover concept mapping; user requirements for information portals; and developing story boards. The practical focuses on critiquing web sites.

The key elements covered in Professional Practice develop skills in resource finding and an understanding of ethics.

The key elements covered in Technical Skills is covered in four practicals which focus on developing the following skills: Introduction to HTML; Further HTML; Building lists and forms; and Adding Animation.

The key elements covered in Team Work, are team dynamics and conflict resolution. These are introduced in lectures and then extended in the workshops that cover practical skills in profiling individuals and team formation strategies; mechanics of conducting team meetings; developing a project plan; team dynamics and conflict resolution.

Professional Studies 2

This unit extends the work in PS1 by introducing the key elements required for dynamic and interactive web-based database applications. Students enhance the solution to the major assignment in PS1 by adding data capture functionality characteristic of transaction processing systems and the reporting functions expected of management information systems. Students provide analysis and design documentation for their enhancements to this functionality and to the look and feel of the web site. Thus, this unit further develops written communication.

The students extend their knowledge and skills in basic IT project management through being given a detailed project plan and adhering to this plan. They regularly report on progress against the plan, and indicate the modifications to the plan and additional resources required to meet the final deadline.

The students will be making a presentation on their solution and hence further develop their competencies in this area. This presentation will take place in a mock trade show setting. Students will develop a poster to attract the consumer to their stand. Each student will have to understand the innovations and specific features of their solution and be prepared to demonstrate their product and answer questions on its features.

Skills in creativity and problem solving are being developed through the workshops and product development, where we focus on user needs analysis, database design and useability.

Students have been profiled using the Myer-Briggs Type Indicator (Myers et al 1999) and de Bono's 6 thinking hats (de Bono 1996) in order to better understand elements of information gathering, decision making and creativity. The rationale behind this approach is published elsewhere, as are the resultant profiles. Essentially we seek to form heterogeneous teams that are balanced in terms of natural team roles of creativity, control, decision making and group harmonising. Both the MBTI and the 6-hats profile give us the means to identify individuals who have a propensity for these behaviours.

A theoretical focus for this unit is studying the characteristics of high performing teams and the competencies required of the individual in working in such an environment (Kamberg 2001, Chowdhury, Endres, and Lanis 2002, Heerman 2002). We have included the evolution of a team compact (Bass and Avolio 1999) as the key enabler to better team functioning. Students complete a team compact which articulates the following elements of their project work: purpose; goal; team structure; power distribution and decision making; rewards; punishment and problem rectification processes; and characteristics and behaviours of trust; communication and conflict resolution processes. This team compact has been useful for the students to define their expectations of one another. The compact makes explicit the tacit beliefs of team work and we hope that it will evolve from a formal declaration to more effective team work. We are monitoring team work using two different team effectiveness instruments. We use this data as feedback to the teams on their performance, to detect dysfunctional teams early and are seeking to correlate team effectiveness with other characteristics of the team. This work will be published next year.

A key teaching strategy is the use of facilitated group-based work which occurs during the scheduled workshops. Group work involves practical exercises such as role plays and structured debates. These workshops lead students to develop better user requirements documents, to explore creative thinking and to develop innovative solutions. Support material has been provided for these elements, which requires pre-reading and reflection. These reflections are being documented by the students and submitted as part of the evidence of engagement with the unit. Other workshop activities focus on developing further skills and knowledge of written, oral and visual communication principles, in addition to developing better knowledge and skills in team dynamics.

The technical task in which all of this work is grounded is to develop, in teams of 4, a dynamic web site based on the problem set in PS2 the previous semester. Specific tasks will be to: refine the database design; develop supporting documentation including project plan, system specifications, detailed design documentation, and project management documentation; design, develop and implement data input systems; design, develop and implement reporting systems; design and develop a poster summarising their project; design enhancements to the web design using theory presented in lectures on graphical design, interactivity design and useability. All of this is to be done in such a way that students can demonstrate the ability to work effectively in teams applying the theory of team dynamics where appropriate.

Assessment items for this unit are: the prototype system (65%) and its associated documentation; a skills portfolio (15%); and an exam (20%). The prototype is assessed through the submission of the following pieces of work: project management documentation; poster summarising key functionality of system; design documentation for their dynamic and interactive web-site; a log comprising of attendance records, peer evaluations, work logs, reflective task completion; the functioning system; satisfactory completion of individual tasks for group project; and presentation about the system features.

The skills portfolio consists of a reflective assignment assessing the individual's current skill base together with work exemplars, and a report detailing the strategies for future skill acquisition. The range of units to be examined by the students covers all units studied in first year. Students are asked to identify the key learning outcomes for each unit and to select the artefact for each unit that demonstrates their existing competency levels. Students will be encouraged to further develop this portfolio in subsequent units.

Technical content for the unit covers: HTML (review including forms, tables), DHTML, Cascading Style Sheets (CSS), DB Design, ASP Page construction, Dream Weaver behaviours, search engine optimisation, ASP.Net and introduction to web-services, and web site hosting (including ISP and Direct).

Content from Faculty of Creative Industries includes web design, written, oral and visual communication. In the area of web design, CI staff are responsible for: graphic design; accessibility; useability and interactivity design. CI staff are specifically asked to focus on the development of better oral and visual communication skills by the IT students. The vehicle for this is the development of a poster and ad hoc speech about their product which will be assessed during the “trade fair” in the final week of the semester. Students will further develop their written communication skills through developing monthly highlight reports and research papers on elements of design.

In the area of Team Dynamics, the focus is on the concepts and theories of High Performing Teams. In particular, the following elements are covered: team work styles (using various measures of different styles, leading to a team formation algorithm) and developing a team compact. This material was developed and taught by IT staff this semester, but it is anticipated that this component will be managed by Creative Industries staff in the future.

Students have been given the following documentation for their problem: business case; project overview; user specifications and project plan template. This set of documentation has been taken from industry examples and refined by the FIT staff. This material is offered to the students to ensure that they have exemplars of best practice that they can reuse in subsequent semesters. In addition, students have been given a working web portal a database design and a working (but unlinked) database, each of which they must modify to conform to the user requirements.

Each unit conducts weekly meetings to brief learning facilitators on the tasks and approaches for the week, and to debrief on the lessons learnt from the previous week. There is ongoing revision of material and development of new case material for the following semester. Some tutors work in both units to ensure appropriate coupling of content, process and approaches.

We have thus detailed how these two units (PS1 and PS2) will develop competencies in students in the key themes set by the 1st year working party: organisational information systems, web application development, creativity and problem solving, high performing teams and communications leading to better professional practice. The next section maps these outcomes to the IS curriculum documents.

FIT OF THE PROFESSIONAL STUDIES UNITS WITH THE OBJECTIVES OF ISCC'99 AND IS2002

IS 2002 (Gorgone et al 2002 : 12,13) highlighted the need for IS students to have effective oral and written communication skills and strong interpersonal skills, including team skills. These skills were also identified as critical in ISCC'99. Gorgone et al (2002 : 14) go on to list the interpersonal, communication and team skills sought in IS graduates. These are summarised in table 5 below, with those elements explicitly taught and assessed in the units shown⁴.

Interpersonal, Communication and Team Skills		
Interpersonal	Team Work and Leadership	Communication
Listening ^{PS1} Encouraging * Motivating * Operating in a global, culturally diverse environment ^{PS1}	Building a team ^{PS1, PS2} Trusting and empowering * Encouraging * Developing and communicating a vision/mission ^{PS2} Setting and tracking team goals ^{PS2} Negotiating and facilitating ^{PS1, PS2} Team decision making ^{PS1, PS2} Operating in a virtual team environment Being an effective leader *	Listening, observing, interviewing and documenting ^{PS1, PS2} Abstraction and precise writing ^{PS1, PS2} Developing multimedia content ^{PS1, PS2} Writing memos, reports and documentation ^{PS1, PS2} Giving effective presentations ^{PS1, PS2}

Table 5 Match of Professional Studies 1 and 2 to meeting the IS 2002 recommendations (Gorgone et al 2002 : 14)

⁴ Shown using PS1 for Professional Studies 1 and PS2 for Professional Studies 2 Stewart (Paper #109)

The elements marked with an asterisk (*) are possible outcomes for the students who have worked as formal or informal team leaders. The workshops will highlight these elements and assist students in developing skills in these areas, as well as to appreciate their need in facilitating effective collaborative work.

Gorgone et al also detail the need to see information systems as technology enabled business development. They summarise the skill set as in Table 6, with the elements explicitly provided by these units shown as before.

Information Systems as Technology-Enabled Business Development		
Systems analysis and design, business process design, systems implementation and IS project management		
Strategic utilization of information technology and systems IS planning IT and organisational systems ^{PS1, PS2}	Systems analysis ^{PS1, PS2} Logical and physical design ^{PS1, PS2} Design Execution ^{PS1, PS2} Testing ^{PS1, PS2}	Deployment Maintenance Use of IT Customer Service

Table 6 Match of Professional Studies 1 and 2 to meeting the IS 2002 recommendations (Gorgone et al 2002 : 14)

The need to have good organisational problem solving is identified and defined as competencies in problem solving methods, techniques and approaches, personal decision making, critical thinking, methods to collect, summarise and interpret data, and statistical and mathematical methods (Gorgone et al 2002 : 14). In addition, the need to foster creativity is identified through explicitly presenting creativity concepts, creativity techniques and using a systems approach. These units seek to introduce the students to creativity as a process using a systems approach. We introduce problem solving methods as well as discuss personal decision making and critical thinking.

IS2002 also identifies a need to develop self-directed leadership, effective time management, and a commitment to complete work. The use of the prototype development product, with a fixed time frame, with regular reporting, self and group evaluation seeks to introduce these skills and orientation in students in PS1 and PS2.

In terms of technology, IS2002 identifies the competencies to develop web pages, understand web architecture design and development as key outcomes for the technology dimension. These units explicitly seek to address these competencies, through the development of technical products: first a web based information portal and secondly through the development of a web application supporting the transaction processing and management information systems requirements of typical businesses.

Finally, IS2002 identifies competencies in Application Development such as: programming, requirements specification development, algorithm design and developing systems for a client server environment; database design and administration, and systems infrastructure and integration. Other units within the compulsory first year introduce students to these areas and students can specialise in these fields later. The design of the first year was to ensure that all Information Technology graduates would have a basic understanding of key elements within each of these domains.

Gorgone et al (2002 : 13) go on to state that ‘ a graduate of an IS program should ... have a basis for continued career growth’. This capability is also identified in CC2001. The skills portfolio assignment starts that process, with the student becoming aware of their skill level, the skill set requirement and the need to plan the acquisition of these skills. This is also a goal articulated in the graduate capabilities program of Queensland University of Technology.

Turning to the ISCC’99 curriculum document, we see that these Professional Studies units specifically seek to address the following elements in the personal skills domain:

- *Systemic thinking skills* through engaging in the analysis and design processes leading to the development of an information portal and dynamic web site by introducing a systems view and an understanding of an information system as a socio-technical system.
- *Problem solving* through structured problem solving methods introduced in the unit.
- *Critical thinking* through critical evaluation of web sites and critical evaluation of group work.
- *Personal discipline skills* in completing individual work set with in a group context, meeting the tight time frame of the project’s duration and meeting the expectations of the group and assessors.
- *Persistence* to complete the tasks in the unit.

- *Curiosity* to find effective enhancements to the products and discover more effective approaches.

This brief analysis shows that the first year IT curriculum at Queensland University of Technology seeks to meet many of the objectives of IS 2002, ISCC'99 and CC2001 for all students of Information Technology. In particular, the units PS1 and PS2 specifically target the development of interpersonal, communication and team skills through the medium of developing web-based products. These latter units emphasise the critical issues of analysis, design, and documentation as well as introduce the students to best practice in IT project management, through using template project documentation, and the exercising of a IS project plan. These units are innovative in the following ways:

- Collaboration between different faculties working to deliver an integrated approach to professional practice.
- Using the development of web applications as an organising theme for student engagement
- Integrating team dynamics, communication skills and interpersonal skills into first year
- Explicitly teaching about teams, conflict resolution and negotiation
- Providing and then using templates for professional communication constructed in the manner of actual professional practice
- Using a team formation algorithm to ensure appropriate mixture of styles within the group in order to build better understanding of teams, more effective teams and more creative solutions.
- Developing reflective practices for the students in their own efficacy as individuals and team members.
- Development of a portfolio of competencies with exemplars.
- The use of a workshop and practical to more intensively develop technical, personal and interpersonal skill competencies, with lectures used solely as advanced organisers and to ensure a consistent presentation of theoretical elements.

RESULTS OF UNIT DELIVERY

Professional Studies 1 has been delivered for the first time in semester 1, 2003. Initial reports from students and tutors are favourable, with most students enjoying the content, role plays and tasks. Many students (about 30%) are unhappy with the emphasis on group work and the soft skills being presented and developed, while others are seeing the benefits of this approach. This result is not surprising, given the high levels of Introversion (60%) being found in the MBTI profiling of the students. Formal evaluation of each unit and the first year design is currently underway.

Professional Studies 2 was developed in Semester 1 and is now undergoing its first delivery to over 230 students. So far, most students (90%) have engaged with the workshop and practical components of the unit, and, though some students are not enjoying the team focus, most appear to understand the industry need to develop such skills. The problem domain is attractive to students. The tight integration of workshop and practical is assisting students to master the material. Full team evaluation and student review of unit will be completed by time of the conference and we look forward to sharing these lessons.

CONCLUSION

In 2002, the Faculty of Information Technology at Queensland University of Technology undertook a radical review of its first year offerings as a result of the need to provide an integrated introduction into the field of Information Technology and a perception that students need to be better prepared for life-long learning through the development of better self-directed learning skills and habits. In addition, it was recognised that students need to be formally prepared in team work and that this needed to be undertaken earlier in their program. The units Professional Studies 1 and Professional Studies 2 were designed to provide this level of integrated and development of better personal and interpersonal skills, shown to be required by industry (Lidtko et al 1999).

This paper has presented the key design elements for these two units and has shown how these units develop many of the competencies listed in IS 2002, ISCC'99 and CC2001. The novelty of these units lies in their design, the collaboration of different faculty in unit design, development and implementation, and through the tight integration of professional skills with the development of technical products. The other novelty of the units is grounding the product output in a web information portal, with a concentration on the information content of the portal in the first unit, and a concentration on the dynamic nature of such portals in the second unit. This setting is appealing to students and provides a good introduction to the key elements of IT professional practice: team work, analysis and design, project management, creativity and effective communication with business

users. Without the strong commitment from individuals in each faculty, this collaborative project would have failed. The team is now implementing its ideas and will report on their successes (or otherwise) at the conference.

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The Professional Studies 2 working party consisted of the following FIT and FCI staff. From FIT: Glenn Stewart (team leader), Tim Dunn (unit coordinator), Jason Watson, David Taylor. From FCI: David Irvine, Kim Rasmussen, Glen Thomas and Jillian Clare.

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