Using a Case Method Approach in an IT Project Management Curriculum: A Long Look over the Shoulder of a Practitioner at Work

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Abstract

Modern IT project managers require a range of multi-disciplinary skill-sets in order to increase the likelihood of project success. Delivery of a single course unit, which attempts to prepare students for the rigours demanded from this role, demands a delicate blend of topics from curricula administrators and a pedagogy that best suits its environmental constraints. The Faculty of Information Technology of one university is using an integrated case method approach in an attempt to link theoretical constructs of IT project management (ITPM) with a real-world, practical implementation example. An analysis of student post-unit feedback indicates a variation in understanding of what had been learnt, providing an opportunity to advance the teaching model.

Keywords: IT Project Management, Case Method Teaching, Learning Approaches

Introduction

Today's corporations recognise that to be successful, they need to understand modern project management techniques, (Schwalbe, 2002). Although considerable effort has been expended on research and development to advance ITPM practices it has not, according to Sauer et al., (1998) resulted in a noticeable industry wide improvement in performance. There is overwhelming evidence to suggest that the reliability of IT project delivery has, in Thorp and DMR's Center for Strategic Leadership's (1999) words, left IT not having lived up to its promise. Evidence of poor IT project success has been provided by many researchers, (McGunnagle, 1995, Dhillon and Backhouse, 1996, Lin and Pervan, 2001, Hochstrasser, 1993).

The growth and acceptance of project management has encompassed virtually every industry in the world, (Kerzner, 1987), but the application of project management techniques varies according to the type of industry in which they are being used. Unlike other types of project management such as civil engineering, there are, as yet, few multi-unit courses that offer a comprehensive ITPM focussed outcome, reflecting the fact that within the ICT sector there are not the same specific ITPM career paths available as there are in civil engineering, (Sauer et al., 1998).

Recognising the IT industry's poor project delivery performance and acknowledging different requirements for ITPM, an 'IT Project Management' unit was offered as an elective for both Faculty of Information Technology postgraduate and undergraduate degrees in 2002.

The academic staff member appointed to develop the unit and coordinate its delivery had been an IT practitioner with extensive experience of IT project management practices and held project man-

agement certified membership of his national computer society. His research area concerned the use of knowledge management principles in improving communication in IT projects. It was not surprising therefore that the development and subsequent delivery of this new unit took the form of an IT project itself, with a strong emphasis on real-world examples to illustrate the application of the various ITPM principles being taught.

The initial delivery of the new unit occurred in the university's second 13 weeks teaching semester of 2002, between July and October and attracted a total of 90 students. The approach to teaching and learning design was deliberately developed to encourage a deep approach to learning on the part of students, (Marton & Saljö, 1976). In following a process that required students to not only fully understand but also to apply the principles behind the concepts being taught, an IT based case study was introduced as a sort of 'virtual environment' in which students were able to ensconce themselves. Although not equivalent to physically being a member of a team in a real project, this 'deep immersion' into an actual case, attempted to provide students with experience of the frustrations and elations that are part of most project environments, an appreciation of the real difficulties faced by project team members, and an understanding of the real purposes for using the theoretical constructs covered in the unit.

The effectiveness of using such a case method approach, combined with traditional lectures, guest lectures and tutorials, in meeting desired learning outcomes was measured by analysing responses from a post unit survey of participants.

Development of the Unit

In pursuing desirable learning outcomes, Ramsden, (1992, pp123-124), lists five problems that need to be addressed by teachers in higher education:

- The problem of goals and structures – what do I want students to learn?
- The problem of teaching strategies – how should I arrange teaching and learning to achieve the greatest chance of learning what I want students to learn?
- The problem of assessment – how can I find out whether students have learnt what I hoped they would learn?
- The problem of evaluation – how can I estimate the effectiveness of my teaching and use the information I gather to improve it?
- The problems of accountability and educational development – how should the answers to 1-4 be applied to improving the quality of higher education?

The design, development and delivery of the ITPM unit was structured around answering these five basic questions.

What do I want Students to Learn? (Goals and Objectives)

In appreciating the true nature of the project manager's role it is worthwhile to investigate some of the definitions provided by the literature. Achieving project success appears to be at the heart of what is considered to be the role of the project manager. The project manager is described by Nicholas, (2001) as the single person who is accountable for the project and who is totally dedicated to achieving its goals. "As a project manager, you are determined to succeed and to bring your project to a successful conclusion – on time, within budget and to the customer's satisfaction", (Cadle & Yeates, 2001, p356).

Clearly, the achievement of success figures prominently in defining a project manager's role. However, within most project manager definitions there is normally a more implicit requirement that is not always so readily recognised but could be considered of equal importance to the goal of striving for success; a

need for the project manager to be accountable and responsible for what occurs within the project. It would appear therefore that the single most important task that project managers should prepare for is how to successfully complete their projects, whilst accepting that they are ultimately responsible for what transpires within the boundaries of the project.

Distinguishing the particular skills of a project manager primarily responsible for project success will according to Mulally, (2002) typically revolve around some variation of: "excellent communication skills," "ability to connect with people at all levels of the organization" and "able to collaborate to develop effective solutions". The so called "hard" skills such as methodologies, processes and tools, which appear to be the emphasis of most project management training approaches today, Mulally suggests, do not contribute to success as significantly as these so called "soft skills". Projects generally do not fail because of the lack of adequate technology, even though we may worry about whether the technology chosen is the right one according to Murch, (2001) who states, "Statistically, most projects fail because the 'soft science' portions of the project have not received enough attention – the human factor has not been adequately addressed" (p17).

The principal goal within this ITPM unit was deemed to be to prepare students for achieving project success and acknowledgement of the responsibility demanded from the role. The clear objective of the unit was to teach students how to increase the likelihood of that success by providing an understanding of,

- The factors likely to contribute to project success.
- The factors likely to contribute to project failure.

In the positioning document prepared for the unit a decision was taken to not make a distinction in the expected differing demands between undergraduate and postgraduate students, although this was to be reviewed following the initial offering.

How Should I Arrange Teaching and Learning to Achieve the Greatest Chance of Learning What I Want Students to Learn? (Teaching Strategy)

In what Prosser and Trigwell, (1999, p3), refer to as "some of the most exciting and relevant research to have been reported on learning in higher education in the past 20 years", they describe work originally undertaken by Marton and Saljö, (1976) and expanded on by (Biggs, 1987; Ramsden, 1992; Marton et al., 1997) which describes students as approaching their learning in two qualitatively different ways. The approach used by students to 'understand ideas and seek meanings' is referred to as a 'deep approach' and is contrasted with an approach where students see tasks as external impositions with a 'focus being on the words, the text or the formulae without reflection on purpose or strategy' referred to as a 'surface approach'.

The objectives of the ITPM unit clearly demand an understanding of ideas and meanings rather than merely learning the techniques used to achieve success in ITPM. An approach to teaching that recognised and encouraged a 'deep approach' to learning was therefore considered more desirable than the alternative 'surface approach'. In a model developed in collaboration with Dr David Newble, Entwistle, (1988) describes different outcomes expected from applying different processes, *(Table 1)*.

Approach	Surface	Deep		
Process Type	Rote-Learning	Operation Learning	Versatile Learning	Comprehension Learning
Description	Focuses on tasks and pieces of information in isolation Uses routine procedures and repetition to memorise both facts and ideas	Examines evidence May include elements of rote learning Particularly sciences	Relates evidence to ideas	Relates ideas Particularly "arts"
Outcomes expected	Little or no understanding Able only to mention a few unrelated facts or unimportant details Superficial level of understanding May have substantial knowledge of factual information Able to provide adequate descriptions	Incomplete understanding based on detailed knowledge of relevant facts with little integration with broad principles	Deep level of understanding Integrates principles with facts Uses evidence to develop arguments	Incomplete understanding based on relationships between ideas unsupported by evidence

Table 1 Outcomes expected from different learning processes

Entwistle's model includes an additional third approach to learning that is referred to as the 'strategic' approach to learning, referred to by Biggs, (1987) as the 'achieving' approach. The predominant motivations for this 'strategic' approach to learning, is the achievement of high grades and competition with others, which might be particular useful for the type of goals and objectives sought in this ITPM unit. Whereas the intention of the 'deep' approach is to reach a personal understanding, this approach describes an intention 'to be successful by using whatever means are necessary'. The perception of what method produces the best grades determines which of the four process types are used. Understanding the student's use of whatever combination of process types will produce the best results, provides an opportunity for designers to use whatever type of course structure and assessment that is likely to require the combination of learning processes considered necessary to achieve the objectives for the unit.

In project management based research conducted in the mid 90's at Queensland University of Technology, Hicks, (1996) citing (Kolb, 1984; Zuber-Skerritt, 1990), claims that "experiential learning, action learning and action research are built on the recognition that learning by experiencing and reflecting on that experience can be most effective in helping students and practitioners acquire professional knowledge and skills". Using this approach, Hicks believes, helps individuals become reflective practitioners who take responsibility for their own learning and performance over a lifetime. In illustrating that learning consists of multiple elements, Hicks provides an enhanced equation for learning L = P + Q + ER where the ER element, "one's own experience reflected on and revised" has only more recently been added to the more traditional P = programmed learning, Q = questioned learning components.

The Case Method Approach

Case method teaching can, according to Mostert and Sudzina, (1996) describe real-world problems that are too complex to approach experimentally (Patton, 1980; Glaser & Strauss, 1967; Lincoln & Guba, 1985). They list a number of arguments for the use of cases that include:

- Cases investigate phenomena in a real-life context.
- Cases are appropriate where the boundaries between the phenomenon and the setting, as in classroom instruction, are not clearly evident
- Cases use multiple sources of evidence to describe the phenomenon under investigation.

"It is the record of complex situations that must be literally pulled apart and put together again before the situations can be understood …. A good case keeps the class discussion grounded upon some of the stubborn facts that must be faced in real life situations." (Lawrence cited in Erskine et al., 1981, p11). In their study of the use of case studies, Rees and Porter (2002) describe nine potential benefits of using a case method.

- The development of diagnostic skills
- Subject and functional integration
- Deep vs surface learning
- The involvement and motivation of students
- The effective use of class time
- Development of team learning
- The analysis of group discussion processes
- Repeat use
- Review of policy and practice.

These types of benefit were ideally matched to the goals and objectives set for the unit and the decision was subsequently taken to use a case method approach. Two different types of student case study are described by Summers and Smith (2003, p61).

- The short case study (also referred to by Wright, (1996) as 'case incidents')
- The Harvard MBA style case study

Unsure of which type would provide the best learning outcomes a Harvard MBA style case study was supplemented with 'case incidents' covering individual issues such as team communication and conflict resolution, which were discussed in weekly tutorial sessions.

The relevance of teaching cases, widely used both in MBA and short executive development courses, and providing a moderately realistic context to explore applications of academic theories and models, is less well recognized in IS departments and faculties (Willcocks & Sauer, 1999). They go on to admit however that the availability of appropriate material is a constraint with using cases in IS. It was opportune therefore that the unit coordinator (lecturer) had in the late 90's been actively involved in an interesting IT project and had already written a case study relating to it.

The potential benefits of writing your own case study and subsequently using it in case method instruction provides an increased sensitivity to all teaching documents, enhanced effectiveness in preparation skills and the production of materials that help blur the distinction between the seminar room and the world "out there" (Barnes et al., 1994, p285). They go on to say that, "Effective cases portray real peo-

ple in moments of decision, faced with a need to take action and accept its consequences", and suggest that as a "second-best" alternative to apprenticeship good cases permit a "long look over the shoulder of a practitioner at work" (p287).

How Can I Find Out Whether Students Have Learnt What I Hoped They Would Learn? (Assessment)

In employing normal project management practices, whenever there is greater uncertainty over an outcome, the risk management model used should incorporate more frequent monitoring of actual outputs for comparison with expectations. The choice of weekly 'case incidents' referred to by Wright, (1996) was used to illustrate single concepts or issues, which had been the subject of that week's lecture. Each week a case incident with questions was issued to students, to be completed for group discussion and handing in for marking at the following week's one hour tutorial session. Although the method used required high maintenance through weekly marking and feedback on students' written responses, it did provide the opportunity to effectively gauge the levels of understanding of each topic. This required students to interpret the practical implications of the theoretical constructs being covered and contributed 15% of the total unit assessment. The case incident/tutorial question took the following form.

Team Communication:

> *Your project team has been working on a new inventory management application for six months. A key individual in the project (a technical wizard in the type of work that you are doing) is making herself unpopular with the rest of the team members by constantly referring to her importance to the success of the project. Several team members have mentioned to you that this perceived "arrogance" is beginning to annoy people so much that they are looking for ways to avoid working with her. You feel that this situation has the potential to affect the success of your project.*

1. What action would you take with the key individual herself?

2. What action would you take with the rest of the team?

3. How might you prevent similar situations from occurring?

The tutorial sessions were used for group discussion of the issues with students being encouraged to add notes to their own printed work in order to demonstrate the value of the team in problem solving and to provide a more comprehensive solution. Although not advised in advance, selected case incidents were later used in the final exam. Promoting a philosophy of striving for continual improvement (kaizen) throughout the semester, the weekly assessments provided an opportunity for students to regularly reflect and self-evaluate in order to consider,

- What they did and with what result,
- Whether they would do it differently next time,
- If so, how;
- The role of other members in their subgroups, and;
- Their self-evaluation of their overall performance using set criteria.

(Anderson & McMillan, 1992).

An appreciation of the multidisciplinary skills needed by IT project managers is considered necessary in understanding the purpose and responsibilities of the role. Knowledge to perform the role effectively must be taken from three separate areas, *(Figure 1).* Although the theoretical component of the unit con-

centrated on generally accepted project management knowledge and practice, the impact of the other types of knowledge was emphasised.

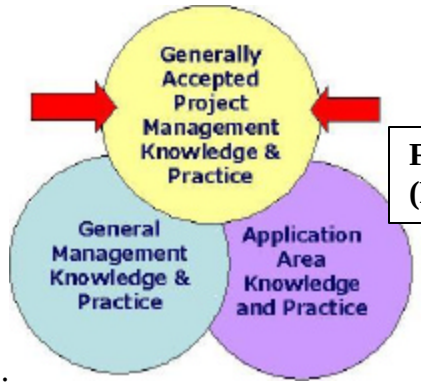

Figure 1 Adapted from (PMI, 2000, p9)

Differences in project managing IS/IT development as distinct from other types of engineering is illustrated by Sommerville (1995) who describes the differences in terms of,

- The product is intangible. Unlike a civil engineering project slippage is not always visible.
- There is no standard process. There is no clear understanding of the relationships between the software process and product types.
- Large software projects are often "one-off" projects that are commonly different from previous projects. Rapid technological changes in computers and communications outdate previous experience and hence lessons learned from past experience may not be transferable.

ITPM was often confused with technical management, according to Thomsett (1989), who suggests that by concentrating on the technical aspects e.g. test plans, design charts, functional models etc., it leaves little time for dealing with the business issues.

Format of the unit

The first six weeks of the unit concentrated on providing an ITPM 'space' or environment in which project managers are expected to operate; the boundaries of responsibility for the role. A mid semester written assignment (worth 20%) assessed whether students had fully understood an IT project manager's multi-functional role and how this could contribute to project success. It used a case incident in which a fictitious technically oriented IT Manager was appointing only technically competent individuals to project management roles, resulting in poor outcomes. A report to the IT Manager explaining why the modern IT project manager required more than mere technical skills in order to be successful was the main requirement.

Immediately following the submission of this "environment" assignment, students were introduced to a case study that was to become a reference model for the remainder of the unit. Project management practices discussed in the second half of the semester were illustrated by referring to incidents described in the case study. A written assignment (worth 35%) required students to develop a project plan based on the case study.

An end of semester final exam equally divided between a theory section assessing student's recall of the principles involved in the unit and an application section assessing student's interpretation of the application of those principles, contributed to 30% of the total assessment mark.

The case study

In 1996 an agreement was made between a well-known beverage manufacturer (the purchaser) and a small Australian electrical engineering company (the vendor), to provide a fully automated storage and

retrieval system (ASRS) facility in Asia. The case study, initially prepared within a Masters programme, set out to evaluate how the vendor's lack of QA processes contributed to the project's ultimate failure. The case study provided compelling evidence of the types of project management incompetency that, from the literature, appears to contribute to the high failure rate in ITPM. For confidentiality reasons, the names of the vendor and purchaser were changed from the original case study, but no other changes were considered necessary.

To aid students understanding of the specific project environment the case study was augmented with a 15 minute video of the facility at various stages of completion together with a working copy of the actual control software, operating in simulation mode. The 6000 word case study provided the background for a major unit assessment requiring students, working in groups of up to 4, to submit their own IT project plan that 'would have contributed to the success of the project'.

How Can I Estimate the Effectiveness of My Teaching and Use the Information I Gather to Improve It? (Evaluation)

In understanding that clients learn by using different approaches and that the structure of learning is made up of a "How" component (approach to) and a "What" component (outcome of), (Marton, 1988), devising a common assessment method for determining whether individuals have actually learnt precisely what you are trying to teach them is likely to be a challenging task. A true evaluation of whether clients, being prepared for professional practice have actually learnt, or indeed were influenced by, what it was that you were trying to teach them is ultimately only displayed by the manner in which they conduct themselves in their professional careers. A follow-up of graduates similar to that described for health professionals by Anderson and McMillan, (1992) would be a useful if not impractical assessment. It is possible however to gain insights into what and how students learn during the course of the subject in some way, and this has been done as part of the evaluation of their learning.

While formal student evaluation of teaching (SET) and student evaluation of unit (SEU) assessments, in the form of questionnaires, were undertaken for both undergraduate and postgraduate units, these assessments because of their anonymous nature, could only be used for statistical purposes. Undergraduate and postgraduate responses both indicated a high degree of satisfaction with both the unit and the teaching. In the unit's final week the issue of 'post implementation review' (PIR) was the main area covered. That week's tutorial questions were designed to evaluate individual responses to the unit and sought to determine,

1. Which learning approach students had predominantly applied.
2. What role the case method approach had played in students understanding of the issues.
3. How the case method had contributed to the overall teaching processes used in the unit.

The tutorial questions took the form,

This week's tutorial is based around the ITPM unit that you have been studying this semester. Treating the last 13 weeks as a project which you are now reviewing, answer the following evaluation questions using the techniques and processes explained in the PIR lecture.

1.

- Describe what this subject has been about.
- What have you learnt about project management?

2.

- What role did the Dag-Brucken case study contribute to your understanding of this subject?

3.

- How do you believe the process used in this unit i.e. 1 hour lecture, 1 hour guest lecture from practicing project manager, mid semester assignment, case study major assignment and final exam, contributed to your understanding of the subject?
- How might the format be improved to aid learning in the future?

The responses were scanned, looking for indicators of whether a deep or surface approach to learning had been taken by the student. Indicators for a deep approach were specific references to the issues of taking responsibility for a project and the role of the project manager in achieving project success, whereas the indicators for a surface approach were specific references to the individual processes only.

Types of comment such as

"…. learnt methods and skills necessary in managing projects"

"…. what procedures are to be followed when managing a project" or

"…. we have learnt to use formal project management components"

were considered indicators of a surface approach, whereas comments such as

"…. responsible for the entire project."

"…. to increase the probability of a project's success" or

"…. how to be a successful project manager"

were considered indicators of a deep approach. In each response the role that the major case study played in reaching these conclusions was examined.

Comments such as,

" …. what factors contributed to failure"

" …. taught me about failure as well as success" or

" …. exemplifies the importance of a highly competent individual who not only is responsible for key issues but also needs to successfully see these areas through …",

confirmed that the case study had been used to reinforce a deep approach, whereas comments that related merely to applying 'techniques' learnt to a real-world situation reinforced a surface approach emphasis.

There were three responses that clearly indicated multiple approaches to learning, showing evidence of both surface and deep approaches. These few responses appeared typical of the 'strategic' or 'achieving' approach, of 'doing whatever is necessary to achieve a good result'. A detailed examination showed that they belonged to two of the four individuals who had been awarded a "high distinction" (the top grading) and in the remaining case an individual with an exceptionally high grade point average who had been 'devastated' when merely awarded a "credit" (the third highest grade). There was, for the remainder of responses however, no obvious link between the indicated learning approach and the final grade awarded.

In response to the question of the case method approach used in the unit and its contribution to understanding the subject, there was general agreement that both the case incident used in the tutorials and the case study used as a reference point for the second half of the unit had offered a 'real-world' perspective that had made understanding the theoretical components easier. There was however a greater number of responses that believed the case incident approach used in the tutorials had contributed more to their un-

derstanding of the topic than the case study itself. The same individuals who were believed to have adopted a deep approach generally made comments about the case study that included terms such as,

" … the sheer complexity of the management process", and

" … the different issues impacting on a project",

whereas the types of comments emanating from the individuals believed to have taken a surface approach included terms such as,

" … example of not applying the correct principles or practices" and

" … using what we had learnt during the lecture to apply to a practical problem".

Interestingly, the individuals that were believed to have taken a strategic approach to learning had all identified the case study as contributing in the same manner as individuals identified as using a surface approach.

Undergraduate / Postgraduate	Surface Approach	Deep Approach	Strategic Approach		Surface use of Case	Deep use of Case
U/G n = 19	14	5	0		18	1
P/G n = 23	10	10	3		21	2
Totals n = 42	24	15	3		39	3
Percentages	57.14%	35.71%	7.14%		92.86%	7.14%

Table 2 Summary of Responses

From the undergraduate group, the five that were believed to be using a deep approach, had all still identified the case study as contributing only to a practical application of principles. All but one undergraduate responses identified the case study as contributing to a better appreciation of the types of situational factors that actually occur on projects, for which there are no set rules or principles to rely on.

Consisting predominantly of students with experience in the work force, the postgraduate group was fairly evenly split between deep/strategic and surface approaches to learning. The three individuals who had indicated that they had applied the case study in a deep learning approach had all received only average grades, indicating that even though this was the type of learning outcome desired, it had not been academically rewarded.

Encouraging individuals to move from a position of dependence towards greater independence, (Marshall & Mill, 1992), was an identified learning outcome, but although students were encouraged to 'take risks' and 'to be creative' in their responses it was not made obvious that these desired attitudes were meant to contribute to a learning outcome.

The results would appear to confirm Entwistle's (1988) findings that, " … few students were able to carry through all the component processes demanded by a fully deep approach which would have resulted in a deep level of understanding", (p28). The case study was used specifically as an example of the need to remove the multiplicity of individual tasks in order to focus on the whole, which contrasted with the actual delivery method of the unit content and the encouraged project management practice of 'breaking down' desired outcomes into manageable sub-tasks. Through the case study the unit had 'pulled apart the complex situations' and had 'kept class discussion grounded upon stubborn facts faced in real life situations' but it had apparently failed to 'put it together again before the situations can be understood', (Lawrence cited in Erskine et al., 1981, p11).

Significance for Improving the Quality of Teaching ITPM in Higher Education. (Conclusions)

Having access to such a rich real-life case study, written by a unit instructor who had extensive experience in IT project management practice may make exact duplication of this particular delivery approach difficult. The analysis of student feedback indicates however that the potential benefits of providing increased sensitivity by writing your own case study, (Barnes et al., 1994), might only be realised if there is a concomitant appreciation of the learning approaches likely to be adopted by students.

Results from using this case method approach, indicates that regardless of how 'real-life' it may be, its value to students still relies on how it is integrated into a unit curriculum. Without an appreciation of precisely how a case method approach will help students reach the desired learning goals, the experience, although likely to be 'interesting' for students, is still unlikely to reliably achieve all desired learning outcomes.

Although the desired outcomes from the unit were identified as being achieved by some students, these students were not sufficiently academically rewarded for their efforts. Questions raised from the outcome of this initial offering include:

- How may we get undergraduates to experience the subject more like postgraduates?
- How may we further encourage all students to adopt a deep rather than a surface approach to learning?
- What are the implications for teachers of students adopting a strategic approach, and is this approach the most desirable one?
- How might we modify the assessment to reward what is the desired learning outcome?

Acknowledgements

In the development of the ITPM unit described and in producing this paper, the authors wish to acknowledge the assistance of the following contributors:

Associate Professor Alan Underwood (Faculty of Information Technology, QUT)

Professor Guy Gable (Information Systems Management Research Group, QUT)

Associate Professor Ali Farhoomand (Centre for Asian Business Cases, University of Hong Kong)

Dr Wui-Gee Tan (Institute of Systems Science, National University of Singapore)

Dr Chris Sauer (Templeton College, Oxford)

Dr Carmen de Pablos Heredero (Facultad de C.C. Juridicas y Sociales, Universidad Rey Juan Carlos)

Mr David Abercrombie (School of Information Systems, QUT)

Queensland University of Technology students from ITB272 and ITN272 second semester 2002

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Biography

Tony John Jewels is currently a lecturer within the School of Information Systems at Queensland University of Technology. An IT professional for over 30 years, he has worked in a variety of roles on many leading edge IT projects throughout the world. His practical experience combined with academic qualifications in business management and information technology provides students at both undergraduate and postgraduate level with real world perspectives of life within the IT sector.

Christine Susan Bruce is currently Director, Teaching and Learning in the Faculty of Information Technology at Queensland University of Technology. Christine's research interests are in the area of higher education teaching and learning. She takes a phenomenographical orientation to investigating curriculum and staff development issues at both undergraduate and postgraduate level, and has for some years focussed on the meaning of a lifelong learning orientation for students and teachers. She has extensive interests in information literacy and information literacy education in academic, workplace and community settings. Christine also investigates the experience of teachers, postgraduate students and researchers.