Perceptions and Performance: ICT at Monash University

CERG Report

Prepared by the Computing Education Research Group

December 2006

Project Leader: Chris Avram
Project Team: Angela Carbone
Des Casey
John Hurst
Judy Sheard
Project Manager: Selby Markham
Research Assistants: Victoria Heathcote
Varintra Sirisuthikul

Contents

List of tables

Acknowledgements

This document reports the findings of a study of the perceptions and performance of students enrolled in the first year of undergraduate IT programs at Monash University.

The data instruments for this study were prepared by Selby Markham with feedback from the project team.

The analysis of the survey data was conducted by Selby Markham. The interviews of the students were conducted by Varintra Sirisuthikul. The interviews of the staff were conducted by Victoria Heathcote. The report was prepared by Selby Markham, Judy Sheard, Angela Carbone, John Hurst, Victoria Heathcote and Varintra Sirisuthikul.

Executive Summary

The purpose of this report is to present the findings of the *Perceptions and Performance: ICT at Monash University* project. This study involved first year undergraduate students and staff in the Faculty of Information Technology and was conducted during semester 1 of 2006. The purpose of the project was to investigate the perceptions students bring into ICT courses and the perceptions that staff have of student expectations.

Specific aims of the Perceptions and Performance study were:

1. To establish the perceptions of ICT that students bring into their course and investigate the role this has on their progression through the course.
2. To explore staff understanding of the attitudes and knowledge that students bring into their course and the role this has on unit design and delivery.
3. To research the associations between these aspects and staff and student behaviour in the teaching-learning context.
4. To inform and enhance current teaching practice within FIT undergraduate teaching programs.
5. To improve information provision to potential students and their advisers.

Students and staff from first year undergraduate ICT courses on the five Victorian campuses of Monash University participated in a series of data collections. The research was conducted using a mixed quantitative and qualitative research design that had four phases: a start of semester survey issued to students, mid semester interviews with students who had participated in the survey and agreed to be interviewed, mid semester interviews with staff who were teaching into the core units or who were coordinators of Special Interest Groups (SIGs)[1] and final semester results of students who agreed to be identifiable.

In general terms, the study found two main outcomes. Firstly, the perceptions and expectations students brought to their courses had little effect upon their university learning experience; and, secondly, while staff had clear perceptions of what students need and want, these did not readily translate well into making sure that students were “brought up to speed’ in their learning experience.

The first outcome was somewhat counter-intuitive: it seems that the ICT experiences, expectations and perceptions of new students had little impact on the way they adapted to the university. “Adaptation” can mean a number of things, but in this context it is seen in terms of completing semester 1. Whether or not students had done ICT subjects in high school did not appear to prepare them any better for university, and interview data suggested that some students may have had an inflated view of what they know through having done ICT subjects. Although the sub-sample of students that agreed to take part in the interview component of the project was small, there is no indication that they performed on end-of-semester assessments any differently from the rest of their cohort. Their performance on the three core units[2] in semester 1 did not differ from the rest of the students in the sample.

[1] A Special Interest Group (SIG) was formed to develop each of the core units for the undergraduate degrees. It comprised of staff from all campuses upon which the unit would be taught.
[2] In first semester of the FIT undergraduate degrees three units are compulsory across all programmes

The second major outcome was that staff were aware of the difficulties facing first-year students, but did not have a clear perception of where the responsibility lies for addressing these difficulties. It was found that the staff had clear views on students' behaviour; however, there was some suggestion that staff may not be grasping some important issues. For example, staff saw the students as lacking preparation and of not having clear expectations. Staff saw the solution in terms of better information being given to students, particularly from the course coordinators, before students make a choice of course or units of study.

While delivery of information to students is second nature to most academics, what is at stake here is not acquisition of knowledge, but change of attitude. Students' expectations may be misguided, but since they are embedded in the attitudes that they bring to university study, they are not going to be turned around by an introductory lecture or handout. What is required is a constant reinforcement throughout the semester of the discipline and habits required for successful university study.

It is clear that students do not come to an instantaneous understanding of the demands of university learning, and must be rehearsed constantly over the contextual issues surrounding their choice of course. The student data makes it quite clear that students are not ready to focus upon such information at the point of embarking upon an ICT course, and hence the Faculty must be pro-active about reinforcing these issues during the early stages of a student's enrolment.

The report is organised into five basic parts. Sections 1-4 set the background and scope of the study; section 5 describes the project design; section 6 discusses the student view, while section 7 gives the staff view; and sections 8-12 infer some conclusions.

Summary of Key Findings and Recommendations against Aims

1. To establish the perceptions of ICT that students bring into their course and investigate the role this has on their progression through the course.

Student profile (student survey — section 6.1)

Monash was the first preference for most students wishing to study IT at the undergraduate level.

Although the parent/teacher/friend structure has been shown to be the most frequently used source of advice on course selection, students based their course decisions on internal factors including interest, challenge and perception of the course as a good pathway into IT.

Most students had some prior knowledge of a programming language.

Student expectations (student survey — section 6.2)

Students' expectations of the time that they would need to spend on their IT coursework outside class was far below the recommended time.

The problems that students saw they would have in doing their course were based upon uncertainty in expectations about university and course activities.

Students expected to learn better in small interactive classes rather than in lectures or working outside class.

Few students were unable to articulate what they would be learning in their course in an open-response question.

Students' expectations of what they would be learning and not learning in their course, as nominated from a list of topics, were broadly in line with the course content.

Within each course, there was substantial alignment between students' interests in aspects of IT and their expectations of what they would be learning in their course.

Student experiences (student interviews — section 6.3)

Students valued the use of practical examples to explain theoretical and difficult concepts.

Students found tutorials more engaging and valuable learning environments than lectures.

Most students found that it took time to adapt to the university teaching environment.

Students disliked having assessment tasks where the marks allocated did not appear to be aligned with the amount of work required.

Students did not appear to have a defined set of time management practices.

Students claimed that interest and curiosity were important factors in course performance. Few students mentioned VCE IT subjects as being useful.

Student performance and progression (student results — section 6.4)

The retention rates varied across courses, with the Caulfield BITS students having the highest retention rates and students from other courses having the lowest.

Student self-perception of performance was not a good predictor of actual performance.

Performance (as measured by final result) in FIT1002 Computer Programming was higher for students who had English as a first language, had entered Monash from secondary school and who had prior knowledge of programming. No relationship was found based on gender or ENTER scores.

No differences in performance were found for FIT1001 and FIT1003 based on gender, English as a first language, course entry path, ENTER score and prior knowledge of programming.

There were very few relationships between the measures of interest in topics and unit results.

Students who claimed that they chose their course to extend their knowledge and skills or because they perceived it as an interesting and challenging course were more likely to have dropped out of FIT1001 Computer Systems than those that did not nominate these reasons. However, students who claimed that they had no clear reason were less likely to have dropped out.

Students who perceived that they did not know what was expected of them were more likely to have dropped out of the FIT1001 Computer Systems than those that did not nominate this problem.

2. **To explore staff understanding of the attitudes and knowledge that students bring into their course and the role this has on unit design and delivery.**

The learning environment (section 7.1)

The students' experience with teaching staff was perceived as being shaped by the quality of their interactions with their tutors.

Teaching staff believed that making lecture notes available to students on the Web resulted in many students failing to attend lectures, and affected the way students engaged intellectually with the content.

The lecture format was perceived as being an impersonal and passive teaching method.

Tutorials were perceived as providing students with the most engagement in their learning.

Adaptation to university (section 7.2)

Teaching staff perceived that the majority of students did not meet work level expectations.

Teaching staff claimed that most students are 'part-time' students and have many time constraints imposed on them.

Most teaching staff agreed that no expectation can be made about what ICT skills students bring into their course beyond basic computer, word processing, internet and numeracy skills.

Expectation about IT degree (section 7.3)

Teaching staff perceived that:

Many students were fairly naïve, and had not thought about why they wanted to do IT nor considered their motivations for doing it. Some students were doing an IT degree because it was the only degree into which they could gain entry.

Many students were unaware of their course content and did not know what they were going to learn in each unit. This was often because they had not done any pre-reading or they did not understand the jargon used in the course handbooks. Students gained very little understanding of what was involved in a course from reading the unit name and synopsis.

Overall, there were some students who understood what their degree involved and knew where they wanted to be, and there were others who had only a very basic, or no, understanding of their course and their reason for doing it.

Factors affecting success/failure of students in IT degree (section 7.4)

Teaching staff suggested that:

Motivation is seen as a major contributing factor to students' success or failure in their degrees.

Students who make a genuine attempt and effort would have little likelihood or reason to fail.

Students would be more likely to succeed if they improved their communication skills and strengthened their analytical skills.

Successful students make good use of resources.

A course selection process that takes into account many dimensions of the students' life may affect whether a student succeeds or fails.

3. To research the associations between these aspects and staff and student behaviour in the teaching-learning context.

The study indicated that students enter their course with a broad idea of course content and the particular IT course that they choose is generally in line with their interests. However, staff consider that students generally do not have a detailed understanding of what they will learn in particular units. There is a concern that students may choose units without sufficient investigation of what they actually involve.

Staff have little expectation of their students' knowledge of IT beyond basic IT literacy. Prior study in IT and knowledge of IT do not appear to be factors in success in an IT course. However, it is concerning that students who chose their course to extend their skills or because they perceived it to be interesting or challenging were more likely to drop out of their course than those who did not have these expectations.

This study showed evidence of staff under pressure to meet expectations of students and adapt to changing patterns of student engagement with their learning environment. Many students, although technically full time students, are studying in part time mode. There is now greater need for flexibility in content delivery and provision of resources. There was general agreement amongst the students and staff that tutorial classes were a more engaging and effective learning situation than lectures. However, there is increasing pressure to deliver course materials online and increasing numbers of students who use online delivery as a substitute for attending classes. With these shifting patterns, many staff are concerned with the level of engagement of their students with their courses and the quality of their educational experience. In addition, there appears to be a difference in the level of work that students do and what staff consider is necessary for successful course completion.

4. To inform and enhance current teaching practice within FIT undergraduate teaching programs.

Recommendation 1: That the Faculty investigate ways in which information about study habits and coursework regimes may be better imparted to first year students.

Recommendation 2: That lecturers be encouraged to supply meta-level information as part of their unit delivery: such information to supply broader, contextual views, which relate unit content to course objectives and outcomes, as well as to immediately adjacent units within the curriculum.

Recommendation 3: That lecturers be encouraged to a "less is more" approach (Biggs, 1999) to unit content, and provide on-going revision sessions**.**

Recommendation 4: That the faculty support better feedback from students on their progress throughout each unit, by using technology such as the "Personal Response Systems"[3] already available within the faculty. These systems can be used to improve the interactiveness of the lecture mode of presentation.

Recommendation 5: That a set of faculty-wide resources directed at study skills, analytical skills, and English language skills be made available to students, and publicized widely**.**

5. To improve information provision to potential students and their advisers.

Recommendation 6: That outcomes from this study be made available to staff so that they may better inform incoming students and improve their understanding of ICT courses, and the relationships between their backgrounds and successful graduation.

[3] Personal Response Systems (PRS) allow large groups of people to vote on a topic or answer a question using devices which communicate with a computer (Wikipedia).

Introduction

The purpose of this report is to present the findings of the Perceptions and Performance: ICT at Monash University project. This project had two main foci: firstly, to explore the perceptions of ICT that students bring into their undergraduate courses and investigate the role this has on their progression through their courses and, secondly, to explore academics' understanding of these perceptions and the role this has on unit design and delivery. The main objectives of this project were to improve information provision to prospective students and inform teaching practice within FIT undergraduate teaching.

The project was conducted on Monash University's five Victorian campuses where undergraduate IT courses are taught. The information for this study was gathered via surveys administered to students at the beginning of first semester 2006, interviews of staff and students conducted during first semester and students' academic records at the end of first semester. All students in the first year core unit FIT1001 Computer Systems were surveyed. From this cohort, students who had attended secondary school locally were selected to be interviewed. All staff involved in teaching first year were invited to participatein the project.

The report is organised into five basic parts. Sections 1-4 set the background and scope of the study; section 5 describes the project design; section 6 discusses the student view, while section 7 gives the staff view; and sections 8-12 infer some conclusions.

This report is structured as follows. Sections – provide the background and scope of the study. Section describes the project design. The findings are presented under a number of sections. Section 5 presents the student view. This section draws on the survey data to provide information about the students' perceptions of their course; the interview data provide insights into the students' experiences of their course. The end of semester results provide information about how perceptions and expectations relate to course performance and course retention. Section 6 presents the teaching staff views of their students. Section 7 explores the relationship between student and staff perceptions. Section 8 discusses the relationship of findings with other data. Sections 9 and 10 discuss the findings of this research and future directions and section 11 concludes the repord.

1Background

Students come into their courses with a set of stereotypes and with limited expectations. The process for changing this has taxed the intellects of the careers advisory system for the past 30 years. When the careers teachers training system in Victoria was upgraded in the late 1970's and training courses were developed, the role of information systems was emphasized. Australian state and federal governments have since spent significant amounts of money on both paper-based and computerised information systems but there is little to show that this has been very effective: retention rates still vary wildly between disciplines and across institutions; graduates still change occupational areas a few years after entering the workforce (Hillman, 2005).

There has been extensive work on the issue of student progression in the Australian tertiary education sector (Marks, McMillan & Hillman, 2001; McMillan, 2005). Most of this work has researched general trends and has found that, for example, students who are uncertain about their choice of career are less likely to succeed with their course and more likely to withdraw (James, 2000). However, research studies have also found a range of other factors which have affected student performance and students' decision to continue with their course (Greening, 1998; Kantanis, 2000; McInnis & James, 1995; Peel, 1998; Taylor, 2004)

One of the assumed negative impacts on student learning and progression is the number of hours that students spend on paid work. In a review of what had been reported in the US, Riggert and his associates (2006) found little consistency in the results from studies into paid work and student performance. An unpublished paper by Applegate and Daly (2005), on students at the University of Canberra, indicates that there is no simple relationship between paid work and performance. Riggert et al (2006) raise the issue that more is needed to be done in defining and developing effective conceptual models of student behaviour if we are to have an effective understanding of what is happening.

Within the 1999 DETYA report on transition there is some emphasis upon the social contacts created by students and a suggestion that more work be done on building initial socialisation into the tertiary life of the ex-high school student. This idea has been presented elsewhere through Tinto's (e.g.,Tucker, 1999) model of social interaction. A newer definition of this approach is student engagement or connectedness, but work such as that of Fredricks, Blumfield and Paris (2004) does not add a great deal to what is already known. What is clear is that this a complex area and any analysis needs quite sophisticated behavioural models (e.g. Tucker, 1999). It is noteworthy that the engagement thinking began almost 20 years ago and still appears not to have made much of an impact. It will be argued later (section 9) that this is, partly, a consequence of a lack of meaningful models of student behaviour.

Conversely, it is reasonable to expect that student behaviour would influence the teaching environment. A number of studies have established relationships between teachers' perceptions of their students' learning experiences and needs and their understandings of their own roles and responsibilities towards their students (Kember, 1997; Prosser & Trigwell, 1999). This is reflected in teaching approaches adopted and the teaching environment they provide (Samuelomicz & Bain, 1992). However, much of the research into student behaviour has not been directly complemented by work on the role of staff perceptions of what students know and expect, and the influence of these on curriculum design and assessment in higher education. For example, the reported work on transition (DETYA, 1999) fails to talk about the way in which academic staff approach transition students in spite of the fact that staff come in for some criticism from students. A recent paper by Manton, Turner and English (2004) that explored how student knowledge is best assessed in business education, failed to look at the antecedent conditions even though it was using coherent educational thinking in its formulation. Hoppes and Chesbro (2003) are amongst those researchers who have explored the commonality between staff and students in the level and type of values they hold and the impact of these on instruction. They found that the quality of the interaction between staff and students is influenced by the values held and the way they are expressed.

If we accept that teachers' perceptions affect their teaching approaches and consequently students learning approaches, then the conceptions that teachers have may be seen to influence student learning outcomes (Kember, 1997). In the educational dynamic between students and their teachers, an understanding of perceptions that teachers have of their teaching is fundamental to understanding the students' learning experiences (Prosser & Trigwell, 1999). Fox (1983) proposes that any mismatch between the students and their teachers in their understandings of teaching and learning can result in frustrating experiences. If these mismatches are to be reconciled then they must be recognised, examined and understood.

This leads to the more general point that there may need to be a review of our understanding of the nature of the student experience in higher education. The 1999 DETYA report on transition (DETYA, 1999) uses data from 1997 and before. Although it reads as if its data is current rather than being 10 years old, the concatenation of factors influencing student behaviour in 2006 has elements that may be different from those of even 10 years ago,

1.1 ICT and students

The Reality Bytes (2001) research showed that school students, five years ago, had fairly negative views of the role of IT in their career prospects. This was most pronounced in females. The more recent project, "Attitudes to ICT careers and study among 17-19 year old Victorians" (2004), indicated a shift, in that three years later, there were more positive attitudes to ICT careers although few students had much idea about what careers and courses were available. If we accept that one of the important reasons for course attrition or low success rates is making a poor choice of course in the first place, then it can be seen that student knowledge and understanding of courses and careers is of interest to us. By exploring what students actually bring into their courses, we extend our understanding of student behaviour which adds to our knowledge on the best ways to market courses and to support careers staff in schools.

Clearly, courses in IT face particular problems through a combination of the relatively diverse nature of IT jobs and the relatively rapidly changing content in the IT area (Hurst & Lynch, 2001). These factors exacerbate the task of defining information that can be delivered to prospective students and create difficulties in establishing that people have an understanding of the content and nature of IT courses (Boyle, 2002). From this general set of issues this research project was designed to begin the analysis of student expectations of IT courses.

From this broad perspective, we chose to focus our interest to a particular set of questions and focused on the possible role that the more specific knowledge and perceptions that students brought into a course could be influential in the way in which they coped with the transition period. Coupled with this, we also decided to explore the ways in which staff viewed students as this is an obvious area that has had limited coverage.

2Aims

The aims for the project were:

1. to establish the perceptions of ICT that students bring into their course and investigate the role this has on their progression through the course;
2. to explore staff understanding of the attitudes and knowledge that students bring into their course and the role this has on unit design and delivery;
3. to research the associations between these aspects and staff and student behaviour in the teaching-learning context;
4. to inform and enhance current teaching practice within FIT undergraduate teaching programs; and
5. to improve information provision to potential students and their advisers.

3Context of the Study

The study investigated perceptions of first year students and staff in the IT undergraduate degree programs in the Faculty of Information Technology, Monash University. The study focused on students and staff in the four undergraduate IT programmes at the Victorian campuses of Monash. These are:

1. Bachelor of Information Technology and Systems (BITS). A three-year general IT degree programme that prepares future information technology professionals for careers in a range of specialised information technology fields. In 2006 the programme enabled students to

focus their study on the following specific areas of IT practice: applications development and networks, business systems, multimedia, net-centric computing, and systems development.

2. Bachelor of Business Information Systems (BBIS). A three-year programme in business information technology. It prepares students for leadership roles in IT management and focuses on the application of information technology to the solution of business problems.
3. Bachelor of Computer Science (BCS). A three year programme which provides an in-depth study of computing with an emphasis on the software, hardware and theory of computation to solve commercial, scientific and technical problems. It also explores software design and programming, computer hardware, the theoretical foundations of computing and its present and potential applications.
4. Bachelor of Software Engineering (BSE). A four year programme which explores the design, construction and engineering of large software systems, subject to constraints such as cost, time and risk management.

More in formation is available from: http://www.monash.edu.au/study/

The BBIS, BCS and BSE programmes are taught at the Clayton campus. In 2006 the BITS programme was taught at four Victorian campuses, with each campus offering different majors as follows:

Gippsland – applications development and networks, business systems.
Berwick – multimedia.
Peninsula – net-centric computing.
Caulfield – systems development.

In first semester of the BBIS, BCS, BSE and BITS programmes there are three units which are core across all programmes:

FIT1001 Computer Systems

FIT1002 Computer Programming

FIT1003 IT in Organisations

As this research was conducted in first semester, most of the discussion will concern students and staff in these three core units.

4Project Design

The project aims were achieved through a mixed quantitative and qualitative research design that had four phases:

1. A start of semester survey using a structured questionnaire. The data from this survey is reported in Sections 5.1 and 5.2.
2. Mid semester interviews with students who had participated in the survey and agreed to be interviewed. The data from these interviews are reported in Section 5.3.
3. Mid semester interviews with staff who were teaching into the core units or who were coordinators of Special Interest Groups (SIGs)[4] This data is reported in Section 6.

[4] A Special Interest Group (SIG) was formed to develop each of the core units. It was made up of staff from all campuses upon which the unit would be taught.

4. Final semester results of students who agreed to be identifiable. This data is reported in Section 5.4.

The methodological basis for the research design was derived from the assumption that we had little knowledge of students' expectations of their courses. It was decided that an exploratory survey would help provide a picture of those expectations. It would also allow us to collect data on the prior experience of the students in ICT activities. The interviews would allow us to gather in-depth data on the way students viewed their courses and the way they were adapting to their courses. The staff interviews were intended to provide us with insights into the way staff viewed their students and the material they were teaching. In addition it was hoped that the student and staff information could be compared to explore commonalities and differences.

The project was prepared for ethics approval and the Monash University Standing Committee on Ethics in Research involving Humans (SCERH) allowed all aspects of the project data collection. The documents associated with ethics requirements are attached as Appendix A.

The data collections were conducted in first semester 2006. The remainder of this section describes the participants, materials, methods, analysis and reporting used for each data collection.

4.1 Survey of students

The students were surveyed at the beginning of first semester 2006 using a paper questionnaire.

4.1.1 Participants

The survey data was collected through the unit FIT1001. This unit was chosen as it is a core unit for all the undergraduate IT programmes in the Faculty of Information Technology and, as such, is taken by most students. There is only a small number of students who gain exemption from this unit.

In first semester 2006 there were 422 students enrolled in FIT1001. A total of 185 students responded to the survey, giving a response rate of 44 %

4.1.2 Survey questionnaires

The survey questionnaire was designed by members of the project team and trialed with teaching staff and students. A copy of the questionnaire is provided in Appendix B.

The questionnaire contained mainly closed response style questions with one open response question. The items in the questionnaire represented a number of different behavioural domains:

Basic demographical data — questions 1–6, 10–12, 15 and 19
Formal and informal experiences with ICT prior to course — questions 7, 13 and 14
Time spent using a computer — questions 8 and 9
Reasons for doing the particular course — questions 16–18
Expectations about the particular course — questions 18 and 26–28
Expectations about the university experience — questions 20–23, 25 and 30
Expectations of chosen course — question 24 (open-ended response question)
Expected areas to be covered in the chosen course — question block 29
Interests in aspects of ICT — question block 31

The items for question blocks 29 and 31 were aligned where possible to the list of topics from the 2005 ACM/AIS/IEE computing curriculum[5]. This curriculum presents a list of topics covered in undergraduate degree programmes in five major computing disciplines. The complete list has 40 computer related and 17 non-computer related topics. A subset of these

[5] ACM/AIS/IEEE-CS Joint Task Force on Computing Curricula 2005: The Overview Report

topics was used in the questionnaire. In considering which topics to include, only topics that were covered in the FIT courses were used. In a couple of cases several topics were consolidated under one topic. A couple of extra topics which are covered in the FIT courses but were not explicitly mentioned in the ACM list were added. The final list contained 26 topics.

4.1.3 Data collection method

The survey questionnaires were distributed to the students by a project team member at the start of an FIT1001 lecture at each campus. Most of the data was collected during the first and second week of the semester.

4.2 Student interviews

The students were interviewed following a semi-structured interview schedule. The interviews were conducted during the middle of first semester 2006.

4.2.1 Participants

Students were recruited for the interviews when the survey was administered. A total of 119 students agreed to be interviewed and a selection of these students were later contacted by email to arrange an interview time. The selection aimed for a spread across the five Victorian campuses, with 4–6 students per campus. As we wished to investigate the perceptions and performance of students from local secondary schools, five criteria were used for selection. Drawing from information provided by the survey, the students who satisfied all or most of the following criteria were selected:

1. student was enrolled as an local student;
2. first language of the student was English;
3. student had studied at a high school within Australia;
4. student had provided an ENTER score; and
5. student’s first attempt at an IT course.

Twenty-five students were eventually interviewed from thirty-one students who were selected. Six were enrolled in BITS (Peninsula), five students were enrolled in each of BITS (Clayton), BITS (Caulfield), BITS (Gippsland) and four were enrolled in BITS (Berwick). There were 22 male and three female students aged from 18–25.

Most of the participants were local students (21 out of 25) with English being first language (20 out of 25) and had previously enrolled in high school within Victoria (24 out of 25). Their enter scores varied from 39.15 to 96.70. Only two students out of 25 reported having attempted to study IT degree in the past, with one successfully completed the degree and one dropping out.

4.2.2 Interview questions

A set of questions for the semi-structured interview was prepared by the project team. The focus of these questions was to determine the students’ reactions to their course and the teaching and learning context. The interview questions were mostly open-ended to encourage the students to raise issues of interest or concern.

4.2.3 Interview schedule

The interview schedule is provided in Appendix C.

Twenty-one interviews were conducted face-to-face (the preferred method) at the student's home campus; and four interviews were conducted by phone. The duration of the interviews ranged from 4½ to 20 minutes. The interviews were audiotaped.

4.3 Staff interviews

The staff were interviewed, following a semi-structured interview schedule. The interviews were conducted during the middle of first semester 2006.

4.3.1 Participants

Staff were invited to participate via email. All staff involved in teaching the first year core units were invited to participate. Seventeen staff members were interviewed from approximately 30 staff who were invited.

4.3.2 Interview questions

A set of questions for the semi-structured interview were prepared by the project team. The questions were designed to gather information about how staff approach curriculum development and their understanding of their students' background and knowledge.

4.3.3 Interview schedule

The interview schedule is provided in Appendix D. The duration of the interviews ranged from 30 t0 70 minutes, approximately. The interviews were audiotaped.

4.4 Student results

The students' end of first semester results for the core units FIT1001, FIT1002 and FIT1003 were obtained from Callista[6]. Results were collected for all students and analysed to gain patterns of performance for each unit. Analysis of results for the students that agreed to participate were used to explore student progression.

4.5 Analysis and reporting

The survey responses of students were analysed to provide descriptive information. A variety of statistical tests were performed on this data. Descriptive and statistical analysis of the quantitative data was performed using SPSS[7]. For all statistical tests conducted, a level of $p < 0.05$ was used to determine statistical significance.

Several groupings of students are mentioned in the reporting. The students that responded to the survey are referred to as *respondents*; the students that agreed to have their final unit results included in the analysis are referred to as *participants.* Students who were interviewed are referred to as *interviewees.*

The emphasis in this report is on presenting results in non-technical terms. Supporting statistical analyses are included as an Appendix.

[6] CRM software for Monash University

[7] Statistical Package for the Social Sciences, SPSS Inc.

5The student view

In this section the analysis of the responses to the student survey questionnaire, student interviews and unit performance are reported. Further descriptive statistical data and analysis are presented in Appendix E and Appendix F.

The data from the student survey is used to provide a profile of the students and information about their perceptions and expectations of university and their IT course.

The data from the interviews is used to provide insights into students' experiences of their courses.

The unit performance data is used to gain understanding of the student progression through the courses.

A final section presents case studies by combining information gained from the survey, interview and unit performance.

This section largely addresses the first project aim.

5.1 Student profile

The survey data provided a profile of the students in the first year of the undergraduate degree programmes in the Faculty of Information Technology. The questionnaire included basic demographics, prior experiences with ICT, time spent using a computer, expectations about their courses and university experience, interest in aspects of ICT and expectations of aspects of ICT they will study in their courses.

The survey response rates varied across the courses, as did the students' willingness to identify themselves and to fully participate in the project. These are shown in Table 1 (p.8).

Table 1 Participation of FIT1001 students in the study

Course	FIT1001 Enrolment	Survey respondents	Respondents willing to be identified	Survey response rate (%)
Berwick BITS	46	26	16	57
Caulfield BITS	77	38	30	49
Clayton	244	95	55	39
BCS		(23)	(14)	
BSE		(17)	(8)	
BBIS		(29)	(14)	
Other course		(26)	(19)	
Gippsland BITS	34	11	8	32
Peninsula BITS	21	15	10	71
Total	422	185	119	44

In presenting the results of particular analyses, the numbers used may vary depending on which combination of students is used, particularly in the analyses of data that includes unit performance.

5.1.1 Demographics

The respondents were aged from 17 to 34 years, with the median age of 20. The ratio of male/female students was 77/23. English was the first language of 66% of the respondents; 20% of respondents were international full-fee paying students. Most students (96%) were studying in fulltime mode.

A majority of respondents (65%) had entered their courses directly from school. The median ENTER[8] score of the respondents who had completed VCE[9] was 81. The highest ENTER scores were for the BBIS course and the lowest was for Gippsland BITS. The Gippsland BITS course also had the highest variation in ENTER scores. The ENTER scores by course are shown in Table 2 (p.9).

Table 2 Respondents' median and mean ENTER scores for each course

Course	N	Median	Mean	SD
Berwick BITS	14	79.1	79.6	6.60
Caulfield BITS	24	79.6	77.8	6.89
Clayton				
BCS	17	81.4	82.5	6.53
BSE	15	81.3	87.3	9.34
BBIS	17	92.3	90.6	5.01
Other course	16	86.5	85.9	9.02
Gippsland BITS	6	63.2	62.2	22.36
Peninsula BITS	11	72.4	74.9	9.11
Total	120	81.0	81.7	10.78

5.1.2 Prior experience with ICT

Most of the respondents (86%) indicated that this was their first attempt at a tertiary IT course. More than two thirds of the respondents (68%) had studied IT at school. This was usually in the form of VCE units; however, some respondents had studied the VET Certificate in Information Technology (11%). The VCE units studied per course are shown in Table 3 (p.10).

[8] Equivalent National Tertiary Entrance Rank. This is the national Australian tertiary entrance score.
[9] Victorian Certificate of Education

Table 3 Respondents' IT study at VCE level

Course	Year 11 IT[a] (%)	Year 12 IS[b] (%)	Year 12 IPM[c] (%)	Year 12 (%)
Berwick BITS	50	27	58	73
Caulfield BITS	32	18	45	53
Clayton				
BCS	44	26	13	35
BSE	18	12	29	41
BBIS	38	21	28	41
Other course	54	27	19	35
Gippsland BITS	55	27	36	46
Peninsula BITS	60	33	53	60
Total	42	23	35	48

[a] VCE Information Technology (Unit 1 or Unit 2)
[b] VCE Information Systems (Unit 3 or Unit 4)
[c] VCE Information Processing and Management (Unit 3 or Unit 4)

5.1.3 Prior knowledge of programming

Most respondents (84%) indicated that they had some knowledge of a programming language; however, only 41% respondents had previously studied a programming language in a course. The most widely experienced languages were HTML (62%) and Basic/VB (60%). Almost a third of the respondents (30%) had some experience with Java, the language of instruction for the core programming unit in the undergraduate degree courses. Very few had experience Pascal/Delphi (5%) or CGI/Perl (4%).

Key Finding

Most students entering FIT undergraduate courses had some prior knowledge of a programming language.

5.1.4 Computer access and ownership

Nearly all respondents had access to a computer (98%). Most respondents had their own computer (87%) rather than a shared computer and 10% of the respondents brought a laptop to university.

5.1.5 Time spent using a computer

The median time spent using computers at home and at school during a normal school week was 14.5 hours. The median time spent on the Internet was 4 hours per week. A median of 2 hours was spent each on chat and games, and 1 hour was spent on email. Less than 50% of the respondents claimed that they spent any time on programming or building Web pages. Only 10% of the respondents spent more than 4 hours a week on programming.

5.1.6 Course preferences and reasons for choice

Most respondents (82%) claimed that the course they were studying was their first preference within their IT course selections, with 68% claiming that Monash IT was their first preference overall.

Key Finding

Monash was the first preference for most students wishing to study IT at the undergraduate level.

Students were asked to select up to four reasons why they had selected their course from a list of set responses. From Table 4 (p.11), it can be seen that the pattern of reasons the students nominated are clear, with the top reasons concerned with having an interest in IT and seeing the course as providing a good pathway into a career in IT. This is in agreement with the Greening (1998) study which showed that personal interest and skills development were the most frequently stated reasons for doing a computer science course and also with the Reality Bytes (2001) research which showed that interesting and satisfying work was the most desirable job characteristic.

The pattern of reasons for doing a course is different from what might be expected in that the parent/teacher/friend structure has a low importance. Although a number of studies have shown that students claim their parents, teachers and friends are the most important influences in their course decision making (e.g., Reality Bytes, 2001), this study clearly shows that students claim that they are making their decisions based on internal factors rather than on the suggestions of others.

Table 4 Respondents' reasons for doing their course

Main reasons for doing the course	N	% of total group
Interest in IT	146	79
Good course for getting into an IT career	109	59
An interesting and challenging course	86	47
Extend my knowledge and skills	66	35
Reputation of this Monash course	42	23
To earn good money	38	21
Best I could get with my ENTER score	26	14
Other reason	15	8
My parents wanted me to do this type of course	14	8
No clear reason	11	6
My friends were doing this type of course	9	5
Suggested by a teacher	7	4

Key Finding

Although the parent/teacher/friend structure has been shown to be the most frequently used source of advice on course selection, students base their decisions on internal factors including interest, challenge and perceiving the course as a good pathway into IT.

5.2 Student expectations

This section draws on the data from the student survey which provided information about the students' expectations of university and their IT course and their interest in a range of computing topics.

5.2.1 Time commitment

The median time respondents expected to spend outside class on their university studies was 14 hours. This is far less time than is recommended for these courses. Students in these courses are advised that they should spend 12 hours per week per unit. In this study, most respondents were taking four units and would typically have 16 hours of class contact time. They should therefore expect to spend 32 hours outside of class on their study. However, only 8% of the respondents indicated that they expected to spend this much time.

The median time respondents claimed that they would be working in a job was 6 hours, with 18% spending 15 hours or more. The median time spent travelling to university was 1 hour per day.

Key Finding

Students' expectations of the time that they would need to spend on their IT coursework outside class was far below the recommended time.

5.2.2 Perceived problems

The students were asked to nominate up to four main problems that they saw themselves facing during the year. Their responses are shown in Table 3. It can be seen that the principle perceived problems in entering the university are related to uncertainty about the social and teaching environments.

Table 5 Problems respondents' perceive they will face in doing the course

Problem	N	% of total group
Not knowing what is expected of me by lecturers and tutors	78	42
Not studied at university level and I am unsure what is expected	74	62
Making social contacts	41	35
Expressing myself in writing	33	27
Having enough money to live on	32	27
Expressing myself in groups	32	27
Not having enough money for books	30	25
Having to travel a long way to attend lectures	20	17
Not having a place to study properly	15	13
Other problem	13	7
None of these	13	7

Key Finding

The problems that students saw they would have in doing their course were based upon uncertainty in expectations about university and course activities.

5.2.3 Expectations of the learning environment

The students were asked to rate how well they felt that they would learn in different situations. A 5-point Likert scale was used where 1 indicates *not at all* and 5 indicates *very well*. The means and standard deviations of these ratings are shown in Table 6. It is clear that at the beginning of their courses the students felt comfortable with the range of learning options that they would experience in their course, even though they may have had minimal experience of some of them. They showed a preference for small interactive classes rather than lectures or working without a teacher present.

Table 6 Mean ratings of how well respondents' felt they learn in different situation

Learning situation	N	Mean	SD
Computer lab classes working on a computer on my own	177	3.98	0.84
Tutorials where I am expected to participate	170	3.87	0.83
Classes where I have to work in a small group	175	3.83	0.86
Tutorial classes devoted to providing answers to problems	173	3.68	0.98
Outside class on my own	180	3.67	0.87
Outside class with friends	175	3.45	0.91
Lectures/formal classes	180	3.44	0.78

Likert scale responses, where 1= *not at all* and 5 = *very well*

Key Finding

Students expected to learn better in small interactive classes rather than in lectures or working outside class.

5.2.4 Expectations about performance

Most respondents (82%) were reasonably confident that they would pass the year, with 67% expecting to get a Distinction grade or higher in the current year. Most (84%) were reasonably confident that they would complete their degree.

5.2.5 Expectations about the course content

The survey contained a number of questions designed to gain understanding of what the students felt that they would be learning in their course.

The students were asked in an open-ended response question what they thought they would be doing in their course. About half of the respondents gave no response or an unusable response to this question. This held across all campuses. Many gave single item or generalised responses. These responses included "how a computer works" and "programming" with no additional information. There were also responses that appeared to be from the unit outlines or marketing brochures. For example, "Learn about the business and management aspects relating to information technology and its applications in the business industries." Only about 5% of the responses across all campuses indicated a complex understanding of what might be in an ICT course. For example a BITS Peninsula student commented:

> "given my background in programming in VB at school, I really expected to find strong emphasis on net-centric computing, but this is taking a little while to happen"

There was little of the complexity implied in the responses to the 36 'learn' items. Similar results were also found in the Greening (1998) study where most of a group of year 11 school students were unable to give a definition of computer science and showed a poor understanding of the nature of computer science.

Key Finding

Few students were unable to articulate what they would be learning in their course in an open-response question.

In a later section of the questionnaire the students were presented with a list of topics and asked to indicate how much of each topic they expected to learn in their course. A 5-point Likert scale was used where 1 indicates *nothing* and 5 indicates *a great deal.* The mean ratings for these topics for all respondents are shown in Table 22 (p.59).

Of more relevance, however, are the expectations of students within each course. The ratings for each "expectation" item were compared between courses. These showed differences between the courses, and for 15 of the 26 items and ANOVA tests showed that these differences were significant. A summary of these findings is presented in Table 7 (p.14). This lists, for each course, the five topics that respondents most expected to learn and the five topics the respondents least expected to learn, determined from the mean ratings. This helps build a picture of the perceptions that students within each course have of what they will be studying. When compared to the course description in Section 3, these show that the students' expectations are broadly aligned with course content for each course.

Table 7 Respondents' expectations of what they will learn in their course

Course	Topics students most expect to learn	Topics students least expect to learn
Berwick BITS	Graphics Writing programs Problem solving HCI How a computer works	Robots Digital logic Developing embedded computer systems Mathematics Developing business applications Developing scientific applications
Caulfield BITS	Writing programs How a computer works Information systems analysis and design Operating systems Problem solving Information management	Graphics Robots Writing computer games Developing embedded computer systems Mathematics
Clayton BCS	Writing programs Program testing	Writing computer games Databases

	Language theory	Developing embedded computer systems
	Problem solving	Digital logic
	How a computer works	Communication
Clayton BSE	Software design	Robots
	How a computer works	Databases
	Writing programs	Writing computer games
	Program testing	Graphics
	Operating systems	Developing embedded computer systems
Clayton BBIS	How a computer works	Writing computer games
	Operating systems	Robots
	HCI	Graphics
	Problem solving	Developing embedded computer systems
	Information systems analysis and design	Digital logic
Gippsland BITS	Writing programs	Robots
	Software design	Writing computer games
	Program testing	Developing scientific applications
	Language theory	Digital logic
	Problem solving	Developing embedded computer systems
	Networks	Graphics
	How a computer works	Robots
	Databases	Writing computer games
	Operating systems	Digital logic
	Writing programs	Developing scientific applications

Key Finding

Students' expectations of what they would be learning and not learning in their courses, as nominated from a list of topics, were broadly in line with the course content.

5.2.6 Interest in the course content

The students were then presented with the same list of topics as used for the *expect to learn* question and asked to indicate their level of interest in each topic. A 5-point Likert scale was used where 1 indicates *nothing* and 5 indicates *a great deal.* Table 8 (p.16) summarises these findings, showing for each course the five topics that respondents were most and the five topics that they were least interested in.

Table 8 Respondents' interests in computing topics

Course	Topics of most interest	Topics of least interest
Berwick BITS	Graphics Software design Writing computer games Program testing Problem solving	Legal/professional/ethical issues Digital logic Mathematics Developing scientific applications Database
Caulfield BITS	Operating systems Writing programs Computer networks Problem solving Program testing	Mathematics Digital logic Robots Legal/professional/ethical issues Language theory
Clayton BCS	Writing programs Problem solving Software design Program testing Graphics	Legal/professional/ethical issues Developing embedded computer systems Project management Communication skills HCI
Clayton BSE	Operating systems Software design Writing programs Problem solving Developing computer systems for the WWW	Databases Communication skills Legal/professional/ethical issues Documentation Project management
Clayton BBIS	Graphics Developing computer systems for the WWW Problem solving HCI Writing programs	Digital logic Language theory Mathematics Developing scientific applications Robots
Gippsland BITS	Writing programs Software design Developing computer systems for the WWW How a computer works Problem solving	Legal/professional/ethical issues Databases Developing scientific applications Robots Digital logic
Peninsula BITS	Networks How a computer works Operating systems Problem solving Security	Mathematics Robots Writing computer games Developing scientific applications Graphics

5.2.7 Intersection of expectations and interests

The results from Table 7 and Table 8 were compared to determine any alignment in what students expect to learn and their interests. Table 9 (p.17) shows, that for each course, there were two or three of the five topics where the expectation to learn and interest were aligned.

Table 9 Alignment of respondents' expectations and interests

Course	Alignment of high expect to learn and interests	Alignment of low expect to learn and interests
Berwick BITS	Graphics Problem solving	Digital logic Mathematics Developing scientific applications
Caulfield BITS	Writing programs Operating systems Problem solving	Robots Mathematics
Clayton BCS	Writing programs Program testing Problem solving	Developing embedded computer systems Communication skills
Clayton BSE	Software design Writing programs Operating systems	Databases
Clayton BBIS	HCI Problem solving	Robots Digital logic
Gippsland BITS	Writing programs Software design Problem solving	Robots Developing scientific applications Digital logic
Peninsula BITS	Networks How a computer works Operating systems	Graphics Robots Writing computer games Developing scientific applications

Key Finding

Within each course, there was substantial alignment between students' interests in aspects of IT and their expectations of what they would be learning in their course.

5.3 Student experiences

This section draws on data from the student interviews to provide insights into students' experiences of their course, whether it was meeting their expectations and factors they felt contributed to their success or failure.

Although students cooperated well during the interviews, most only showed low to moderate enthusiasm and provided a moderate level of detail. Responses were often brief in spite of the prompting question being open. Hence there was a lack of richness in the responses.

The students were asked for their reactions to their courses and to describe any positive and negative responses. Overall, students' experiences towards their courses were revealed as more positive than negative. However, few students could expand on and define experiences that were either positive or negative. When students talked about negative experiences they tended to mention specific units or situations with which they had difficulty. There was an element that suggested the students were becoming more aware of what was needed of them as the course progressed.

As a general comment, some models of student behaviour place emphasis upon the social environment in which the students work and upon the way they engage with the university environment. This sample of student interviews suggests that the social environment within the university is not a critical element for many.

In the remainder of this section, the students' responses to their reactions to their course and positive and negative responses are reported under the learning environment, adaptation to university and comments on core units.

5.3.1 The learning environment

5.3.1.1 Teaching staff

Students generally found lecturers and tutors approachable and helpful:

> Lecturers and tutors are pretty keen to tell you stuff. Lecturers have been nice and helpful. (BITS, Berwick)

> I like teachers in Computer systems, IT in Organisations because they are helpful. You can raise your hand to stop them and ask questions in the classes. (BITS, Berwick)

5.3.1.2 Teaching methods

Regardless of the students' educational background or programme of study, their views toward different teaching styles were somewhat similar. Students struggled mostly with units in which lecturers taught only theory, did not provide enough examples and read from slides/PowerPoint.

> But part of the reason is that the lecturer's voice projection was not well, she started mumbling toward the end, plus she's reading out of the lecture's note. She could have helped to explain things a bit more. (BBIS, Clayton)

> IT & Organization, the lecturer just read it out from slides, didn't actually explain things. (BITS, Peninsula)

Key Finding
Students valued the use of practical examples to explain theoretical and difficult concepts.

5.3.1.3 Lectures

Students disliked lectures which were not engaging and were presented to large groups. Many students remarked that a 2-hour lecture was too long, affecting their level of concentration regardless of the teaching style used. Yet, most students acknowledged that lectures were useful for presenting foundation and theory, but suggested that lecturers should provide more examples in order to facilitate learning. Other ideas that students reported as helping them to more easily absorb lecture material better were having lecture notes in front of them during the lecture, reading the unit guideline before coming to class, having adequate practicing assignments and having Q&A or consultation periods.

> Attended the first few lectures, found them difficult to follow. I found that it was more effective for me just to skip the lectures and do the readings with the lecture's guide. Sitting in the classes to listen to the lectures without an engaging environment did not encourage learning.

5.3.1.4 Tutorials

Tutorials were found to be the most favorable learning environment. All students claimed that the format of tutorials provided an engaging learning situation. A number of students commented that tutorials were similar to classes they were accustomed to at high school and therefore allowed them to adapt to learning at university more easily.

> During the tutorials is where I learned the most. Tutorials provide the educational environment that is similar to high school where students are expected to actively contribute to classes and tutors actively help students

> I think tutorial sessions are usual. I think they are more helpful than the lectures. I actually learn more in tutorial sessions. (BBIS, Clayton)

However, there were also cases where tutorials were criticized as ineffective, such as when tutors focused on teaching theory instead of giving emphasis to hands-on exercises, tutors were unwilling to provide individual assistance or tutors provided answers without explanations.

> FIT 1002 where the tutor doesn't want to help. FIT 1003 the lecturer just reads out the lecture's note but she's pretty approachable if anyone needs help. (BITS, Peninsula)

Key Finding
Students found tutorials more engaging and valuable learning environments than lectures.

5.3.2 Adaptation to university

Although most interviews were carried out about halfway through first semester, it is interesting to point out that many students related their experiences of the course to their experiences in high school. This suggests there may be an issue with the speed of adaptation of students to university.

The majority of students found a big change from high school to university:

> Totally different environment than high school. It's a lot more like you are on your own a little bit. Unlike in high school that you are having someone and the same classes everyday. It's interesting. It made you feel independent. It's good.

> More difficult than high school, more workload, more difficult things to learn. A lot less guidance compared to high school. They only give you the weekly topic and you need to prepare before coming to class. The guide is very broad; they don't tell you specific things to study for exam. Need to do a lot of preparation.

Only few students claimed that they did not find adjustments needed in the move from university to high school:

> I have no problem changing from high school. Workload is fine, taking 4 classes.

> Changing from high school, I found myself settled quite well. The hours are a lot less restricted. Workload is lighter, have more time left. I have more choices. High school at this time had a lot of workload. I just started university, so the workload is not much now. Don't see much different from high school. I am just required to be more independent.

Although some students admitted that they still needed time to adapt to the new environment and teaching style, they seemed to be favorable and optimistic about their new university experiences. All students enjoyed the flexible hours and not being required to attend university everyday. Most students liked the independence that university experiences encouraged. Meanwhile, they were aware that they were required to be more focused and responsible, as well as having better time management. Noticeably, those who were local students seemed to have more favorable attitudes toward changing from high school to university, compared with international students and female students who found they had less time and consequently struggled more at university.

> It's very hard. I came from high school in NZ. Not a lot of work. I find it very different from here. There are less subjects in university but a lot more workload and the pace is very fast. If you can't catch up, you miss the whole thing. I don't have time left for other things. (International student)

> I need to work harder. There is more stress in uni than in high school. For me the IT things are new. I have to spend time to go through all the slides, unit guides and the readings. (International student)

> A lot more busier. I have been under pressure. The amount of work is higher and the amount of work required is much higher. Having less time to do thing I used to do. Simply because I want to put my best into the course and to the units, so that I can achieve what I want to achieve. (Female student)

Key Finding
Most students found that it took time to adapt to the university teaching environment.

5.3.2.1 Level of work

Most of the comments about level of work related to the workload rather than the difficulty of the work. Overall, students found that the workload was at the right level, with the exception of international students who may struggle more due to a language barrier. Most comments related to mark allocation for assignments in relation to the hours required to complete these assessments.

> The work takes up a lot of hours. A couple of assignments take a long time for each one. Stuffs that we are doing are really new, things that I've never done before. It's enjoyable, rewarding. It's about problem solving, reaching milestone in the project. So it's good. (BITS, Berwick)

> For the assignment in computer system, the mark in relation to the amount of work that they give is not suitable. Took a few days to finish one assignment which was only 5%. (BITS, Caulfield)

> Computer system is interesting but I don't like the assignment. There are a lot of assignments for just little mark. There are around 4 assignments, two assignments are only 5% the other two are 10%. It's time consuming. The lecturer keeps giving assignment week after week. It's hard for me to have time to prepare for other subjects. (BITS, Caulfield)

> Some subjects are quite challenging. One second subject last year but it was moved to this year. I had to spend a lot of time even though the mark allocated was only 5-10% was not that much. (BITS, Gippsland)

Key Finding
Students disliked having assessment tasks where the marks allocated did not appear to be aligned with the amount of work required.

5.3.2.2 Time management practice

Most students claimed that since entering university they had more free time, allowing them to maintain their social life and personal activities. None of the students had a defined set of time management practices. The majority of students said they were able to divide time between university work and maintain the same level of social life, while some felt that they were under pressure due to the intensity and fast pace of the university teaching style.

Although many students worked part-time during the school period and lived away from campus, which took approximately 25 to 45 minutes to commute, none mentioned these as causing time pressure.

> I don't work but I play a lot. I do my assignments. I go to tutes and classes. I don't miss any classes and that helps me a lot. When I go to lectures, I understand better, and then I have more time left to do other things. I make sure that I don't miss anything. But many students they don't really come to class. (International student)

> Work one day per week. Still get in touch with friends in high school. Mostly hang out with new friends at uni between classes. Still have plenty of time outside school because workload is still light. Live quite close to uni. Have no problem with travelling time. Although it is not required, I still spend a lot of time in library to do class work and readings because it helps me to focus better.

Key Finding
Students did not appear to have a defined set of time management practices.

5.3.2.3 Previous experience

There was little mention by the students of the role of VCE IT subjects as direct influences on their performance in the university IT units, although some commented on other subjects that helped with expression and writing in these units. Most students found that their own interest and curiosity in IT units played a big part in helping them to do the course

> The VCE units that I took were not directly related to uni work. But the knowledge of computer that I gained out of my own interest helps a lot. (Art/BCS, Clayton)

> The VCE units help me to prepare. I didn't know java before I came here but it's OK. (Commerce/ITS, Caulfield)
>
> I enjoyed IT for many years. Started out young age when I was in primary school. The course here is slightly different to what I have done originally but that will change coming to next semester and second year. I will start doing stuffs that I have been doing for awhile. The stuffs that I used to in primary and secondary school were a lot of programming in visual basic and PHP web development, that will happen next year. (BITS, Peninsula)

No difference in perceptions of performance was found between students who had previously taken IT units and those who had not. Although students with non-IT backgrounds may need more training and practising in the technical aspects of the IT, they reported having no difficulty in catching up in class.

> I don't really have any previous skills in IT before. I came from a commerce side. I only learn IT here. But they are not too difficult now. I guess I just have to try to like it. (BBIS, Clayton)

Information Processing was most frequently mentioned as the VC units that helped with the IT course at university level.

Key Findings

Students claimed that interest and curiosity were important factors in course performance. Few students mentioned VCE IT subjects as being useful.

5.3.3 Comments on core units

Student responses to the units was mixed. Some typical comments:

> Most of the subjects are quite technical. But one subject is too broad, I feel that it's vague and that subject is Organization. (BITS)
>
> For the IT Stuffs, things have been pretty cool. Some of the kind of basic stuffs are not interesting that much, like real jargon. (Commerce/BITS, Berwick)
>
> Stuffs that we are doing are really new, things that I've never done before. It's enjoyable, rewarding. It's about problem solving, reaching milestone in the project. So it's good. (BITS, Berwick)
>
> The work has been great, it's kind of help me to get into the direction where I want to go. (BITS, Gippsland)

Specific comments about each unit are now presented.

5.3.3.1 FIT1001 Computer Systems

Computer Systems was mostly perceived as being too technical and boring, especially for students who had no technical background.

> Computer system is not very good for me. I am not the technical type of person. (BITS, Caulfield)

> The biggest problem for me is computer system because it is very technical. My friends which are all female, also struggled a lot from the technical aspect of this class.

5.3.3.2 FIT1002 Computer Programming

Comments about the Computer Programming unit related to the content and organisation of the unit. Some typical comments:

> 1002 … the way the class is conducted is not productive. Programming is completely pointless. We were given assignment to create a graphic package when some of us didn't even know even how to draw up a window yet. (BITS, Peninsula)

> With FIT 1002 Programming, it's coming to the end of it but it's still like what we were doing at the beginning where we were expected to know how to program by ourselves. The lecturer just went through the theory behind it and not until like the past three or four weeks that we got to learn about programming. (BITS, Peninsula)

5.3.3.3 FIT1003 IT in Organisations

Students generally perceived IT in Organisations as very general, some commenting that it was an easy topic that was made unnecessarily difficult:

> I don't like unit where the content is too broad like IT & Organization — that try to make general knowledge sound technical. (BITS, Caulfield)

> IT Organization is not a complicated class but it seems to be made complicated. (BITS, Berwick)

5.3.4 Factors contributing to success

When asked what contributed to success or failure toward their course, only a few students were able to answer. This lack of response perhaps indicates that very few of them had thought through this issue. It is possible to offer various explanations for this, but to do so on the paucity of data would be purely speculative.

5.3.5 Meeting expectations

Almost all students indicated that they did not have clear expectations prior to coming to the course. Overall, students' experiences of the courses were revealed as more positive than negative:

> So far I have been pleasantly impressed about the stuffs that we are doing in the units. ... The contents really help to learn stuffs. I have actually learned more than what I have expected to learn. The course is challenging. (BITS, Peninsula)

> I like the course. I think it's been in a good pace. Some of the unit, a lot of information that you need to take home before you can understand the rest of it. I understand that that needs to be done. (Commerce/BITS, Caulfield)

When asked if the course had met their expectation so far, most answered 'yes' with a few responses as 'I guess so' indicating that they were uncertain in their answer.

> It's good but it was harder than what I expected. I guess I expected it to be broader. (BITS, Gippsland)

A few students commented that they expected the course to have more focus in their area of interests. For example, Berwick students expected to be taught more in multi-media units. Peninsula students expected the course to be more involved in networking. BBIS students in Clayton expected the course to be less technical and more business oriented.

> The course has not yet met my expectation. I actually expected it to be more involved in networking as the name suggested. It came to the point that I felt some of the classes were pointless. I am not learning anything new with the way the course was structured. (BITS, Peninsula)

However, these students also said that they understood that they were required to learn the foundation in the first year and expected the course to be able to better meet their expectation in the coming semester/year.

> Main positive experience is about the course itself because it offers technical knowledge and teach how to get things right. Enjoy most units that provide technical knowledge. (BITS, Caulfield)

5.4 Student performance and progression

The end of first semester results for the core units FIT1001, FIT1002 and FIT1003 were used to gain understanding of student progression through the courses, a primary aim of this project.

5.4.1 Patterns of results for FIT1001, FIT1002 and FIT1003

The numbers of students for each core unit who agreed to participate in the study and who had an end of semester result recorded, and the overall numbers of results recorded are shown in Table 10 (p.24).

Table 10 Numbers of students with final results recorded for FIT1001

Unit	Total number of results	Participants with results	% of group
FIT1001	330	64	19
FIT1002	321	51	16
FIT1003	265	48	18

The pattern of results for each core unit are shown in Table 11 (p.25). To establish if there were any differences between the pattern of grades for the participants and the total group, cross tabulations of these were performed for each unit. The results are presented in Table 52 (p.70), Table 53 (p.70) and Table 54 (p.71). These showed that there were no significant differences in the pattern of grades between those who agreed to participate and the rest of the students for FIT1001 and FIT1003. However, for FIT1002, the participants performed better than the overall group, recording more HD results and fewer fails and this difference was significant (χ^2 (4, N = 321) = 12.515, $p < 0.05$).

Table 11 Final results of participants and all students for FIT1001, FIT1002 and FIT1003

Group	HD	D	C	P	N	Total
FIT1001 Participants	10	16	20	7	11	64
All students	54	60	73	60	83	330
FIT1002 Participants	26	8	7	5	5	51
All students	114	37	40	41	89	321
FIT1003 Participants	3	10	14	11	10	48
All students	23	54	81	57	50	265

5.4.2 Relationships of results for FIT1001, FIT1002 and FIT1003

The correlations in Table 12 show that there were significant relationships between students' final results for FIT1001, FIT002 and FIT1003.

Table 12 Correlations between Unit results

	FIT1002	FIT1003
FIT1001	0.830(**) (N=49)	0.883(**) (N=44)
FIT1002		0.726(**) (N=35)

** Correlation is significant at the 0.01 level (2-tailed)

5.4.3 Retention rates for FIT1001

Another aspect investigated was the retention rates of students in the core units. There were 64 students who had a result recorded for FIT1001 out of the original 95 who agreed to be identifiable. This gave a rate of getting to an assessable result of 67% (retention rate). The retention rate for the other students in this unit was 62% (266 of 427). This suggests that the sample did not differ on this indicator.

The retention rates for FIT1001 were explored within each course. Table 55 (p.71) contains the cross-tabulation of FIT1001 by the course studied for the participants in the project. Although a chi-square showed differences across courses (χ^2 (34, N = 119) = 65.497, $p < 0.05$), this table is very sparse with a number of low and empty cells so the results can be seen, at best, to be indicative. What is suggested is that the Caulfield BITS students had higher retention rates than would be expected and the Other Course students had a much lower rate of retention. Berwick BITS also indicated a lower retention rate than expected.

The data for the other two core units also produced significant differences but the tables are even sparser.

Key Finding

The retention rates varied across courses, with the Caulfield BITS students having the highest retention rates and students from other courses having the lowest retention rates.

5.4.4 Relationship of expected versus actual grades

In the survey, the students were asked to nominate the grade that they expected to get for the year. The survey ratings were compared against the actual performance in the three core units, FIT1001, FIT1002 and FIT1003. Table 13 to Table 15 show that predicted performance did not relate very strongly to their actual unit performance – none produce a statistically significant pattern.

Table 13 Grade expected against FIT1001 performance

Grade expected	Final grade for FIT1001					Total
	HD	D	C	P	N	
HD	3	5	2	0	3	13
D	5	8	12	4	5	34
C	2	4	7	3	2	18
P	0	0	1	0	0	1
Don't know	0	0	0	0	1	1
Total	10	17	22	7	11	67

Table 14 Grade expected against FIT1002 performance

Grade expected	Final grade for FIT1002					Total
	HD	D	C	P	N	
HD	7	1	0	0	1	9
D	14	4	4	2	2	26
C	8	3	3	3	1	18
Don't know	0	0	0	0	1	1
Total	29	8	7	5	5	54

Table 15 Grade expected against FIT1003 performance

Grade expected	Final grade for FIT1003					Total
	HD	D	C	P	N	
HD	0	3	3	4	2	12
D	2	6	7	4	2	21
C	1	1	4	3	6	15
Total	3	10	14	11	10	48

Key Finding

Student self-perceptions of performance was not a good predictor of actual performance.

5.4.5 Relationships between gender, ENTER score, prior study of IT and unit results

Comparisons of the mean results (using t-tests) gender found no significant differences.

No significant relationships were found (using Pearson's Correlations) between ENTER scores and results for the three core units.

Comparison of the mean results (using ANOVA tests) for each core unit based on the level of IT study that they had done prior to the course (none, Year 11 or Year 12) showed no significant differences. These results are shown in Relationship between prior study of IT and unit results (p.72), Table 57 (p.72) and Table 58 (p.72).

5.4.6 Relationship between English as first language and unit results

The mean results for each core unit were compared according to whether English was the first language of the students. This showed that the students with English as a first language achieved higher results in FIT1002 than those with another first language and t-tests showed that this difference was significant ($t(52) = 2.76, p < 0.05$). There were no differences with the other units.

Key Finding
Students with English as a first language achieved higher results in FIT1002 Computer Programming than students who had English as a second language.

5.4.7 Relationship between course entry from school and unit results

The mean results for each core unit were compared according to whether the students had entered their course from secondary school. This showed that the students that had entered their course from school achieved higher results in FIT1002 than those who had other pathways and t-tests showed that this difference was significant ($t(52) = 2.30, p < 0.05$). There were no differences with the other units.

Key Finding
Students entered their course from secondary school achieved higher results in FIT1002 Computer Programming than those who had other pathways.

5.4.8 Relationship between prior knowledge of programming and unit results

The participants were grouped according to whether or not they had any knowledge of programming when entering the course. Comparison of the mean results for each core unit showed that the students who had prior knowledge of programming achieved higher results in FIT1002 Computer Programming. These results are shown in Table 58 (p.72). There were no differences found with the other core units.

Table 16 Comparison of results for FIT1001 based on prior knowledge of programming

Knowledge of programming	N	Mean	SD
No	8	61.3	20.7
Yes	46	78.3	24.2

Key Finding

Students who had prior knowledge of programming achieved higher results in FIT1002 Computer Programming than those with no prior knowledge.

5.4.9 Relationship between interest ratings and unit results

The small number of responses restricts the extent to which analyses can be done to compare the interest attitudinal measures and the performance on the first semester units. Analyses must therefore be seen as indicative rather than as definitive.

The most noteworthy data from this aspect of the analysis is that the "Interest" items had very few statistically significant correlations with unit performance in any of the courses. Few measures of interest tended to be related to actual performance.

Key Finding

There were very few relationships between the measures of interest and unit results.

5.4.10 Factors in retention

An area of interest in this study was the retention rates of students in the FIT courses. The retention rates in FIT1001 were explored.

To investigate possible factors in retention, the reasons that participants gave for doing their course and the problems that they perceived they would face in doing their course were analysed. Cross tabulations were used to find any differences in the responses to these questions between the participants who had a final grade recorded and those who did not.

On the "reasons for doing the course" items there were three reasons that produced significant differences. An interesting finding was that those who did not sit the FIT1001 exam were more likely to have said that they did the course to extend their knowledge and skills. This is supported by the pattern of the second item, where those who do not sit the final exam expected an interesting and challenging course. Clearly this is an area that needs to be pursued.

Table 17 Retention in FIT1001 by Reason: Extend knowledge and skills

FIT1001 result recorded		Reason: Extend my knowledge and skills		Total
		No	Yes	
Result	Count	50	17	67
	Expected Count	42.8	24.2	67.0
No result	Count	26	26	52
	Expected Count	33.2	18.8	52.0
Total	Count	76	43	119

Pearson Chi-Square 7.694 DF = 1 P=0.006

Table 18 Retention in FIT1001 by Reason: An interesting and challenging course

FIT1001 result recorded		Reason: Interesting and challenging course		Total
		No	Yes	
Result	Count	42	25	67
	Expected Count	36.0	31.0	67.0
No result	Count	22	30	52
	Expected Count	28.0	24.0	52.0
Total	Count	64	55	119

Pearson Chi-Square 4.892 DF = 1 p= 0.027

Table 19 Retention in FIT1001 by Reason: No clear reason

FIT1001 result recorded		Reason: No clear reason		Total
		No	Yes	
Result	Count	62	5	67
	Expected Count	64.2	2.8	67.0
No result	Count	52	0	52
	Expected Count	49.8	2.2	52.0
Total	Count	114	5	119

Pearson Chi-Square 4.051 DF = 1 p= 0.044

Key Findings

Students who claimed that they chose their course to extend their knowledge and skills or because they perceived it as an interesting and challenging course were more likely to have dropped out of FIT1001 Computer Systems than those that did not nominate these reasons. However, students who claimed that they had no clear reason were less likely to have dropped out.

There was only one problem the students perceived that differentiated those who sat the final assessment in FIT1001 and those who did not. This problem was *Not knowing what is expected of me by lecturers and tutors*. Those who did not sit the final exam were more likely to be less sure on this item.

Table 20 Retention in FIT1001 by Perceived problem: Not knowing what is expected

FIT1001 result recorded		Problem: Not knowing what is expected of me		
		No	Yes	
Result	Count	44	23	67
	Expected Count	38.8	28.2	67.0
No result	Count	25	27	52
	Expected Count	30.2	21.8	52.0
Total	Count	69	50	119

Pearson Chi-Square 3.720 DF = 1 p= 0.05

The items that asked students to rate learning situations (item block 25) produced no differences in retention. This may be a result of the students producing the ratings from poor information although at the time of the survey they had had experience of some of these learning situations.

Key Findings

Students who perceived that they did not know what was expected of them were more likely to have dropped out of FIT1001 Computer Systems than those that did not nominate this problem.

5.5 Case studies: How students expectations and interest affect course progression.

The information gained from the interviews coupled with survey data and unit performance data provided opportunities to investigate some students as case studies. This is a useful approach because it gives some insights into how a student's perception of their course affects their progression through the course.

The four case studies presented provide examples of students with different levels of interest and expectations. They illustrate the complexity of some of the factors which influence course performance and progression.

5.5.1 Case 1: Well-defined expectations and well-defined interest

From the survey results, this student is a good example of the motivated student with well-defined interests and expectations about the course. He entered the course from school and had completed all the VCE IT subjects.

During the interview the student did not have a lot to say that allows for much understanding of why he was doing the course and what he was achieving from the course. To illustrate this, a typical phrase is his response when asked his reaction to the course so far was: "I guess it's been okay".

Although he entered the course from VCE IT and had seemingly clear expectations about content, he was unhappy with units where there was a lot of "technical stuff". He admitted that he wanted simple examples that may not even have anything to do with IT.

He did not talk about the course outside of content. There was no suggestion that the course had a bigger role in his life than just the qualification and a job. However, he was basically happy with what he was getting.

He passed all units, getting an HD in FIT1002 Computer Programming.

If this student had been interviewed on entry to the course he would have been accepted, but the interviewer would have had doubts about his motivation. This is a case where more objective measures are a satisfactory method of course selection.

5.5.2 Case 2: Not so clear expectations and well-defined interest

This student, from the survey responses, is very similar to the previous case.

However, the interviews were very different. The student claimed he was having a good educational experience. He was very positive about the lecturers' attitudes and approachability. He felt that he was learning a great deal from the course. He claimed that he was having a much more effective learning experience than in high school, stating "so far I have been pleasantly impressed with what we have got ".

He gave the impression that he had his studies under control at the time of the interview.

Statements during the interview such as, "before coming into the course I taught myself lots of stuff particularly to do with hardware" gave the interviewer the impression that he was a gamer who was interested in hardware.

He was a member of the IT students' group and saw it as a good social contact. He claimed that he did not have a wider support or social group; however, he did have a group of friends who would get together to study or review work.

According to the end of semester results he passed one core and deferred the other two. There is no suggestion as to why this might have happened. This is a case where a further follow-up interview would have been useful.

5.5.3 Case 3: Well-defined expectations and ill-defined interest

This student indicated on the survey that his reasons for choosing the course included an interest in IT and pursing a career in IT, and a desire to extend his knowledge and skills. He was confident that he would successfully progress through the first year. His responses to the question in which he was asked “how much of each topic he was expected to learn in the course” indicated a definite pattern of expectations in the topics he expected to learn. However, his interest in topics was less clear. The student expressed a middle range of interest in the items he expected to learn a lot about.

During the interview he talked about elements of course being quite challenging. He suggested that the amount of work required was demanding, and the marks allocated to the assignment components could better reflect the amount of work required. He claimed that many lectures were very boring.

He was unable to express any ideas on the teaching and learning environment. He felt that staff should show more empathy in that they should check on whether students were coping. He found that, as a student, he was unable to approach the lecturers, stating, "I do not have enough time to contact them, too much work altogether". Even though he criticised tutorials and said he didn't go to them, he could not pinpoint the reasons why or ways of improving them.

He seemed to have extremely good basic study skills, at least a very functional level.

He stated that he preferred to work alone.

In spite of all this, he failed to sit the final exams for any of the core units. There is no obvious reason for this, and it is doubtful that he would have been seen as a potential withdrawal if interviewed on entry.

5.5.4 Case 4: Ill-defined expectation and ill-defined interest

This student could be seen as a classic uncertain individual. His survey responses to the ‘Expect to Learn’ and ‘Interest’ questions had no clear patterns. He was not confident about passing the year or course.

During the interview he was uncertain and indecisive. He constantly remarked, "I don't get...". When asked about his expectations about the course all he could say was "hard to say". Even though he had no expectations about the course, he claimed that the course was what he expected.

He appeared to be somewhat isolated. Apart from one friend he had little contact with other students.

An impression gained from the interview responses was that he lacked technical knowledge and experience. He gave the impression that he was not pressured by the course but this did not seem convincing.

At the end of semester this student did not sit any of the core unit exams.

It is probable that this student would not have been selected if a part of the selection procedure had been an interview about knowledge of the discipline area and confidence in progressing.

Key Findings

The motivated student with well-defined expectations and interests about the course progressed well through the course.

The two students with not so clear expectations and well defined interests about the course and well-defined expectations and ill-defined interests about the course progress did not make good course progression

The student with ill-defined expectations and ill-defined interests about the course did not complete the course.

6The Staff view

In this section the analysis of the staff interviews is used to provide insights into staff perceptions of the students' experiences of their course.

This section largely addresses the second project aim:

> To explore staff understanding of the attitudes and knowledge that students bring into their course and the role this has on unit design and delivery.

6.1 The learning environment

6.1.1 Teaching staff

Much anecdotal evidence was offered by interviewees that suggested that the teaching staff were generally helpful and data collected from students supported this view. The majority of interviewees believed that students are generally satisfied with the amount and quality of their interaction with staff. However, lecturers generally perceived that the students experience with teaching staff was shaped by the quality of their interactions with their tutors. This was mainly because students seldom make the effort to visit the lecturer for help, which affects how personable the lecturer appears to the student, and that the tutors are the first port of call for help.

Given that students primarily seek help from tutors, it is important to retain those tutors with good teaching skills. However, developing good teaching skills requires investment of time and is a demanding activity, so retaining good tutors with teaching experience is important but sometimes difficult to achieve. Illustrative quotes follow.

> Teaching into a tutor group is a learning experience for the new tutor as well, and their experience takes time to acquire. The faculty are nonetheless "churning tutors through the system" therefore it is difficult to build up a skills base

> The Faculty currently relies on part-time tutors who may come recommended by colleagues. It is difficult, however, to know how well the tutors are going to perform and difficult to predict their ability to understand the material. Lecturers must rely on their students to say "That tutor is no good," although it may be that

> tutor's first semester tutoring. The faculty ask students to pay $20k+ a year and are providing them one staff member per unit or subject who is fully trained and the rest are part-time staff who are sometimes learning the material just one week ahead of the students

Key Finding
Teaching staff generally perceived that the students' experience with teaching staff was shaped by the quality of their interactions with their tutors.

6.1.2 Teaching methods

Most interviewees believed that lecture notes made available to students on the Web resulted in many students failing to attend lectures, and students therefore perceiving little advantage is be gained in attending lectures. One interviewee despaired that many students attend only the first and the last lectures. The interviewee proposed that this disconnect and disregard was enabled further by allowing lecturers to post all their lectures, and solutions to exercises, on WebCT and MUSO. Some believed that this affected the way students engaged intellectually with the content.

> Avoid posting tutorial solutions on the web as it discourages students from attempting to think for themselves

Several interviewees did not make lectures notes available online for the above reason, so that students had to come to classes and involve themselves in the discussion.

> there's no exact material online that is going to supplement what they do in class. A lot of that is supplemented by videos and practical examples that can't get out of a book.

Key Finding
Teaching staff believed that making lecture notes available to students on the Web resulted in many students failing to attend lectures, and affected the way students engaged intellectually with the content.

6.1.3 Lectures

A handful of teacher interviewees lamented the continued use of the lecture format as being impersonal and passive a teaching method:

> Attendance rates at lectures are abysmal. Ideally it would be better to move away from lectures and towards a method with one staff member per group of twenty students, and then teach to these small groups for the entire semester. There is a cost issue, of course

Students acknowledged lectures were useful for presenting theory, but they disliked lectures which were not engaging. Several interviewees thought that one hour lectures are essential and that 2-3 lectures are too long as students get restless and "switch off".

> Teaching the programming units in first year via lecture delivery is not an ideal way to help students adapt. It is a two-hour non-interactive session, essentially, of theory. First year students do not deal too well with that.

One interviewee advised scheduling a short break between the first and second hour of a lecture as she had found that many more students attend when this has been done. Another interviewee reflected on an interesting question asked of him at Cambridge by an eminent. The question,

> *"Do you expect your students to understand everything in the lecture at the time they give the lecture?"*

was answered in the negative. That is, of course he did not expect his students to understand everything. The interviewee was then informed that most lecturers say the direct opposite, which is that they do expect their students to understand everything. The interviewee explained that he did not expect this of students because often they are given sophisticated ideas and to expect them to absorb it all in the lecture is unrealistic. Students need time to think about these things and to reflect and evaluate.

Key Finding

The lecture format was perceived as being an impersonal and passive teaching method.

6.1.4 Tutorials

Academics were keen to promote the benefits of tutorial and/or seminar-based learning where much smaller groups of students can interact and problem solve. An illustrative comment follows:

> IT students respond best to hands-on, workshop type activities where a lot of feedback is given to them about their progress. Students get better results and derive benefit from interactive activities which can be done in tutorials

Students also claimed that tutorials provided them with the most engagement in their learning.

Key Finding

Tutorials were perceived as providing students with the most engagement in their learning.

6.2 Adaptation to university

An issue raised by several interviewees concerned students' difficult transition from secondary to tertiary education. Some of the issues that affected students' adaptation to university are discussed next. These include: level of work that was expected from students, the students' ability to manage their time, and previous experience.

6.2.1 Level of work

Interviewees expected a medium to high level of work from their students, but added that a minority of students meet these expectations, and that most students did work only when assignments were due. This is aligned with the student view in that most students discussed level of work in relation to the amount of work associated with the assignments.

One interviewee commented that typically in a first year university unit tutorials are compulsory, and the lectures are not, and new students look at the schedule and say to themselves “Hang on a minute, all I’ve got to do is attend 8 hours of classes a week. This great.” They reduce their efforts until the time when first assignments are due and then all suddenly 3 or 4 are due all at once across their units and they cannot cope.

Another interviewee believed the prescribed 12 hours per unit a week was adequate and expected that level of work from his students. The interviewee however added that the standard 12 hours of work is not expected every week, for example, those weeks when assignments fall due many more hours of work is expected of students.

> There are two types of work to be done. The university mandates twelve hours of work per subject, per week. Realistically, students tend to do just what is assessable, and unless something is assessed it will not get done. It would be ideal to think that students read material because they feel it was necessary to read, but that is simply not the case. Students will only read things material if it is explicitly indicated that it is necessary to read it and there are marks allocated to it. As a general rule very few students do background reading

One interviewee noted that for many units the skills are cumulative and must be worked at regularly, week on week. At the start of semester lecturers must impress on students that they have made a 12 hour per unit commitment and they have got to structure a timetable that includes 8 hours of work outside of class, and they have to do it from week one. First year coordinators try to reinforce that message over and over, but like anywhere there are students who are doing 30 hours of paid work a week and cannot put that time and effort in.

> The university has the official estimate of 12 hours a week so lecturers cannot really design anything else outside of this, much as they might like to “throw all material at them”. There is always some guess work in working out what 12 hours of work equals for the “average” student. Lecturers attempt to put some of their efficiencies back into the students’ inefficiencies. What takes the lecturer one hour to do will take the students 4-5 hours longer to do. Sometimes lecturers get this equation wrong to the perceived detriment of students

Key Finding

The teaching staff perceived that the majority of students did not meet work level expectations.

6.2.2 Time management

Many interviewees believed that most students have time constraints which means they have difficulty devoting adequate time to study. Students have conflicting commitments with many working between 20-30 hours a week.

> These days students pay approximately 40% of the fees and many live away from home; therefore they have problems in simply trying to survive. The ideal that students study full-time no longer exists. University guidelines state that full-time students must study 38 hours a week. However, if they also doing 20-30 hours of paid work a week it is simply unachievable.

The interviewees commented that the degrees we have today, IT and others, are pre-1970 and are of an era when students probably did study full-time and had this as their main commitment. However in this era the university students are, in net effect, part-time students.

Key Finding
Teaching staff claimed that most students are 'part-time' students and have many time constraints imposed on them.

6.2.3 Previous experience

Interviewees were mostly in agreement that with first year undergraduate course requirements no expectations can be made about what ICT skills students bring into their IT degree. However, some interviewees did expect students to have some skills. These included:

- basic computer skills,
- word processing skills,
- internet literacy,
- mathematics and numeracy

6.2.3.1 Basic computer skills

Most interviewees qualified the statement that they could not expect the students will bring any ICT skills into their degree by adding that it is nonetheless fair to assume most students will have. These interviewees also expect that the students will therefore have basic mouse and keyboard skills.

> Lecturers have to start with the basics. However they cannot spend too much time on the basics and must assume that students that have not done any work in these areas will spend additional time catching up on that material. This is because most of the students who have started that course have an interest in that area and have therefore exposed themselves to it through their own personal actions or through subjects that they have done in high school

6.2.3.2 Word processing skills

In addition clear written expression and the ability to put a report together (some do not know how to and need the help) was a common expectation held by interviewees. Individual interviewee findings on this assumption follows:

> Handling all sorts of word processing skills and things like presentation of materials when handing in assignments. Some international students have never seen a mouse. Lecturers cannot expect tutors to hold the rest of the class back for these students, and may have to get the tutor to give them special attention or separate lessons

6.2.3.3 Internet Literacy

A substantial number of interviewees assumed students would be literate in terms of use of the World Wide Web, which came with the expectation that lecturers and tutors will not have to show them where to search and find information on the web (web browser and search engines). Interviewee expectations were met in the sense that students know how to use these things, but not in the sense that they will use them appropriately, for example, citing and referencing sources correctly. Some were concerned that students were using the Web as a replacement for 'proper research' which requires that students not only find the information but that they also critically analyse it.

> Most important is students' ability to access and use the Internet. They are used to reading articles, reports and papers on screen. Many students sit with their Note Books during lectures and take lecture notes. This is a good thing

6.2.3.4 Mathematics and Numeracy

One interviewee thought that students need a good mathematical background, but then cautioned that what this means needs to be clearly defined. That is, does it mean manipulating numbers and modeling a problem? The interviewee concluded that analytical thinking is more important than "number crunching" and that lecturers' task is to prepare the students to become experts working from the assumption that they have no pre-existing ICT skills.

Several interviewees assumed that students are numerate because there is a requirement that they complete Year 12 mathematics for some degree programmes.

Key Finding
Most teaching staff agreed that no expectation can be made about what ICT skills students bring into their course beyond basic computer, word processing, Internet and numeracy skills.

6.3 Expectations about IT Degrees

Interviewee's observations ranged from believing that students lacked understanding altogether, to believing that they had a fair understanding, to believing that students had a strong understanding of what their degree involves.

6.3.1.1 Unclear Expectations

One interviewee stated that students have very little idea about what an IT degree involves, and suggested the following three things are completely foreign to them as new students:

1. The nature of the content they are going to be covering;
2. The nature of the career outcomes the university are directing them toward;
3. The way in which the lecturers are going to try to convey content to them and the expectations lecturers have of them regarding what they are expected to learn and think about these things.

The interviewee explained that for these reasons first year students cannot be expected to know what they are going to do or even what they want to do. They are unlikely to have much of an idea at such an early stage, and some students find themselves in a bind when they get some way into first year because they may realise or suspect they have made the wrong choice(s).

6.3.1.2 Unmet Expectations

Several interviewees noted that, on occasion, students say that the course is not what they were expecting. Other students say that what is covered in the degree is not what they will expect they will be doing once they are qualified and working as IT professionals in industry. One interviewee added that students do not appreciate or comprehend that, although they may do specialised work once in industry, the university and Faculty must, however, cater to a wide range of opportunities for them, and that these should not be narrowed down. Students find this difficult to understand, and they fail to appreciate that the Faculty has designed a generic degree so that students can easily apply what they learn it in a range of different fields later on.

6.3.1.3 Clear expectations

Finally, several interviewees thought that students overall do have a good understanding of what their degree involves and this is partly because they have access to MUSO and WebCT. Accessing and using these has become a routine activity. This is a good way for staff to get messages to students, and is much better than relying on information passing from student to student.

Interviewees were asked what they thought students want from their degrees, and the overwhelming response was that students want a vocational outcome.

> The majority are looking for a job. Although the university is focused on research and research students, the majority of our students will not head in that direction. Students enrol in IT because they hope it' is going to be of interest to them, and because they have no experience that is usually all they can do – hope. They hope for career and job opportunities. Most students have not got the faintest idea what they are in for. DEST are very concerned about this and that they want the university to tackle this. But frankly, secondary schools just do not have the knowledge and experience to prepare the students for what university life is going to be like

Other responses included: gaining a qualification, counselling services to help nurture students and return on investment.

Key Findings

Interviewees perceived that:

1. Many students were fairly naïve, and had not thought about why they wanted to do IT nor considered their motivations for doing it. Some students do an IT degree because it was the only degree into which they could gain entry.

2. Many students were unaware of their course content and do not know what they were going to learn in each unit. This was often because they had not done any pre-reading or they did not understand the jargon used in the course handbooks. Students gained very little understanding of what was involved in a course from reading the unit name and synopsis.

3. Overall, there were some students who understood what their degree involves and who know where they wanted to be, and there were others who had only a very basic, or no, understanding of their course and their reason for doing it.

6.4 Factors affecting success/failure of students in IT degree

When asked to describe the factors that contribute most to the success and failure of students in the IT degree interviewees overwhelmingly cited motivation, (enthusiasm and interest), effort and preparedness, analytical and communication skills, the quality or teaching and the selection process. These issues are discussed below.

6.4.1.1 Motivation (Enthusiasm and Interest)

Motivation, which closely relates to enthusiasm and interest (the "unquantifiable stuff" as one interviewee put it), was seen as a major factor contributing to students' success or failure in their degrees. Several interviewees felt that students "Come in and think they can get a good job in this area but they're not particularly interested in the subject matter so they're less likely to succeed". Interviewees generally agreed that students who exhibit interest in using technology to solve business and technical problems and are highly motivated to work are going to succeed.

Several interviewees thought that what contributes to students' success is their working habits, their ability to organize themselves, and that these contribute to levels of motivation and ability to deal with the "ups and downs of life".

One interviewee formulated four reasons why students lack motivation and fail their course. The first reason was because students dislike the subject area and emphasised the need to explain this to students "You are not going to like every single subject area. So that's a problem, but it's a problem you're going to have to work out how to overcome". The second problem was that students do not adapt well to the "university style of thinking" and what a particular unit wants and requires them to do. Thirdly, students are too busy having a good time, and do not prioritise their study. Finally, students do not develop any interest in the study or understand what the point of the unit is, to which the interviewees replies "Well, tough. It's in the course and you have to do it so you have to go back to plan B which is working out how to overcome this problem".

6.4.1.2 Effort and Preparedness

Most interviewees agreed that student success largely depends on what they expect to get out of their time at university. In terms of marks, interviewees thought that students who made a genuine attempt and effort would have little likelihood or reason to fail. Genuine effort and preparedness make all the difference, both in terms of before starting the unit (how much students already know) and how much students are prepared to put in each semester. Many students who fail do neither.

One interviewee recalled the old truism that "80% of success is being there" and added to this that many students do not come to all the tutorials. The simple fact that these students have not made the commitment to come to the tutorials affects their commitment overall which in turn means they are placing themselves in that "grey area of getting through the course."

Another interviewee recalled a conversation with some Honours students who said to him that in first year students would start working on an assignment the morning it was due and realised that they had not left enough time for it. By second year these students had "wised up to it" and started working on an assignment the night before or two nights before it was due and still found that they were not getting it done in time. By the time they get to third year the students felt they "got really clever" and were starting the work a week before it was due and yet were still not getting it completed to a satisfactory level. From this example the interviewee identified a progression by the students as they go through the course but asked himself why he bothered handing out this material 4 weeks before it was due if the students are only going to start the work 3 or 4 days before it is due. The students do not ask themselves the question "Why did the lecturer give that to me now?"

6.4.1.3 Analytical and Communication Skills

A handful of interviewees argued that if students improved their communication skills, and strengthened their analytic skills as used through mathematics or English they would be more likely to succeed in their degree. As one interviewee explained it, "The more willing they are to become nerds through learning new things the better. The more nerdish they become, especially for computer programming, the better they'll do. It certainly doesn't help the information systems skills to become a nerd because to tend to go off into corners and hack into programs. About 30% have nerdish capabilities and attributes, some go completely overboard".

6.4.1.4 Quality of Teaching

Interviewees overall believed that successful students make use of the resources made available to them, that is, the teaching staff. With this came the additional comments that a providing high quality academic staff was instrumental to student success or failure.

One interviewee proposed that it was the ability of staff to engage with students on a wide range of levels that increased student success. A strong sense of "We really want you here" and "We really want to help you" is also required to boost students chances of success. This interviewee felt that staff and students alike would benefit from having more help and information sessions, especially for the practical classes, as well as creating communities so that there is a more personalised experience for students.

Several interviewees commented that "at the moment" the quality of teaching and attention by staff of students has "Gone by the wayside because the focus is moved from teaching and the rewards of the system are not for teaching, it's seen as more of a chore that has to be done. Make as little effort as possible because the rewards just aren't there". The interviewee concluded that those lecturers and tutors that do put more effort in to help students do well are "punished for it and given more teaching because they have not done enough research and so on". When lecturers are given 4 or 5 units this becomes even harder, "It's become a cultural thing in this Department".

6.4.1.5 Student selection process

One interviewee discussed the approach taken by the IBL program as an exemplar of selecting students who exhibit promise of achieving academic and career success. These students are selected to enter the program not by the academic staff, but by interview with the Program's industry partners. These partners look not only at academic results (assumed), but at the ability of the student to work as part of a team; their communication skills; whether the student is a well-rounded person. The industry partners look for people who have outside interests as well as academic interests, whether they have had outside work experience as well. The interviewee remarked "So we're not looking just looking for one dimensional people (based on ENTER scores) when selecting people for the IBL program".

Key Findings

Interviewees perceived that:

1. Motivation is a major contributing factor to students' success or failure in their degrees.

2. Students who make a genuine attempt and effort would have little likelihood or reason to fail.

3. Students would be more likely to succeed if they improved their communication skills and strengthened their analytical skills.

4. Successful students make good use of resources

5. A selection process that takes into account many dimensions of the students' life may affect whether a student succeeds or fails.

6.5 Suggested changes to improve students' adaptation to IT degree

Interviewees were asked what changes to the core unit structure might positively affect students' adaptation to their degree. A diverse range of responses were provided and included such changes as positive and negative reinforcement, consistency in approach, increased flexibility in the design and delivery of courses and units, and general improvements in raising students' awareness of what their courses entail and what is expected of them. These changes are discussed below.

6.5.1.1 Positive and Negative Reinforcement

Most interviewees emphasised that the success of any changes made to the core unit structure in order to positively affect students' adaptation to their degree would depend on the stage of their studies. Interviewees agreed that first year students require a lot of guidance and need the "big stick" in so far as they require incentives to complete tasks in a timely manner (includes negative reinforcement).

6.5.1.2 Consistency in Approach

Another issue raised was the inconsistency in cultures between schools, and also lecturers. Interviewees noted that a number of lecturers are very strict about cut-off dates for the submission of material and other are more relaxed. Most interviewees acknowledged that staff teach differently and that there are different approaches, and that some lecturers want to apply these to create incentives for students to submit their work.

A number of interviewees lamented, however, that the inconsistency in approaches for encouraging students to submit their work on time tended to create sloppiness in the students who were confused by differing expectations.

Interviewees identified another problem to arise out a perceived inconsistency in approach taken by the common core unit structure that would benefit students by being revised. In the previous model, prior to the adoption of the core unit approach, lecturing staff would provide a list to the administrative staff of their assignment or tutorial work due dates. This meant that administrative staff knew clearly when assignments were due and could handle lae submissions. This procedure also meant administrative staff were able to revert to the lecturer and say "We've got two other units of that particular year that have got assignments due in that week. Can you shift yours?" Interviewees claim to have lost control of this process in recent times, and that someone needs to take the initiative to re-establish this procedure. One interviewee recognised that this may generate a new problem when the faculty has got students enrolled in different courses across different campuses and with different timetables.

6.5.1.3 Flexibility in Design and Delivery

The issue of designing a more consistent or standardised approach across the faculty was supported by interviewees who conceded a need for less variety in approach across campuses where each campus had the equivalent and comparable numbers of students. However Monash was viewed by most interviewees as a diverse institution that enrols both top level students as well as lower level students across courses and campuses, and attempting to force foundation (common core) units across these was overwhelmingly seen to be problematic.

6.5.1.4 Increase Student Awareness

Some interviewees did not believe their lecturers could do much in the way of making changes to the core unit structure to help students adapt to their degree other than to better educate students about what they are getting themselves into in enrolling in the degree.

One interviewee noted that there was nothing worse than a student doing a course "because someone tells them to, because those students will keep failing. Over every year and every semester we get students who keep failing a particular unit, and when we ask them why they keep doing that they say 'we just hate this unit.' And when we ask them why they're doing it then, they say 'because it's a compulsory common core unit in my degree.' So they get into the degree without realizing they have to do certain things."

6.5.1.5 Revised Workload and Content

One interviewee felt a significant reduction in workload (in common core units) would help students positively adapt to their degrees. The interviewee commented that in some units lecturers attempt to squeeze in up to 18 weeks of work into 13 and then try and talk really fast to get through it all in the lectures.

Finally, another interviewee recommended doing much more to establish credible and substantive bodies of case studies and so forth that are made available to students. The interviewee argued the need for bodies of materials to be made available to students as an alternatives means to help them problem solve and appreciate the diversity of solutions to problems.

7The staff-student matrix

The world of the student, as found in this study, is one of conventional, stereotyped expectations and staff may be seen as being quite realistic about their students. Some staff are seeing a need for a critical link between the student's needs and expectations and the way courses are structured.

Of particular interest is the extent to which staff believe students will be better able to cope through better information. This assumes that information directly given to the student is a primary driver of that student's choice of course, and that students digest and understand this material in timely fashion. In practice, we know that many other factors influence the way students perceive their learning experience, such as intrinsic unit interest, career choice, engagement and activity with and within the learning environment, together with other prejudices and biases generated by their peer and parent groups. These factors are borne out by the study. One possible strategy to improve the learning experience of many students is to use the stated interests and career options to guide the choice and design of the learning activities.

Perceived problems students have about doing the course focus upon their expectations of what they do not understand. This is in agreement with the staff view that students are not well prepared for university activities.

There were proactive statements by staff on the way the teaching environment would best be developed. Some of these raised the question about the appropriateness of unit structures when we look at student preparedness. For instance, they point to an emphasis upon lectures when a tutorial structure might be more effective, although this is coloured by the need to have tutors who are not new graduates with little teaching background.

Key Finding

There is little obvious conflict between how staff and student view the teaching-learning environment. Staff tend to have forward looking views that support the development of a more student centred environment.

8Relationship to other data

The data that was collected for the evaluation of the core units as well as the unit evaluations could be compared to that collected here. The timing of this study pre-empted an analysis of the raw data from the unit evaluations, and the methodology employed in those evaluations was different, so consequently we deal only with the evaluation done in the context of the study.

There appears to be broad agreement between the data from the evaluation study and the one being reported here.

9Discussion

In exploring the primary aim of this project, relating the perception students have of ICT to their progression through the course, we have been able to note a number of important factors. It is clear the students surveyed and interviewed did not have particularly clear views on what they were intending to do. On the one hand they were able to rate a series of items on what the expected to learn in the course, yet when asked what they expected to get from the course, they had little to say. The important point here is that it is unclear how much information potential students can be given in order to better inform their choice behaviour. We have already pointed to the fact that careers information systems are well-developed, with substantial resources having been allocated to them the last 20 years. Added to this, the university system spends a substantial amount of money each year on school-based marketing.

It is also informative that almost none of the measures used in our survey had any relationship to the end of the semester performance or progression of participants. Admittedly the number of students we were able to utilise for this analysis was rather small. But under such circumstances extreme cases can often indicate possibilities yet we found few such indicators. A consequence of the lack of relationships was that we decided not to continue with a second survey of the students. There was little that this could add. Furthermore, with the relatively high attrition rate, the sample we would obtain from a further data collection could not be guaranteed to have a clear relationship to the original data.

All of this can be seen to follow the pattern of educational research into student selection of courses and progression through courses. It is rare to find simple indicators or simple factors that account for either effective selection or affective progression. See for example the ACER study into student progression (Hillman, 2005).

We may have to accept relatively high levels of attrition in ICT courses and look towards ways of establishing better means of helping students recover from poor choices. Another alternative is to take seriously the task of finding those students who would benefit from particular types of IT courses. For example, the faculty could look at the means for developing courses that will attract young woman through such things as positive discrimination support. There is continued evidence that there is a body of young women who are interested in IT but find the environment repressive (Lewis, 2006; Pearl, 2002)

The exploration of the second aim of this project, staff perceptions of their students, also generated some useful information. Staff perceive students as being unprepared from the point of view of both expectations about the course and about university study. Staff also perceive that the motivation of students to study their course is relatively narrow, but they have strong job focus. This, interestingly enough, raised the question in some staff thinking that we may have to consider the idea of return on investment issue for some students, particularly those enrolling as full-fee paying students.

Staff do not appear to have high expectations of what knowledge and skills the students will bring into an ICT program. But they do expect students to have the preparation that allows them to deal with the course and university study. This may warrant some further discussion.

On some of the functional issues relating to how students should organise themselves, there seems to be a degree of regimentation in the approaches staff talked about. This is not to say that some students may be comfortable with this, but it does raise questions about the way in which students are being prepared for a continuously changing world in ICT.

This has to be qualified by another set of comments that reflect upon the interests and motivation of students and how these might develop.

From results from the first two project objectives it might appear that there is conflict between staff and student thinking that would militate against a productive teaching and learning context. The feel of the student and staff interviews is that this is not the case. There are always dissatisfied students and there are always staff who will have unrealistic expectations about students. The issue here is to relate this to how the Faculty can re-work itself to attract students. If it decided to look at attracting a non-traditional body of students, it may have to do a great deal more work on how staff think about ICT students.

We doubt that there is any simple way of increasing the depth and quality of the information going to students, teachers and parents. It is not a simplistic marketing exercise. Rather it is a problem of dealing with an evolving occupational area that overlaps with a number of other disciplines.

10Understanding student behaviour and future directions

The starting point for developing a better understanding of how students become a part of a university system is through developing meaningful models of student behaviour. Too much of what is reported is naïve in terms of understanding why students do what the do. The DETYA (1999) report uses a scattergun approach in defining what needs to be done as some 24 actions and a further 6 institutional policies. The ACER longitudinal study (Hillman, 2005) simply reports head counts.

The complexity of the student experience has been pointed to by others. Applegate and Daly (2005), in an unpublished study, show that within a university there is no simple relationship between paid work and performance. Manthei and Gilmore (2005), in a study of New Zealand students, show that paid work is not necessarily detrimental. These confirm the experiences in the US and they illustrate the need to take a more sophisticated approach to the issue of attrition and performance.

The starting point for any effective behavioural model is to recognise the complexity of what we are dealing; to take seriously individual behaviour within varying societal settings. In addition we have try to think outside of one dimensional solutions. That is, to think about the diversity of students who enter a university and the need to reflect that inherent dimensionality of that diversity in any research into student behaviour.

Of importance here is the fact that vocational behaviour thinking is moving from relatively simplistic models based upon single assessment devices (such as the Holland VPI and its derivatives) into behavioural models that take into account complex individual behaviours, particularly the Social Cognitive Career Theory (Lent, Brown and Hackett, 1994) and the chaos model being developed by Pryor and Bright (2003).

There is now a surfeit of studies that count heads and generate limited connections. To continue head counting, no matter how sophisticated, is unlikely to lead very far because it does not tell us about structural things; it does not give us the *why*'s, it gives us only aggregations of ratings.

An important starting point is to move away from the attrition/failure concept and to look at a proactive concept like *adaptation*. The attrition/failure concept makes simplistic assumptions about entering and leaving courses, particularly the assumption that to drop out is bad and to stay in is good. It is often psychologically healthy for a student to drop out of a course. Student counselors have plenty of examples of the opposite where a person stays in a course because of external pressures even though they are very unhappy.

By adopting something like adaptation we accept that there are many ways in which people make decisions about what they do and, to that extent, it is value free. The term adjustment could be used but it has other connotations in behavioural analysis.

11Conclusion

???

References

ACM/AIS/IEEE-CS Joint Task Force on Computing Curricula 2005: The Overview Report. ACM Press and IEEE Computer Society Press, September 2005. (available: http://www.acm.org/education/ , accessed: December 2006)

Applegate, C. & Daly, A. (2005) *The Impact Of Paid Work On The Academic Performance Of Students: A Case Study From The University Of Canberra*, Centre for Labour Market Research, The University of Western Australia,

Attitudes to ICT careers and study among 17-19 year old Victorians (2004) Department of Infrastructure, Multimedia Victoria.

Beaubeouef, T. & Mason, J. (2005) Why the high attrition rate for computer science students: Some thoughts and observations, *Inroads The SIGCSE Bulletin*, 37(2), 103-106.

Biggs, J. (1999), Teaching for Quality Learning at University, Buckingham: SRHE and Open University Press.

Boyle, R., Carter, J. & Clark, M. (2002) What makes them succeed? Entry, progression and graduation in computer science. *Journal of Further and Higher Education,* 26(1), 2002, 3-18.

DETYA (1999) *Transition from Secondary to Tertiary: A performance Study.* Department of Education Training ans Youth Affairs, Higher Education Series, 36,.

Excellence and Diversity – Strategic Framework 2004-2008, Monash University, May 2004.

Fox, D. (1983). Personal theories of teaching. *Studies in Higher Education*, 8(2), 151-163.

Fredricks, J., Blumenfield, P. & Paris, A. (2004) School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), p. 59-109.

Greening, T. (1998) Computer science: *Through the eyes of potential students. Proceedings of Australasian Computer Science Education conference*, Brisbane, Australia, 145-154.

Hillman, K. (2005) *The first year experience : the transition from secondary school to university and TAFE in Australia*. Melbourne: ACER.

Hoppes, S. & Chesbro, S. (2003) Elements of instruction in allied health: Do faculty and students value the same things? *Journal of Allied Health,* 32 (3) 167-172.

Hurst, J. & Lynch, J. (2001) *The ICTed Project: The report on learning outcomes and curriculum development in major university disciplines in information and communication technology,* Canberra: AUTC.

James, R. (2000). How school-leavers choose a preferred university course and possible effects on the quality of the school university transition, *Journal of Institutional Research*, 9 (1), 78-88.

Kalamatianou, A. G. & McClean, S. (2003) The Perpetual Student: Modeling Duration of Undergraduate Studies Based on Lifetime-type Educational Data *Lifetime Data Analysis;* 9 (4), 311-330.

Kantanis, S. T. (2000). The role of program cohesion in effecting a smooth transition from secondary school to university, *Journal of Institutional Research*, 9 (1), 100-110.

Kember, D. (1997). A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction*, 7(3), 255-275.

Lewis, S. & McKay, J., et al (2006). The next wave of gender projects in IT curriculum and teaching at universities. the Australasian Computing Education Conference (ACE), Hobart, Tasmania, ACM Digital Library.

McInnis, C. & James. R. (1995). First year on campus: diversity in the initial experiences of Australian undergraduates , Canberra, Australia.

McMillan, J. (2005) “Course changes and attrition from higher education” in Longitudinal surveys of Australian youth research reports. Melbourne: Australian Council for Educational Research.

Manthei, R. & Gilmore, A. (2005) The effect of paid employment on university students' lives, *Education + Training*, 47, 3, 202-215

Manton, E., Turner, C. & English, D. (2004) Testing the level of student knowledge, *Education*, 124(4), 682.

Marks, G. N., J. McMillan & K. J. Hillman. (2001) Tertiary Entrance Performance: The Role of Student Background and School Factors. in Longitudinal surveys of Australian youth research reports. Melbourne: Australian Council for Educational Research.

Morrison, J. (2004) Introduction to survival analysis in business, *The Journal of Business Forecasting Methods & Systems,* 23 (1), 18+

Muthén, B. and Masyn, K. (2005) Discrete-Time Survival Mixture Analysis, *Journal of Educational and Behavioral Statistic*, 30 (1), 27-58.

Pearl, A., Pollack, et al. (2002). "Becoming a computer scientist.", SIGCSE Bulletin Inroads Special Issue Women and Computing 34(2): 135-144.

Prosser, M., & Trigwell, K. (1999). Relational perspectives on higher education teaching and learning in the sciences. *Studies in Science Education*, 33, 31-60.

Peel, M. (1998a). The Transition from Year Twelve to University, report on the Monash Transition program.

Pryor, R. G. L., & Bright, J. E. H. (2003a). The chaos theory of careers. *Australian Journal of Career Development*, 12(2), 12–20.

Pryor, R. G. L., & Bright, J. E. H. (2003b). Order and chaos: A twenty-first century formulation of careers. *Australian Journal of Psychology*, 55(2), 121–128.

Reality Bytes (2001) Victorian Government.

Riggert, S., Boyle, M., Petrosko, J., Ash, D. & Rude-Parkin, C. (2006) Student Employment and Higher Education: Empiricism and Contradiction, *Review of Educational Research*, 76, 1, 63-92

Samuelowicz, K., & Bain, J. D. (1992). Conceptions of teaching held by academic teachers. *Higher Education*, 24, 93-111.

Spratt, C. & Lueckenhausen,G. (2006) An evaluation of the Core Units in the Undergraduate Programs in the Faculty of Information Technology – Stage 1 Report, CALT Monash

Taylor, J. & Bedford, T. (2004) Staff perceptions of factors related to non-completion in higher education. *Studies in Higher Education*, 29(3), 375-394.

Tucker, J. (1999) Tinto's Model and Successful College Transitions, *Journal of College Student* 163-175.

Appendix A Documents for participants from Ethics approval process

Project Explanation letter to students

Faculty of Information Technology
Monash University

Dear Student,

Ref: Project 2006/039– *Exploring the process of adaptation in the teaching/learning environment*

The Faculty is carrying out a project on how students approach their course and their study. We are also interested in the strategies you use to survive in the early part of your university experience. The senior researcher is Mr.Chris Avram. We are asking you, as one of the first year students entering FIT in 2006, to participate

The project will take very little of your time (about 45 minutes over the whole semester). You will be asked to complete a short survey at the beginning and end of semester. We will randomly select a few students to give feedback through a face-to-face or e-mail interview. All participation will be voluntary

To carry out this type of research we need to be able to follow your progress over time. This is the only way that we can effectively plot what is happening. Consequently, we are asking you to identify yourself through your student identification number.

Your responses will not be available to the teaching staff. The research database will be maintained by Dr.Selby Markham, the Research Fellow for computing education. The database will be password encrypted, using a password established by him.

Any follow-up of individual students, from the analysis of the database, will be carried out under the supervision of Selby.

All of the data reporting will be at an aggregated level and will be done in such a way that an individual could not be recognised. You can remove your identifying information from the database at any time. A Web page will be made available for this.

Results will be reported on the project web site: http://cerg.csse.monash.edu.au/adaptation

I hope that you will appreciate the importance of this project and give it your full support.

Should you have any questions about how the data storage and handling will work, feel free to contact Selby at Selby.Markham@infotech.monash.edu.au or telephone (03) 9903 2660 or fax to (03) 9903 1077. For other information you can contact Cris Avram (Chris.Avram@infotech.monash.edu.au).

Should you have any complaints concerning the manner in which this research (Project number 99/026) is conducted, please do not hesitate to contact The Standing Committee on Ethics in Research on Humans at the following address:

The Secretary, The Standing Committee on Ethics in Research on Humans

Monash University
Wellington Road
Clayton Vic 3168
Telephone (03) 9905 2052 Fax (03) 9905 1420

Project Explanation letter to staff

Dear Staff Member,

Ref: Project 2006/039 – Perceptions and performance: ICT at Monash University

The Faculty is carrying out a project on interaction between the student perceptions of their course and the perceptions staff have of students. The senior researcher is Mr.Chris Avram. We are asking you, as one of the faculty staff, to participate. Your participation will help in the development of a better understanding of the faculty's teaching and learning activities, helping develop courses that are both academically sound and meeting student learning needs.

The project will take very little of your time (about 20 minutes over the whole semester). We will ask you to participate in an interview that will explore the your perceptions of students and the impact of them on unit design and delivery. If you choose to help in this way, your responses will be maintained securely.

All participation will be voluntary.

Your identifiable responses will not be accessible to the other academic staff on the project. They will access anonymous data. The research database will be maintained by Dr.Selby Markham, the Computing Education Group Research Fellow.

Any follow-up of individual staff, from the analysis of the data, will be carried out under the supervision of Selby. All of the data reporting will be at an aggregated level and will be done in such a way that an individual could not be recognised. Should we feel that a quotation from your response would be useful in a paper or report but may indirectly identify you, Selby will contact you to ask for your permission

You can remove your identifying information from the database at any time. A Web page will be made available for this.

Results will be reported on the project web site: http://cerg.csse.monash.edu.au/adaptation

I hope that you will appreciate the importance of this project and give it your full support.

Should you have any questions about how the data storage and handling will work, feel free to contact Selby at Selby.Markham@infotech.monash.edu.au or telephone (03) 9903 2660 or fax to (03) 9903 1077. For other information you can contact Cris Avram (Chris.Avram@infotech.monash.edu.au).

Should you have any complaints concerning the manner in which this research (Project number 2006/039) is conducted, please do not hesitate to contact The Standing Committee on Ethics in Research on Humans at the following address:

The Secretary, The Standing Committee on Ethics in Research on Humans

Monash University
Wellington Road
Clayton Vic 3168
Telephone (03) 9905 2052 Fax (03) 9905 1420
Chris Avram chris.avram@infotech.monash.edu.au

Informed Consent Form for staff participants

Ref: Project 2006/039– Perceptions and performance: ICT at Monash University

I have read the attached information sheet on this project and I understand what it involves. I understand that agreeing to participate means that I willing to make myself available for one (aprox 20 minute) interview. I also understand that I am in no way compelled to participate in this project.

I accept that, in doing this I will have identifying information recorded in the project data base with the understanding that the identifying data will not be accessible to academic staff on the research team.

I understand that I may withdraw from the project and have my data removed.

I am prepared to be a participant in this project [ ]

Name (please print) ____

Signature ____

Date ____________________

Informed Consent Form for student participants

Ref: Project 2006/039– Perceptions and performance: ICT at Monash University

I have read the attached information sheet on this project and I understand what it involves. I understand that agreeing to participate means that I willing to

Have my student identification number used to identify my responses

(Understanding that the data will not be accessible to course staff)

Complete the survey at the beginning of term

Complete the survey at the end of term

Make myself available for one (aprox 20 minute) interview*, if randomly selected*

I understand that participation is voluntary. I also understand that, at any time during the project I am able to withdraw my consent to participate.

I am prepared to be a participant in this project [ ]

I am not prepared to be a participant in this project [ ]

Name (please print) ____

Signature ____

Date ____________________

Appendix B Student Survey Questionnaire

Faculty of Information Technology, Monash University
Survey - Perceptions and performance: IT at Monash University

We are asking you to fill out this questionnaire to give us information about what you want from the units and your course.

Your responses will NOT be available to your teaching or tutorial staff.
They will see only data from which all identifying information has been removed. The database of individual responses will be independently controlled by the Research Fellow in the Computing Education Research Group.
If you are not willing to identify yourself, could you leave "student ID" blank, and complete the survey.

1. Student ID

2. Year of birth

3. Gender (optional)
   Tick the box that applies to you
   - Male
   - Female

4. What was your ENTER score
   Not Applicable

5. Is your first language English? (optional)
   Tick the box that applies to you
   - Yes
   - No

6. Where did you study for your VCE(Victorian Certificate of Education) or its equivalent? (optional)
   Tick the box that applies to you
   - Victoria
   - Another Australian state
   - Outside Australia
   - Not applicable

7. What IT units did you study at school?
   Tick all boxes that apply to you.
   - Information Technology (Unit 1) 1
   - Information Technology (Unit 2) 2
   - Information Systems (Unit 3) 3
   - Information Systems (Unit 4) 4
   - Information Processing and Management (Unit 3) 5
   - Information Processing and Management (Unit 4) 6
   - VET Certificate in Information Technology 7
   - Other units? Please specify: ______________ 8
   - None of these. 9

8. How many hours did you spend using computers at home and at school during a normal school week?

9. How much time did you use a computer during a <u>normal school week</u> to do each of the following? (Write in the hours)
   - accessing the Internet 1
   - email 2
   - chat 3
   - games 4
   - programming 5
   - working on Web pages 6

10. Are you an international full fee paying student? (optional)
    - Yes
    - No

11. Which course are you enrolled in?
    - Bachelor of Information Technology Systems at:
      - Caulfield 1
      - Peninsula 2
      - Berwick 3
      - Gippsland 4
    - Bachelor of Computer Science 5
    - Bachelor of Software Engineering 6
    - Bachelor of Business Information Systems 7
    - Other course? Please specify:_________________ 8

12. What was the last study you did before entering this course?
    - High School 1
    - Diploma course 2
    - Another degree – completed 3
    - Another degree – incomplete 4
    - TAFE college 5
    - None 6

13. In which of the following programming languages do you have some experience or knowledge?

HTML	Java
Basic/VB	CGI / Perl
Pascal/Delphi	Other
C/ C++ / C#	None

14. Which of the following programming languages had you studied in a course prior to this semester?

HTML	Java
Basic / VB	CGI / Perl
Pascal / Delphi	Other
C / C++ / C#	None

15. What mode of study are you doing?
    - Full Time
    - Part Time

16. Where did this course fit in your overall course preferences?
    - 1st choice
    - 2nd choice overall
    - 3rd or lower overall

17. Where did this course fit in your IT course preferences?
    - 1st choice in IT studies
    - 2nd or lower in IT studies

18. What are the MAIN reasons you are doing this course? *Tick up to 4 of these.*
    - My parents wanted me to do this type of course 1
    - A teacher suggested that I do it 2
    - My friends were doing this type of course 3
    - I am interested in information technology 4
    - I see it as a good course for getting into a career in IT 5
    - The reputation of this Monash course 6
    - The best I could get with my ENTER score 7
    - To extend my basic knowledge and skills 8
    - It appears to be an interesting and challenging course 9
    - To earn good money. 10
    - No clear reason. 11
    - Other. 12

19. Is this your first attempt at an IT degree or diploma?
    - Yes
    - No

20. Approximately how many <u>hours a week</u>, on average, do you expect you will need to allocate for your university course outside class times?

21. Approximately how many hours a day, on average, will you be travelling to and from University?

22. Approximately how many hours a week, on average, will you be working in a job during semester? (include travel time to and from work)

23. What access do you have to a computer?
    - None outside Monash
    - My own computer
    - A laptop I bring to university
    - A family computer I can use
    - A computer I share with friends

24. Can you please describe in your own words what you think you will be doing in this course:

25. **How well do you feel you learn in the following situations**

Circle the number that applies to your choice.
*Circle **DK** if you don't know what a particular situation is.*

	Not at all				Very well	
Lectures/Formal classes	1	2	3	4	5	DK
Outside class on my own	1	2	3	4	5	DK
Outside class with my friends or classmates	1	2	3	4	5	DK
Tutorials where most of the time is spent being given answers to problems	1	2	3	4	5	DK
Tutorials or seminars where I am expected to participate and make a contribution	1	2	3	4	5	DK
Computer lab classes where I have to work at a computer on my own	1	2	3	4	5	DK
Tutorials or computer lab classes where I have to work in a small group	1	2	3	4	5	DK

26. What grade, overall, do you think you can attain in your course this year?
    - High Distinction (80-100%)
    - Distinction (70-79%)
    - Credit (60-69%)
    - Pass (50-59%)
    - Don't know

	Unsure				Confident	
27. How confident are you that you will pass all units this year?	1	2	3	4	5	DK
28. How confident are you that you will complete your degree?	1	2	3	4	5	DK

29.

How much do you think that you will learn about these topics in this course?

Circle the number that applies to your choice.
*Circle **DK** if you don't know what the topic is about.*

	Nothing				*A great Deal*	
Building databases e.g. Access	1	2	3	4	5	DK
Communication and presentation skills	1	2	3	4	5	DK
Computer graphics and animations	1	2	3	4	5	DK
Computer networks	1	2	3	4	5	DK
Developing computer systems for businesses applications	1	2	3	4	5	DK
Developing computer systems for scientific/engineering applications	1	2	3	4	5	DK

Developing computer systems for the World Wide Web (Web)	1	2	3	4	5	DK
Developing computer systems for use in devices such as mobile phones	1	2	3	4	5	DK
Digital logic and electronic circuit design	1	2	3	4	5	DK
How a computer works	1	2	3	4	5	DK
How operating systems work e.g. Windows, Linux	1	2	3	4	5	DK
How people interact with computers	1	2	3	4	5	DK
How to build computer controlled robots	1	2	3	4	5	DK
How to write programs	1	2	3	4	5	DK
Information management	1	2	3	4	5	DK
Information systems analysis and design	1	2	3	4	5	DK
Legal / Professional / Ethical issues in computing	1	2	3	4	5	DK
Mathematics	1	2	3	4	5	DK
Project Management	1	2	3	4	5	DK
Report writing and program documentation	1	2	3	4	5	DK
Security issues and management e.g. computer viruses	1	2	3	4	5	DK
Software design	1	2	3	4	5	DK
Solving computer problems	1	2	3	4	5	DK
Testing computer programs and systems e.g. finding bugs	1	2	3	4	5	DK
Theory of programming languages	1	2	3	4	5	DK
Writing computer games	1	2	3	4	5	DK

30 **What are the MAIN problems you see yourself facing this year?**

Tick up to 4 of these.

I have not studied at university level and am unsure of what is expected	1
Making social contact because I do not know anyone	2
Having to travel a long way to attend classes	3
Having enough money to live on	4
Having enough money to buy books and equipment for the course	5
Not having a place where I can study properly	6
My ability to express myself well in discussion groups	7
My ability to express myself well in writing	8
Not knowing what is expected of me by lecturers and tutors	9
Other problems, please specify.________________________________	10
None of these	11

31.

What is your level of interest in the following topics?

Circle the number that applies to your choice.

*Circle **DK** if you don't know what the topic is about.*

	Nothing				*A great Deal*	
Building databases e.g. Access	1	2	3	4	5	DK
Communication and presentation skills	1	2	3	4	5	DK
Computer graphics and animations	1	2	3	4	5	DK
Computer networks	1	2	3	4	5	DK
Developing computer systems for businesses applications	1	2	3	4	5	DK
Developing computer systems for scientific/engineering applications	1	2	3	4	5	DK
Developing computer systems for the World Wide Web (Web)	1	2	3	4	5	DK
Developing computer systems for use in devices such as mobile phones	1	2	3	4	5	DK

Digital logic and electronic circuit design	1	2	3	4	5	DK
How a computer works	1	2	3	4	5	DK
How operating systems work e.g. Windows, Linux	1	2	3	4	5	DK
How people interact with computers	1	2	3	4	5	DK
How to build computer controlled robots	1	2	3	4	5	DK
How to write programs	1	2	3	4	5	DK
Information management	1	2	3	4	5	DK
Information systems analysis and design	1	2	3	4	5	DK
Legal / Professional / Ethical issues in computing	1	2	3	4	5	DK
Mathematics	1	2	3	4	5	DK
Project Management	1	2	3	4	5	DK
Report writing and program documentation	1	2	3	4	5	DK
Security issues and management e.g. computer viruses	1	2	3	4	5	DK
Software design	1	2	3	4	5	DK
Solving computer problems	1	2	3	4	5	DK
Testing computer programs and systems e.g. finding bugs	1	2	3	4	5	DK
Theory of programming languages	1	2	3	4	5	DK
Writing computer games	1	2	3	4	5	DK

Appendix C Student Interview Schedule

Perceptions and performance: ICT at Monash University

Draft Student Interview Schedule

Name:

Comment: The interview is confidential between you and I. No member of academic staff will hear or see your responses. They will not know what you, as an individual, have said about the course and your experiences.

How would you describe your reaction to the course so far?

What have been the main positive experiences in the course?

If there have been any negative experiences, can you describe them for me?

When you think about the feelings about the course:

- What do you now want from the course?
- The type of teaching you cope with
- The level of work you are having do
- The relationship between the skills you had on entering the course and how you are doing on the course.

What are the factors that, in your opinion, contribute most to success or failure on this course?

Appendix D Staff Interview Schedule

Perceptions and performance: ICT at Monash University

Draft staff Interview Schedule

Note: The aim of the interview is to get a feel for the way staff approach curriculum development in terms of what they understand about student background and knowledge.

What first year units are you teaching this year?

Can you tell me how you prepare a unit for delivery?

When you think about the average first year student how would you define:

> What they want from the course they are doing?
>
> The type of teaching they cope with
>
> The level of work you expect them to do
>
> The ICT skills you assume they will bring in.

What are the factors that, in your opinion, contribute most to success or failure in ICT courses?

Appendix E Student survey: data analysis results

Hours using a computer descriptives

Table 21 Survey data descriptives

NOTE The following table uses the means for all items. This is not necessarily appropriate but will give an indication of patterns.

	N	Minimum	Maximum	Mean	SD
Hours on computer	185	0	80	18.71	15.703
Hours on internet	185	0	70	7.87	10.462
Hours on email	185	0	30	2.18	3.153
Hours on chat	185	0	30	3.92	5.624
Hours on games	185	0	60	4.52	8.374
Hours on programming	185	0	30	1.57	3.510
Hours on Web pages	185	0	10	0.98	1.840

'Expect to Learn' items descriptives

The descriptives of the 26 'Expect to Learn' items used in Q29 are presented in Table 22. Appendix F gives some information on how these items might be structured.

Table 22 Descriptives for Expect to Learn items

Learn Data	N	Mean	SD
Building databases e.g. Access	162	3.33	0.971
Communication and presentation skills	169	3.27	0.931
Computer graphics and animations	173	2.83	1.206
Computer networks	172	3.60	0.902
Developing computer systems for businesses applications	173	3.46	0.979
Developing computer systems for scientific/engineering applications	170	3.08	1.049
Developing computer systems for the World Wide Web (Web)	172	3.58	0.904
Developing computer systems for use in devices such as mobile phones	172	2.80	1.138
Digital logic and electronic circuit design	168	2.94	1.146
How a computer works	175	4.05	0.856
How operating systems work e.g. Windows, Linux	173	3.83	0.928
How people interact with computers	176	3.64	0.903
How to build computer controlled robots	163	2.47	1.172
How to write programs	175	4.11	0.974
Information management	174	3.66	0.822
Information systems analysis and design	174	3.77	0.836
Legal / Professional / Ethical issues in computing	168	3.15	0.964
Mathematics	172	3.05	1.176

Project Management	171	3.50	0.942
Report writing and program documentation	172	3.53	0.939
Security issues and management e.g. computer viruses	173	3.46	0.886
Software design	174	3.69	0.977
Solving computer problems	174	3.91	0.882
Testing computer programs and systems e.g. finding bugs	171	3.78	0.955
Theory of programming languages	174	3.80	0.919
Writing computer games	170	2.69	1.222

'Interest' items descriptives

The descriptives of the 26 'Interest' items used in Q31 are presented in Table 23. Appendix F gives some information on how these items might be structured.

Table 23 Descriptives for Interest items

Interest Data	N	Mean	SD
Building databases e.g. Access	168	2.92	1.155
Communication and presentation skills	171	3.25	1.006
Computer graphics and animations	171	3.55	1.199
Computer networks	172	3.77	1.071
Developing computer systems for businesses applications	172	3.34	1.201
Developing computer systems for scientific/engineering applications	171	2.99	1.237
Developing computer systems for the World Wide Web (Web)	172	3.63	1.066
Developing computer systems for use in devices such as mobile phones	171	3.07	1.239
Digital logic and electronic circuit design	167	2.83	1.207
How a computer works	173	3.58	1.131
How operating systems work e.g. Windows, Linux	173	3.73	1.110
How people interact with computers	174	3.27	1.087
How to build computer controlled robots	168	2.86	1.322
How to write programs	171	3.84	1.165
Information management	172	3.30	1.065
Information systems analysis and design	170	3.31	1.141
Legal / Professional / Ethical issues in computing	169	2.72	1.234
Mathematics	171	2.81	1.342
Project Management	172	3.21	1.088
Report writing and program documentation	171	3.09	1.097
Security issues and management e.g. computer viruses	173	3.59	1.023
Software design	172	3.81	1.016
Solving computer problems	174	3.89	1.006
Testing computer programs and systems e.g. finding bugs	173	3.60	1.066
Theory of programming languages	172	3.14	1.206
Writing computer games	172	3.31	1.382

Course by Attitudes tables

The following tables are those that were statistically significant at or beyond the 0.05 level from an Analysis of Variance. The first block covers the questions in section 29 of the Survey (see Appendix 3) and the second covers section 31. They have been called the 'Expect to Learn' questions' and the 'Interest questions' respectively.

'Expect to Learn' items by course

Table 24 Expect to learn: Database -

Course	N	Mean	SD
Caulfield BITS	34	3.65	
Peninsula BITS	**15**	**4.00**	
Berwick BITS	23	3.57	
Gippsland BITS	9	3.33	
BCS	**20**	**2.80**	
BSE	11	2.82	
BBIS	28	3.18	
Other course	22	3.05	
Total	162	3.33	

Table 25 Expect to learn: Communication skills -

Course	N	Mean	SD
Caulfield BITS	35	3.26	0.886
Peninsula BITS	**15**	**3.80**	**0.676**
Berwick BITS	**23**	**3.70**	**0.926**
Gippsland BITS	9	3.11	1.054
BCS	22	3.00	0.535
BSE	15	3.27	0.961
BBIS	28	3.36	1.026
Other course	**22**	**2.73**	**0.985**
Total	169	3.27	0.931

Table 26 Expect to learn: Graphics -

Course	N	Mean	SD
Caulfield BITS	**37**	**2.30**	**1.024**
Peninsula BITS	15	2.33	1.047
Berwick BITS	**24**	**4.29**	**0.859**
Gippsland BITS	10	3.10	0.994
BCS	22	3.05	0.899
BSE	15	3.13	0.990
BBIS	27	2.48	1.252
Other course	23	2.39	1.033
Total	173	2.83	1.206

Table 27 Expect to learn: Networks -

Course	N	Mean	SD
Caulfield BITS	36	3.56	0.843
Peninsula BITS	**15**	**4.47**	**0.743**
Berwick BITS	23	3.52	0.730
Gippsland BITS	11	3.82	0.874
BCS	22	3.45	0.858
BSE	15	3.87	0.743
BBIS	**28**	**3.18**	**1.056**
Other course	22	3.59	0.854
Total	172	3.60	0.902

Table 28 Expect to learn: Scientific programming -

Course	N	Mean	SD
Caulfield BITS	35	3.00	1.057
Peninsula BITS	**15**	**2.67**	**1.047**
Berwick BITS	23	3.22	1.085
Gippsland BITS	10	2.80	0.919
BCS	23	3.39	0.891
BSE	**15**	**3.87**	**0.990**
BBIS	**26**	**2.65**	**1.093**
Other course	23	3.09	0.900
Total	170	3.08	1.049

Table 29 Expect to learn: Digital logic -

Course	N	Mean	SD
Caulfield BITS	33	2.91	1.128
Peninsula BITS	**15**	**2.53**	**0.834**
Berwick BITS	22	2.82	0.958
Gippsland BITS	9	2.89	1.269
BCS	23	2.91	1.164
BSE	**15**	**3.93**	**0.799**
BBIS	**27**	**2.48**	**1.282**
Other course	24	3.29	1.122
Total	168	2.94	1.146

Table 30 Expect to learn: Robots -

Course	N	Mean	SD
Caulfield BITS	33	2.42	1.173
Peninsula BITS	**15**	**2.00**	**1.069**
Berwick BITS	23	2.78	1.204
Gippsland BITS	7	2.14	1.676
BCS	**23**	**3.17**	**0.937**
BSE	13	2.54	1.127
BBIS	26	2.19	1.096
Other course	23	2.17	1.114
Total	163	2.47	1.172

Table 31 Expect to learn: Write programs -

Course	N	Mean	SD
Caulfield BITS	**38**	**4.50**	**0.762**
Peninsula BITS	15	3.93	0.961
Berwick BITS	24	4.21	0.779
Gippsland BITS	**11**	**4.36**	**0.674**
BCS	**22**	**4.36**	**0.848**
BSE	15	4.13	1.125
BBIS	**27**	**3.37**	**1.149**
Other course	23	3.96	0.976
Total	175	4.11	0.974

Table 32 Expect to learn: Information Management -

Course	N	Mean	SD
Caulfield BITS	**38**	**4.00**	**0.838**
Peninsula BITS	15	3.80	0.561
Berwick BITS	23	3.70	0.876
Gippsland BITS	10	3.80	0.632
BCS	**23**	**3.35**	**0.775**
BSE	15	3.67	0.724
BBIS	27	3.52	0.893
Other course	23	3.39	0.839
Total	174	3.66	0.822

Table 33 Expect to learn: IS analysis -

Course	N	Mean	SD
Caulfield BITS	**38**	**4.18**	**0.652**
Peninsula BITS	15	3.73	0.704
Berwick BITS	23	3.65	0.832
Gippsland BITS	11	3.91	0.701
BCS	**23**	**3.43**	**0.843**
BSE	15	3.87	0.834
BBIS	26	3.54	0.989
Other course	23	3.70	0.876
Total	174	3.77	0.836

Table 34 Expect to learn: Mathematics -

Course	N	Mean	SD
Caulfield BITS	36	2.89	0.919
Peninsula BITS	14	2.86	1.027
Berwick BITS	23	3.17	0.984
Gippsland BITS	10	3.30	1.252
BCS	**23**	**3.70**	**1.146**
BSE	**15**	**3.73**	**1.033**
BBIS	**27**	**2.52**	**1.341**
Other course	24	2.75	1.294
Total	172	3.05	1.176

Table 35 Expect to learn: Software design -

Course	N	Mean	SD
Caulfield BITS	38	3.63	0.998
Peninsula BITS	**15**	**3.33**	**1.113**
Berwick BITS	23	3.87	0.815
Gippsland BITS	**11**	**4.36**	**0.809**
BCS	22	3.41	0.734
BSE	**15**	**4.40**	**0.828**
BBIS	27	3.41	1.010
Other course	23	3.65	1.027
Total	174	3.69	0.977

Table 36 Expect to learn: Program testing -

Course	N	Mean	SD
Caulfield BITS	38	3.97	0.716
Peninsula BITS	13	3.62	1.261
Berwick BITS	23	3.78	0.736
Gippsland BITS	**11**	**4.36**	**1.120**
BCS	22	4.00	0.690
BSE	14	4.07	0.997
BBIS	**27**	**3.26**	**1.059**
Other course	23	3.52	1.039
Total	171	3.78	0.955

Table 37 Expect to learn: Language theory -

Course	N	Mean	SD
Caulfield BITS	38	3.97	0.885
Peninsula BITS	15	3.80	0.862
Berwick BITS	23	3.52	0.730
Gippsland BITS	**11**	**4.27**	**0.905**
BCS	22	3.95	0.785
BSE	15	4.00	1.134
BBIS	**27**	**3.26**	**0.944**
Other course	23	3.91	0.900
Total	174	3.80	0.919

Table 38 Expect to learn: Write games -

Course	N	Mean	SD
Caulfield BITS	35	2.69	1.022
Peninsula BITS	**14**	**2.00**	**1.038**
Berwick BITS	24	3.96	0.955
Gippsland BITS	11	2.73	1.489
BCS	22	2.64	0.848
BSE	15	2.93	1.438
BBIS	**27**	**2.11**	**1.121**
Other course	22	2.32	1.086
Total	170	2.69	1.222

‘Interest’ items by course

Table 39 Interest: Graphics -

Course	N	Mean	SD
Caulfield BITS	34	3.12	1.200
Peninsula BITS	**15**	**2.53**	**0.990**
Berwick BITS	**23**	**4.43**	**1.037**
Gippsland BITS	11	3.64	1.206
BCS	23	3.57	0.843
BSE	16	3.81	1.377
BBIS	27	3.74	1.095
Other course	22	3.50	1.144
Total	171	3.55	1.199

Table 40 Interest: Networks -

Course	N	Mean	SD
Caulfield BITS	35	3.89	0.932
Peninsula BITS	**15**	**4.53**	**0.743**
Berwick BITS	**23**	**3.30**	**1.146**
Gippsland BITS	11	3.73	1.191
BCS	23	3.70	1.185
BSE	16	4.19	0.981
BBIS	27	3.52	1.051
Other course	22	3.68	1.041
Total	172	3.77	1.071

Table 41 Interest: Develop business -

Course	N	Mean	SD
Caulfield BITS	**35**	**3.86**	**1.089**
Peninsula BITS	15	3.47	1.125
Berwick BITS	23	3.00	1.206
Gippsland BITS	11	3.09	1.578
BCS	**23**	**2.91**	**1.240**
BSE	16	3.81	1.109
BBIS	27	3.37	0.967
Other course	22	3.00	1.234
Total	172	3.34	1.201

Table 42 Interest: Develop scientific -

Course	N	Mean	SD
Caulfield BITS	34	3.12	1.274
Peninsula BITS	**15**	**2.40**	**1.056**
Berwick BITS	22	2.68	1.287
Gippsland BITS	11	2.45	1.635
BCS	23	3.04	1.107
BSE	**16**	**4.00**	**0.730**
BBIS	27	2.63	1.079
Other course	23	3.39	1.158
Total	171	2.99	1.237

Table 43 Interest: Digital logic -

Course	N	Mean	SD
Caulfield BITS	31	2.71	1.160
Peninsula BITS	15	2.53	1.187
Berwick BITS	**23**	**2.39**	**1.158**
Gippsland BITS	11	2.82	1.401
BCS	23	2.83	1.114
BSE	**15**	**3.53**	**0.834**
BBIS	26	2.54	1.334
Other course	23	3.48	1.082
Total	167	2.83	1.207

Table 44 Interest: Computer works -

Course	N	Mean	SD
Caulfield BITS	35	3.49	1.040
Peninsula BITS	15	4.27	1.033
Berwick BITS	**23**	**3.26**	**1.137**
Gippsland BITS	11	3.91	1.044
BCS	23	3.35	0.832
BSE	**15**	**4.13**	**1.060**
BBIS	**28**	**3.21**	**1.371**
Other course	23	3.78	1.085
Total	173	3.58	1.131

Table 45 Interest: Operating Systems -

Course	N	Mean	SD
Caulfield BITS	35	3.94	0.838
Peninsula BITS	**15**	**4.47**	**0.915**
Berwick BITS	**23**	**3.22**	**1.043**
Gippsland BITS	11	3.55	1.128
BCS	23	3.61	0.783
BSE	**16**	**4.63**	**0.806**
BBIS	**27**	**3.22**	**1.251**
Other course	23	3.65	1.335
Total	173	3.73	1.110

Table 46 Interest: Write programs -

Course	N	Mean	SD
Caulfield BITS	35	3.91	1.095
Peninsula BITS	**15**	**3.07**	**1.387**
Berwick BITS	22	3.50	1.185
Gippsland BITS	11	4.09	1.136
BCS	23	4.22	0.902
BSE	**15**	**4.47**	**0.640**
BBIS	28	3.54	1.319
Other course	22	4.05	1.090
Total	171	3.84	1.165

Table 47 Interest: Legal, etc. issues -

Course	N	Mean	SD
Caulfield BITS	35	2.91	1.173
Peninsula BITS	**15**	**3.27**	**1.163**
Berwick BITS	23	2.35	1.229
Gippsland BITS	**11**	**1.73**	**0.905**
BCS	21	2.48	1.327
BSE	15	2.93	0.884
BBIS	27	3.00	1.271
Other course	22	2.68	1.323
Total	169	2.72	1.234

Table 48 Interest: Mathematics -

Course	N	Mean	SD
Caulfield BITS	33	2.39	1.273
Peninsula BITS	**15**	**2.07**	**0.961**
Berwick BITS	23	2.65	1.301
Gippsland BITS	11	2.91	1.578
BCS	22	3.27	1.202
BSE	**16**	**3.69**	**1.250**
BBIS	28	2.57	1.200
Other course	23	3.26	1.484
Total	171	2.81	1.342

Table 49 Interest: Software design -

Course	N	Mean	SD
Caulfield BITS	35	3.83	0.954
Peninsula BITS	**15**	**3.13**	**1.125**
Berwick BITS	24	3.83	1.129
Gippsland BITS	11	4.00	0.894
BCS	22	3.82	0.958
BSE	**16**	**4.50**	**0.632**
BBIS	27	3.52	1.051
Other course	22	3.95	0.950
Total	172	3.81	1.016

Table 50 Interest: Language Theory -

Course	N	Mean	SD
Caulfield BITS	35	3.09	1.173
Peninsula BITS	15	2.87	1.125
Berwick BITS	23	3.00	1.243
Gippsland BITS	11	3.18	1.328
BCS	22	3.55	1.184
BSE	**16**	**3.88**	**0.885**
BBIS	**28**	**2.57**	**1.136**
Other course	22	3.32	1.249
Total	172	3.14	1.206

Table 51 Interest: Write games -

Course	N	Mean	SD
Caulfield BITS	35	3.14	1.438
Peninsula BITS	**15**	**2.33**	**0.816**
Berwick BITS	23	3.74	1.544
Gippsland BITS	11	3.64	1.433
BCS	22	3.45	1.224
BSE	**16**	**4.13**	**1.088**
BBIS	28	3.11	1.257
Other course	22	3.14	1.521
Total	172	3.31	1.382

Performance of each core unit by participation in study

Table 52 Cross tabulation of FIT1001 performance by participated in study

			FIT1001					Total
			N	HD	D	C	P	
Participated	Yes	Count	11	10	16	20	7	64
		Expected Count	16.1	10.5	11.6	14.2	11.6	64.0
	No	Count	72	44	44	53	53	266
		Expected Count	66.9	43.5	48.4	58.8	48.4	266.0
Total		Count	83	54	60	73	60	330
		Expected Count	83.0	54.0	60.0	73.0	60.0	330.0

Table 53 Cross tabulation of FIT1002 performance by participated in study

			FIT1002_A					Total
			N	HD	D	C	P	
Participated	yes	Count	5	26	8	7	5	51
		Expected Count	14.1	18.1	5.9	6.4	6.5	51.0
	no	Count	84	88	29	33	36	270
		Expected Count	74.9	95.9	31.1	33.6	34.5	270.0
Total		Count	89	114	37	40	41	321
		Expected Count	89.0	114.0	37.0	40.0	41.0	321.0

Pearson Chi-Square 12.515 (4) alpha=0.014

Table 54 Cross tabulation of FIT1003 performance by participated in study

			FIT1003					Total
			N	HD	D	C	P	
Participated	yes	Count	10	3	10	14	11	48
		Expected Count	9.1	4.2	9.8	14.7	10.3	48.0
	no	Count	40	20	44	67	46	217
		Expected Count	40.9	18.8	44.2	66.3	46.7	217.0
Total		Count	50	23	54	81	57	265
		Expected Count	50.0	23.0	54.0	81.0	57.0	265.0

Performance of FIT1001 by participation in study

Table 55 Comparison of performance in FIT1001 across courses for participants

Course		FIT1001 final grade						Total
		N	HD	D	Credit	Pass	DNS	
Caulfield BITS	Count	2	2	7	7	5	7	30
	Expected Count	2.8	2.5	4.3	5.5	1.8	13.1	30.0
Peninsula BITS	Count	0	1	1	5	0	3	10
	Expected Count	.9	.8	1.4	1.8	.6	4.4	10.0
Berwick BITS	Count	0	1	3	2	0	10	16
	Expected Count	1.5	1.3	2.3	3.0	.9	7.0	16.0
Gippsland BITS	Count	3	1	1	1	0	2	8
	Expected Count	.7	.7	1.1	1.5	.5	3.5	8.0
BCS	Count	2	0	2	4	1	5	14
	Expected Count	1.3	1.2	2.0	2.6	.8	6.1	14.0
BSE	Count	2	1	2	2	0	1	8
	Expected Count	.7	.7	1.1	1.5	.5	3.5	8.0
BBIS	Count	0	4	1	0	1	8	14
	Expected Count	1.3	1.2	2.0	2.6	.8	6.1	14.0
Other course	Count	2	0	0	1	0	16	19
	Expected Count	1.8	1.6	2.7	3.5	1.1	8.3	19.0
Total	Count	11	10	17	22	7	52	119
	Expected Count	11.0	10.0	17.0	22.0	7.0	52.0	119.0
Pearson Chi-Square		65.497 df = 35 alpha 0.001						

Relationship between prior study of IT and unit results

Table 56 Comparison of results for FIT1001 based on prior IT study

Prior IT study	N	Mean	SD
No IT study	16	66.9	21.3
Year 11 IT study	9	58.6	26.1
Year 12 IT study	36	59.1	22.3

Table 57 Comparison of results for FIT1002 based on prior IT study

Prior IT study	N	Mean	SD
No IT study	16	78.5	22.5
Year 11 IT study	7	71.6	32.7
Year 12 IT study	27	75.7	17.5

Table 58 Comparison of results for FIT1003 based on prior IT study

Prior IT study	N	Mean	SD
No IT study	14	57.8	19.1
Year 11 IT study	4	54.5	38.9
Year 12 IT study	25	57.4	19.3

Appendix F Student survey: learning and interest items analysis

The Nature of Interests and Learning

Self-reported interests in things are often measured when looking at student behaviour. This can be done with conventional interest inventories or with simplified measures such as the one used in this study. In order to establish what the ‘Expect to Learn’ and ‘Interest’ items in in this survey meant, a factor analysis was carried out. This enabled a higher level view of the interest items and enabled us see any relationships between the items.

Seven factors were found for each group. There were similarities in four factors across the groups, namely, Programming theory and practice, Information systems and management, Games applications and Computer technology.

‘Expect to Learn’ Items

The results of the factor analysis (see Table 61, p.76) showed that there were seven factors that account for the common variation between the items. These can be described as:

1. Programming theory and practice: 14, 22-25
2. Information systems and management: 2, 12, 15-17, 19-21
3. Games applications: 3, 26
4. Computer technology: 10, 11
5. Digital logic: 9
6. Embedded applications: 8
7. WWW applications: 7

There are 3 questions that load on no particular factor.

What appears to be the case is that questions 5 through 8 do not measure anything that is in common with the other questions. An attempt to force them into a factor structure reduced the information content of the results.

‘Interest’ Items

The results of the factor analysis (see Table 62, p.77) showed that there were seven factors that account for the common variation between the items. These can be described as:

1. Information systems and management: 2, 15-16, 19-20 [12][17]
2. Programming theory and practice: 14, 22, 25 [24][26]
3. Applications development: 5, 7, 8
4. Computer technology: 10, 11
5. Games applications: 3, 13 [26] (graphics + robots)
6. Scientific applications: 6, 9, 18 (weak)
7. Databases: 1 (weak)

Five questions had mixed loading and they are shown in square brackets.

Factor Analysis of 'Expect to Learn' items

The rotated factor structure is presented based on a Varimax rotation of a Principle Axes solution using an eigen value of > 1.00 as the cut-off for factor selection. Any factor loading with a value < 0.1 or > -0.1 is not presented.

Table 59 Rotated Factor Matrix

Interest items	Factor						
	1	2	3	4	5	6	7
Database		.336		.402		.346	-.107
Communication skills		.662	.276	.238	-.201	.181	-.103
Graphics		.160	.763				
Networks	.126	.127		.247		.393	
Develop business applications	.473	.215	-.135		.222	.458	.338
Develop scientific applications	.285		.142		.527	.467	
Develop Web applications	.276	.117	.283	.244		.176	.594
Develop embedded applications		.120	.366		.291	.643	.101
Digital logic	.166	.121		.154	652		.112
Computer works	.146	.160	-.197	.718			
Operating systems	.216	.206		.686		.153	.105
HCI	.262	.516		.157	-.114	.119	
Robots			.441		.440	.191	
Write programs	.658	.120		.147		.134	.125
Information management	.210	.646	-.102	.178		.151	.173
Information systems analysis	.301	.632	-.170	.208	.104	.134	.222
Legal etc issues		.661	.122		.153		
Mathematics	.314		.189	.153	.408		-.234
Project management	.270	.569	.125		.101	.180	-.162
Documentation	.265	.546	.126	.112	.208		
Security	.119	.408		.438	.223		.298
Software design	.608	.133	.163		.234		.237
Problem solving	.665	.328		.192			
Program testing	.774	.220	.138	.160	.102	.111	
Language theory	.693	.191			.244	.156	
Write games applications	.210		.695		.151		

Table 60 Factor structure of 'Expect to Learn' items

Course	Topics students expect to learn
Programming theory and practice	Writing programs Software design Solving computer problems Program testing Language theory
Information systems and management	Communication skills HCI Information management Information systems analysis and design Legal/professional/ethical issues Project management Documentation Security
Games applications	Graphics Writing computer games
Computer technology	How a computer works Operating systems
Digital logic	Digital logic
Embedded applications	Developing embedded computer systems
WWW applications	Developing computer systems for the WWW

Factor Analysis of 'Interest' questions

The rotated factor structure is presented based on a Varimax rotation of a Principle Axes solution using an eigen value of > 1.00 as the cut-off for factor selection. Any factor loading with a value < 0.1 or > -0.1 is not presented.

Table 61 Rotated Factor Matrix

Interest item	Factor						
	1	2	3	4	5	6	7
Database	.263	.133	.259	.236		.162	.499
Communication skills	.543	-.218		.156	.287		.373
Graphics		.104			.701		
Networks	.230	.198	.301	.361	-.107	.143	.208
Develop business applications	.425	.114	.643	.114		.154	.115
Develop scientific applications	.134	.285	.368	.159		.587	
Develop Web applications		.300	.637		.110		
Develop embedded applications	.215		.659	.118	.268	.225	
Digital logic	.144		.263	.248	.200	.594	
Computer works	.176	.134		.841	.127		
Operating systems	.217	.266	.122	.674			.118
HCI	.466		.278	.303	.136		.170
Robots		.197	.340	.107	.569	.216	
Write programs		.693			.163		
Information management	.768	.149	.265				
Information systems analysis	.734	.169	.279	.143			.116
Legal etc issues	.522		.371	.132			.190
Mathematics		.302	-.108			.514	.193
Project management	.708			.191		.204	
Documentation	.675	.105		.161		.178	
Security	.280	.323	.137	.463			.270
Software design		.632	.110	.147	.329	.158	.110
Problem solving	.188	.533	.175	.354		.138	.179
Program testing	.169	.491	.310	.195		.125	.124
Language theory	.211	.584		.311		.273	-.173
Write games applications		.479			.588		-.332

Table 62 Factor structure of 'Interest' items

Course	Topics of interest
Information systems and management	Communication skills Information management Information systems analysis and design Project management Documentation [HCI] [Legal/professional/ethical issues]
Programming theory and practice	Writing programs Software design Language theory [Program testing] [Writing computer games]
Applications development	Developing business applications Developing computer systems for the WWW Developing embedded computer systems
Computer technology	How a computer works Operating systems
Games applications	Graphics Robots [Writing computer games]
Scientific applications (weak)	Developing scientific applications Digital logic Mathematics
Databases (weak)	Databases

Exploring the 'Interest' factors

The mean values of items for each 'Interest' factor showed that the highest interest levels were for Computer technology and Programming theory and practice and the lowest for Scientific applications and Database.

The high and low interest levels across each course are shown in Table 63 (p.78). The highest levels of interest were shown in the BSE course. The mean values were compared across each course using ANOVA tests. This showed significant differences across each course for each factor except Database.

Table 63 High and low level interest factors for each course

Course	Factor with highest level of interest	Factor with lowest level of interest
Berwick BITS	Games applications Programming theory and practice Computer technology	Computer technology Scientific applications Database
Caulfield BITS	Computer technology Programming theory and practice Applications development	Scientific applications
Clayton BCS	Programming theory and practice	Information systems and management
Clayton BSE	Programming theory and practice Applications development Computer technology Games applications Scientific applications	Database
Clayton BBIS		Computer technology Scientific applications Database
Gippsland BITS	Programming theory and practice Computer technology	Information systems and management Scientific applications Database
Peninsula BITS	Computer technology	Programming theory and practice Games applications Scientific applications

Appendix G Summary of Key Findings

Exploring students' perceptions of their course

Student profile (section 6.1)

Monash was the first preference for most students wishing to study IT at the undergraduate level.

Although the parent/teacher/friend structure has been shown to be the most frequently used source of advice on course selection, students base their decisions on internal factors. The strongest factors were interest, challenge and perceiving the course as a good pathway into IT.

Most students who enter FIT undergraduate courses have some prior knowledge of a programming language.

Student expectations (section 6.2)

Students' expectations of the time that they would need to spend on their IT coursework outside class is far below the recommended time.

The problems that students saw they would have in doing their course were based upon uncertainty in expectations about university and course activities

Students expected to learn better in small interactive classes rather than in lectures or working outside class.

Few students were unable to articulate what they would be learning in their course in an open-response question.

Students' expectations of what they would be learning and not learning in their course, as nominated from a list of topics, are broadly in line with the course content.

Within each course, there was substantial alignment with students' interests in aspects of IT and their expectations of what they would be learning in their course.

Student experiences (section 6.3)

Students valued the use of practical examples to explain theoretical and difficult concepts.

Students found tutorials more engaging and valuable learning environments than lectures.

Most students found that it took time to adapt to the university teaching environment.

Students disliked having assessment tasks where the marks allocated did not appear to be aligned with the amount of work required.

Students did not appear to have a defined set of time management practices.

Students claimed that interest and curiosity were important factors in course performance. Few students mentioned VCE IT subjects as being useful.

Student performance and progression (section 6.4)

The retention rates varied across courses, with the Caulfield BITS students having higher retention rates than would be expected and students from other courses having lower retention rates.

Self-perceptions of performance were not good predictors of actual performance.

Students with English as a first language achieved higher results in FIT1002 Computer Programming than students who had English as a second language.

Students entered their course from secondary school achieved higher results in FIT1002 Computer Programming than those who had other pathways.

Students who had prior knowledge of programming achieved higher results in FIT1002 Computer Programming than those with no prior knowledge.

Students who had no prior IT study achieved higher results than those with prior study, although this difference was not significant.

There were very few relationships between the measures of interest in topics and unit results.

Students who claimed that they chose their course to extend their knowledge and skills or because they perceived it as an interesting and challenging course were more likely to have dropped out of FIT1001 Computer Systems than those that did not nominate these reasons. However, students who claimed that they had no clear reason were less likely to have dropped out.

Students who perceived a problem that they didn’t know what was expected of them were more likely to have dropped out of the FIT1001 Computer Systems than those that did not nominate this problem.

Exploring staff understanding of the attitudes and knowledge that students bring into their course and the role this has on unit design and delivery.

The learning environment (section 7.1)

The students’ experience with teaching staff was perceived as being shaped by the quality of their interactions with their tutors.

Teaching staff believed that making lecture notes available to students on the Web resulted in many students failing to attend lectures, and affected the way students engaged intellectually with the content.

The lecture format was perceived as being impersonal and passive a teaching method.

Tutorials were perceived as providing students with the most engagement in their learning.

Adaptation to university (section 7.2)

Teaching staff perceived that the majority of students did not meet work level expectations.

Teaching staff claimed that most students are ‘part-time’ students and have many time constraints imposed on them.

Most teaching staff agreed that no expectation can be made about what ICT skills students bring into their course; however some did expect students to have basic computer, word processing, internet and numeracy skills.

Expectation about IT degree (section 7.3)

Teaching staff perceived that:

Many students are fairly naïve, and they have not thought about why they want to do IT or considered their motivations for doing it. Some students do an IT degree because it is the only degree they can get into.

Many students are unaware of what is in their course and do not know what they are going to learn in each unit. Students may see a unit name and synopsis but they have little idea of what is actually involved in it. This is often because they do not do any pre-reading and they do not understand the jargon used in the handbooks

Overall, there are some students who do understand what their degree involves and who know where they want to be, and there are others who have a very basic, or no, understanding of what is involved and where they want to be.

Factors affecting success/failure of students in IT degree (section 7.4)

Teaching staff perceived that:

Motivation is seen as a major contributing factor to students' success or failure in their degrees.

Students who make a genuine attempt and effort would have little likelihood or reason to fail.

Students would be more likely to succeed if they improved their communication skills and strengthened their analytical skills.

Successful students make good use of resources

A selection process that takes into account many dimensions of the students' life may affect whether a student succeeds or fails

Appendix H Summary of Recommendations

Recommendation 1: That the Faculty investigate ways in which information about study habits and coursework regimes may be better imparted to first year students.

Recommendation 2: That lecturers be encouraged to supply meta-level information as part of their unit delivery: such information to supply broader, contextual views, which relate unit content to course objectives and outcomes, as well as to immediately adjacent units within the curriculum.

Recommendation 3: That lecturers be encouraged to a "less is more" approach (Biggs, 1999) to unit content, and provide on-going revision sessions.

Recommendation 4: That the faculty support better feedback from students on their progress throughout each unit, by using technology such as the "Personal Response Systems" already available within the faculty. These systems can be used to improve the interactiveness of the lecture mode of presentation.

Recommendation 5: That a set of faculty-wide resources directed at study skills, analytical skills, and English language skills be made available to students, and publicized widely.

Recommendation 6: That outcomes from this study be made available to staff so that they may better inform incoming students and improve their understanding of ICT courses, and the relationships between their backgrounds and successful graduation.