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Title:

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Date:

2005

Citation:

Moffat, A., HUGHES, B. M., SONDERGAARD, H. C. & GRUBA, P. A. (2005). Making Connections: First Year Transition for Computer Science and Software Engineering Students. Young, A (Ed.) Tolhurst, D (Ed.) Proceedings of the Seventh Australasian Computing Education Conference, 42, pp.229-238. Australian Computer Society.

Publication Status:

Published

Persistent Link:

<https://hdl.handle.net/11343/34046>

Making Connections: First Year Transition for Computer Science and Software Engineering Students

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Abstract

During the last decade, an increasing emphasis has been placed on the need for carefully planned transition programs to help first-year students integrate into university. In this paper we critically examine our experiences in designing and running successive transition programs for Computer Science and Software Engineering students. Over the last three years we have trialled several models. At present, our program requires all entering students to be enrolled in a transition subject, “Making Connections”, which runs for half a semester. The subject, led by designated academic staff, serves as a forum for students to learn about each other, the department and the university. The program includes a computer-based language and study skills assessment component, including self-assessment tasks. Students can extend the subject by taking academic skills workshops run by the university’s student support services. We have found compulsion to be a useful facilitator of student engagement, and the addition of an objective assessment task has been beneficial.

1 Introduction

There is now considerable consensus about the need for universities to develop first-year transition programs. A concern about rising drop-out rates, particularly amongst non-traditional and international students, and a growing sense of student disengagement, has prompted action. The importance of developing effective transition programs is well recognised within Australia (DETYA 1999, Levy, Osborn & Plunkett 2003, McInnis & James 1995, McInnis, James & Hartley 2000) and beyond (Ward-Roof & Hatch 2003, Upcraft, Gardner & Barefoot 2005), and the literature related to transition programs is growing. More than 15 years ago, Nicholson (1987) saw the need for transition support; identified key areas requiring attention: institutional, learning, social, technological, communication; and a number of important transition contexts including from secondary to tertiary education. Dalziel & Peat (1998) evaluate a transition workshop program and provide tentative evidence of its positive impact. Pearson, Roberts, O’Shea & Lupton (2000) provides the view from the research-focused university. Levy et al. (2003) investigate international students’ academic and social transition requirements. Entire conferences are now devoted to

student orientation and transition in the USA (*Students in Transition*) as well as in our region (*Pacific Rim First Year in Higher Education Conference*).

In this paper we relate our experiences in developing a transition program over three years in the Faculty of Engineering at the University of Melbourne. We focus on how it has been instantiated in our home department, Computer Science and Software Engineering, in Semester 1, 2004.

Although a large number of first-year students are enrolled in computing subjects, the department has “ownership” of only 100–120 first-year students in computer science and software engineering programs. Approximately one third of our first-year students are international students; nearly half of them are enrolled in combined degrees with the Faculties of Arts, Commerce, Law, and Science. By and large the incoming students are strong academically as demonstrated by their entrance scores.

Our transition program has changed repeatedly over the last four years. Until 2003, it was organised on a Faculty-wide basis as a non-assessed, non-compulsory, opt-in program. Despite revisions and exhortations, we witnessed a pattern over the years in which initial sessions were well-attended and later sessions were not. Similar observations have been made by Elliott (1995).

In 2004, we revised once again. In its current form, all students entering the faculty are automatically enrolled in a mandatory transition subject taught by their home department. Positioning transition as a formal subject – albeit with no credit points or fees attached – was a significant step forward in the maturation of our efforts. Notably, results from the zero-credit subject are permanently written into each student transcript.

Each of the six departments in our faculty runs a transition subject for a required six sessions. A further four sessions are conducted by the university’s Language and Learning Skills Unit (LLSU). In week 4 of semester, all students are required to sit an “Engineering Study Skills Assessment” (ESSA) exercise. This on-line evaluation instrument is designed to identify students who may need additional support as they make the adjustment to an academic environment. Students who perform poorly in the ESSA, for example, are encouraged to attend the LLSU sessions regarding writing skills, reading comprehension, and working in teams.

In the balance of this paper we review the rationale for running a transition program (Section 2); describe the factors that have contributed to our current transition program (Section 3); provide details of this year’s program (Section 4); discuss the objectives of the ESSA and the instrument used (Section 5); examine student feedback on the 2004 program (Section 6); and, finally, reflect on what we have learned in 2004 (Section 7).

2 Why a transition program?

First-year transition programs are now common in Australian universities and take many different forms. Most were started in response to the growing realization that many students need help to settle in and engage with university study. Ramsden (2003) writes:

We easily forget how students can experience a sense of dis-orientation owing to a rapid shift from an ordered and familiar environment to one of considerable freedom. It is apparent from several studies of transition from school to university and students' early experiences of higher education that the first few weeks of their studies are critical to success.

Valuable information about the first-year experience in Australian universities is available in DEET and CAUT reports. In one, McInnis et al. (2000) noted several reasons to focus on first-year transition issues. They found, for example, that two out of three students felt they were ill-prepared for university study. One in three did not feel ready to choose a course. One in three seriously considered deferring during first semester. High first-year drop-out and failure rates continued to be a problem. McInnis et al. (2000) found that outside work commitments, a detriment to serious academic engagement, appeared to be growing amongst students and suggested that

it appears that university study occupies a smaller proportion of a growing number of students' lives. The slight but noteworthy decline in motivation to study, the increase in the hours of paid work, and the trend towards less engagement with the university have implications ...

Our transition program itself has undergone a series of revisions over the last three years. Importantly, it now consumes more resources than ever. In the following section, we discuss the main reasons we mounted a substantial, structured transition program for first-year students for our own department, as part of a concerted effort throughout the entire faculty.

2.1 Examining roles

Many new students have a simplistic understanding not only of how a university functions, but also of their own role within the institution. Students who identify strongly with their department and the wider university are likely to perform better. One way to encourage a strong affiliation is to make an effort to help students understand the institution and the people who work in it. A transition program provides a useful forum for discussing academic rights and responsibilities amongst both students and staff. What do staff expect from students, and what should students expect from staff? How do student/staff relationships differ, compared to those at school?

2.2 Explaining university culture and values

Each university has its own tacit set of norms and values that successful students eventually come to understand. In the press of daily teaching, we have little time to explicitly discuss issues such as respect, openness to ideas, commitment to truth and wider academic values. And yet students are expected to conform with university rules and standards on responsible behaviour. An effective transition program quickens the pace of assimilation into an academic culture through the clarification of expectations.

2.3 Informing about resources

Progress interviews sometimes expose a failing student's lack of knowledge about the variety of support units available on campus. A transition program is a convenient vehicle for delivering information about libraries, computing resources, student societies, student health services, learning support, and grievance procedures.

2.4 Providing a networking opportunity

One of the most important aims of a transition program is to provide students with ample opportunities to meet classmates and develop friendships. The importance, for most students, of a social network is obvious. A student interviewed by McInnis & James (1995) put it this way:

...if you don't make contacts in the first two weeks it's most likely that you are not going to make those contacts for the rest of the year. That first fortnight is so crucial. If you know no-one by the end of those two weeks you will be one of those people walking around and very rarely seeing anyone you can say hello to, unless they are from your old school.

2.5 Facilitating early intervention

In light of high failure rates in first-year subjects, many subjects have adopted mid-semester tests that allow students to receive timely feedback. The faculty attempts to monitor student performance across subjects, to identify at-risk students as early as possible. To provide triangulation in this at-risk exercise, we have long wanted to assess the language and learning skills for all new students. Such an evaluation would allow us to refer students with possible language problems for further assessment, and to recommend suitable learning skills programs.

For maximum impact, a study skills instrument would need to be compulsory. In Section 4 we explain how this has been achieved.

3 Previous approaches

The 2004 program is the result of several years of development. To put these efforts in perspective, it is important to understand that each annual effort made by the Faculty of Engineering formed part of a much larger campus-wide initiative. Since 1990 the University of Melbourne has had a purpose-built "Transition Program" that is run by a dedicated manager, two full-time project officers, and casual staff. Tailor-made resources for academic staff include a professionally produced video, a "Tips for teaching first year students" kit, and guidelines for developing student mentoring programs. Additionally, each faculty has created its own program. Every year, the university hosts an internal half-day conference to promote and showcase transition issues.

Within the overall university context, a description of the 2003 Faculty of Engineering transition program provides further basis for understanding our current thinking. Frustrated by poor attendance and scheduling difficulties in previous years, in 2003 the faculty arranged to have a one hour per week time-slot placed in each student schedule. Although named "Engineering Communications", incoming first-year students were not provided with any further information. On their initial arrival at the designated room, students were given details of the sequence of five

sessions that would be offered. Topics included an warm-up “meet your neighbours” exercise; a study skills session; discussion of diversity issues; a “what is my research about” lecture by a senior academic; and a discussion of university and academic goals and ideals. The program ran in first semester for the main intake of local and international students, and again on a smaller scale in the second semester to cater for the mid-year entry cohort.

Two significant problems emerged in 2003. Once again, strong attendance at the start was weak by the end. Because of the “lure them in” approach that exploited students’ lack of understanding of their timetable, most students attended initial sessions. After that, however, it was downhill. By the fifth week, less than half of the students were attending. Rooms scheduled for classes of 60 had as few as 15–20 in attendance. Poor attendance, we know, is a pervasive problem with all opt-in programs – while students may be willing to admit that they benefit from a transition program, they also find it easy to stay away. Ironically, students who stay away are perhaps the ones with the most to gain from a transition program.

The second problem in 2003 was one of relevance. Because the program was run on a whole-of-faculty basis, the student cohorts were mixed across degree streams. The computer science and software engineering students, for example, were scattered amongst civil, chemical, environmental, geomatic and mechanical engineering students. As a result, our “making new friends and forming a study group” part of the program was compromised. Additionally, academic staff who lectured were not necessarily from the students’ departments. Having computing students addressed by staff and senior students from mechanical engineering, for example, was less than ideal.

In an administrative sense, there was a further issue that also became apparent – two of the departments in the faculty believed in the program and contributed strongly to it, with both ideas and staff, while other departments were largely passive and showed little interest in what was being done for their students.

On the plus side, we were able to generate positive campus-wide publicity through a “photo safari” activity. A set of clues and a disposable camera was given to each group of 5–7 students. The group had to solve the clues collectively and take a photo of themselves in front of the clue solution. Valuable prizes were awarded to the winners of the competition. Participating staff, too, were acknowledged with a small gift.

4 The 2004 program

Several changes were introduced in 2004 to improve the usefulness and reach of our program.

4.1 Making it mandatory

After extensive discussions in the second half of 2003, the faculty made a transition program compulsory. Each department, including our own, was to create a formal subject, and the relevant degree regulations were amended to stipulate enrolment in the first semester of attendance. The subjects were weighted at zero points, and a tacit understanding was reached that non-completion would not be regarded as an obstacle to graduation; nevertheless, it was well understood that adding a pass/fail mark to the students’ transcripts was a significant escalation of emphasis. Transition was to be taken seriously by all, staff and student alike.

Making transition a formal subject of the university implied assessment criteria. After considerable debate it was agreed that attendance had to be a key requirement. Accordingly, students were informed that to pass the subject they must attend four or more of the six sessions scheduled. A second agreement resulted in the requirement that students must attempt the ESSA.

We also set learning objectives, suggesting that, at the completion of the subject, students would:

- understand their roles, rights and responsibilities in the university;
- have an understanding of the university as a source of critical thought, a place of discovery and application of knowledge, as well as a provider of teaching, learning and service to the wider community;
- embrace the university’s culture of empathy and respect for people of all backgrounds and abilities and share its celebration of diversity;
- be familiar with academic values and teaching goals as expressed in the university’s “Graduate Attributes” statement;
- be familiar with the range of resources and services that are available to support them in their study and university life; and
- have established a supporting network of peers, and regular and effective study techniques involving those peers.

4.2 Sharing the ownership

It was important that the transition program, once dispersed faculty-wide, was now squarely the responsibility for each department. The central intent of this change was to give students themselves a stronger sense of allegiance to their cohort as well as a more relevant set of interactions with departmental staff. Before the start of the semester, liaison meetings were held to ensure a modicum of consistency across the six subjects. Ongoing support was provided throughout the semester by the faculty secretariat.

Some departments chose to couple the transition program loosely with a first-year subject by having a first-year lecturer also deliver the transition subject. Other departments assigned a different staff member to coordinate each session. Either way, the learning skills and exam preparation content, for example, was much more relevant to students’ needs than it had been when delivered generically by the university’s Language and Learning Skills Unit.

The devolution also had the beneficial side effect of making it much harder for departments to ignore their transition responsibilities. Greater sensitivity to transition issues amongst teaching staff across more of the faculty was clearly a benefit of the 2004 arrangement.

4.3 Changing the subject name

One of the most pleasing things we achieved in 2004 was a new name. Rather than the boring – and entirely predictable – “Computer Science 101” label, it was agreed faculty-wide that the six new programs would share a common tag. The result was that all six subjects went by the name “Making Connections”, and used the same subject number within each department. The intention with the name was to stress that the purpose of the subject was to help students make links to other students, to the departments in the faculty, and to the faculty and the university too. Our subject was thus called “Making Connections

(Computer Science)", with other subjects called "Making Connections (Electrical Engineering)", and so on.¹

4.4 Introducing study skills assessment

One substantial part of our 2004 program was the addition of a mandatory evaluation instrument called the Engineering Study Skills Assessment (ESSA). The intention of this instrument was to provide a general diagnostic of academic abilities for entering first-year students. ESSA was designed for ease of administration and largely-automated evaluation, rather than precision, and also included questions that relied on self-reflection. The instrument was designed to be suited for both native and non-native speakers of English, and made use of several comprehension exercises based on paragraphs drawn from the main first-year texts used in the faculty. The result was a tool that was open to abuse by students, and could not be used, for example, in assigning precise marks; but nevertheless, when taken seriously by the students, allowed identification of several important cohorts of "at risk" students, and the areas in which further assistance through remedial programs might be beneficial.

A number of studies have explored the relation between levels of English language competency and successful transitions to tertiary studies. In particular, Edwards (1995) observes, after a large study, that it is perhaps the type of language competency which is important, with high IELTS or TOEFL scores not necessarily translating into tertiary success. This is further reinforced by studies such as that of Gunn-Lewis (2000) who posit that educational background and/or completion of a tertiary course in academic English, may be better indicators of success than IELTS or TOEFL scores. One of the broader aims of ESSA is to explore the hypothesis that English language proficiency is only one of many factors influencing academic success.

Section 5 describes the ESSA in more detail.

4.5 The program

Making Connections is intended to help students adjust to university life, provide an understanding of what the study of computing is about, and to create awareness of study resources and techniques that are essential for success. It also offers students more insight into the various roles in society of a university and discusses students' roles, rights and responsibilities. In the computer science and software engineering instantiation we held seven sessions:

- Session 1: Introduction to Making Connections
- Session 2: Learning styles
- Session 3: University goals and ideals
- Session 4: Discrimination and diversity
- Session 5: University organisation and support services
- Session 6: Meet an academic
- Session 7: Preparing for exams

In Session 1, the staff introduced themselves, and the objectives of the program. Students were asked to first talk in pairs for a few minutes with a person they didn't know, before joining into fours, in each case introducing the new colleague to the other two people. The bulk of the class was then occupied by a set of exercises intended to show that different people could contribute to group activities in different ways. Some ten questions were posed, drawn

¹There was a very small amount of confusion with the latter of these two – some students presuming it to be a class about circuits and wiring.

At university, I should:
– develop my analytic skills.
– develop my speaking skills.
– learn concepts and theories.
– develop a capacity to make informed ethical choices.
– develop management skills.
– develop respect for others.
– prepare for a career.

Table 1: Statements about learning goals.

from technical areas ("what number comes next: 1, 2, 4, 6, 10, 12, 16"; what letter comes next: H, H, L, B, C, N, O, F") as well as non-technical areas ("how many words can you make from the letters "aiionnrstt"; "what movies have been directed by James Cameron"). By working in groups, students were made aware of the many facets of peoples' knowledge, and that other people quite probably possess types of knowledge that complement one's own knowledge. At the end of the session, students were told that a Making Connections photo album was part of the subject web page, and that it was open to submissions. The intention was that they should send in pictures of them and their new friends in an interesting place or pose, showing that they had retained the connection.

Session 2 presented students with Bloom's taxonomy of knowledge, and also various learning modes, and asked the students to score themselves on a positive/negative scale. The axes considered were sensing versus intuitive, visual versus verbal, active versus reflective, and sequential versus global. Students were further pointed at a more precise questionnaire designed to elicit this kind of understanding of their preferred learning modality.²

This session was based on a presentation to Engineering staff that had been made by education experts Richard Felder and Rebecca Brent five months earlier. While there was no particular resolution sought, and relatively little scope for discussion of the outcomes, student comments were that this had been an interesting exercise, and that they had never thought before about what type of learning was best for them.

In Session 3, a group self-assessment exercise was undertaken. Students were given a sequence of statements, and asked to categorise their reactions to them. Students worked in small teams, with a brief discussion of each question permitted before they were asked to commit to a group answer. Table 1 lists some of the statements. In each case the allowed answers were "very important", "important"; and "somewhat important". The statements were based on an exercise suggested by Angelo & Cross (1993).

Once the full set of 30 statements had been considered, it was revealed to the students that they fell under six main headings. Groups were asked to summarise their responses, indicating how many "very important"s they had under each of the six sections. A class-wide tabulation then provided the basis for a discussion as to what universities are "for", at least in the eyes of one key stake-holder group, the incoming undergraduate students.

The third session also considered two documents that have been prepared by the university (and debated and then approved through to the highest levels), the "Graduate Attributes", and the "Nine Principles of Teaching

²See <http://www.engr.ncsu.edu/learningstyles/ilsweb.html> for an example.

and Learning". Students were invited to comment on the extent to which these desiderata showed through in the teaching they had encountered so far.

In Session 4, we made use of a video tape showing (in a somewhat heavy-handed manner that was entertaining as well as being informative) a number of situations that students might find themselves in – for example, wanting to complain about a lecturer's heavy accent; or being patronised by a fellow student in a laboratory situation. After each scenario, the video was paused, and the scenario discussed to try and isolate the nature of the various parties' grievances, and what courses of action were open to the participants. Our plan initially had been to script and film these scenarios ourselves, so that the staff and sets would be familiar. But time ran out, and instead we used a video that had been prepared at Curtin University.

In Session 5 students were given a mini-lecture about the university hierarchy and governance ("faculties have deans, departments have heads", and so on); about some of the important formal processes (results determination and board of examiners' activities, unsatisfactory progress hearings); and about university support services (applying for special consideration, the counselling service, and so on). In Session 5 we also had speakers from the Melbourne University Computer Students Association, to both tell the group about the society and its role as a networking catalyst, and also to tell them about their own personal histories as students, to give an "I only wish I had listened to these guys when I was in your shoes" message.

At the end of Session 5 the standard university-wide Quality of Teaching Questionnaire was administered. These outcomes are discussed in Section 6.4.

Session 6 was titled "Meet an academic", and the idea was to have each student aware of at least one more person in the department other than their first-year lecturer and their transition group coordinator (who might have been the same person). The three Making Connections sections (around 30 students in each) were divided into groups of approximately 10 students, and each group spent a class with a senior academic. The script given to the academics included instructions to tell the students about their own academic background and employment history; to explain the balance between teaching and research, including the ebb and flow of the academic year ("no, we don't get four months holiday during the summer"); and then a little about their own research. The academics were also requested to hand out their business cards and make sure that students in their group knew how to locate them again, in the hopes that students wishing to discuss problems would feel that they had been invited to return to that academic for advice. No staff member met with more than one group, and while we carefully didn't use the word "mentor", we hoped that some permanent relationships might flourish as a result of this exercise. The parting instruction of the script was this:

That all adds up to 45 minutes, and you can follow it slavishly if you wish, but truth is, I don't care terribly much *how* you spend the 45 minutes, provided at the end you have "made a connection" of some sort with the students.

The seventh and final Making Connections session was on exam preparation, and was held in week 10 of semester, after a break of several weeks. Students were reminded that at the university the examiner was probably the person who had been standing in front of them all semester rather than a faceless enemy; and that many of

the clues and cues they needed to prepare for the final assessment would by now already be available to them. A list of "do's and don'ts" for examination success were presented, as well as a range of "healthy body, healthy mind" tips. Student response was that they appreciated the timing of this session, as well as the fact that it was directly relevant to the subject that they most needed to pass if they were to remain on-track with their degree program.

The ESSA, described in more detail below, was scheduled for week 4 of the semester, and then opened again later in the semester to cater for the people who missed it first time round.

As well as the seven computer science and software engineering classes, students were informed about several other classes run on a faculty-wide basis by the Language and Learning Skills Unit. These activities are described in Section 5.4.

5 The Engineering Study Skills Assessment

This section describes the structure and implementation of the ESSA instrument that students were required to use.

5.1 Nature and purpose of ESSA

The intent of ESSA is to highlight the type of language and academic skills that are expected in first year, based on materials that are used in first year Engineering teaching. ESSA was not designed to replace officially designated second language tests (of which the University of Melbourne has several). It is not a formal, officially sanctioned test of academic language skills, and has not been subjected to rigorous reliability and validity checks required of other "high stakes" tests informed by focused, dedicated research agendas. Instead, the instrument provides students and staff with a baseline assessment from which they can pursue appropriate remedial options. The main role of the ESSA is to provide a set of indicators on which academic and support staff can engage in dialogue with individual students. ESSA is thus a low-stakes general diagnostic instrument to assist students with the transition from school to tertiary study.

5.2 ESSA components

ESSA is delivered to students through WebRaft, an integrated online learning management system currently in use at the University of Melbourne. Such integration allows economy and scalability in delivery of general course materials to students, as well as assessment instruments via the TestPilot framework. ESSA is the largest single deployment of web-based assessment within the institution to date.

The source of all test materials are authentic first year engineering or faculty process materials. Little, Devitt & Singleton (1994) posit that learners are likely to find authentic texts more motivating than invented texts and are thus more likely to engage with "acquisition-promoting content" and thus have a "richer linguistic diet". When authentic texts are used in assessment, tasks need to be designed such that they (a) relate to real-world activities, (b) avoid predetermined outcomes, and (c) vary in levels of complexity.

Content for this year's ESSA incorporated topics of laser safety, the operation of the GPS system, basic computer functionality, the special consideration process, and free versus non-free educational access.

The online component of ESSA has four parts:

- **Reading:** Three sections of representative first year textbook material, assessed via 10 multiple choice questions each section;
- **Grammar:** Short passage of grammatical errors, assessed via 15 fill-in-the-blank responses;
- **Self-assessment:** Students asked to gauge their own competencies in several areas including time management, listening comprehension, study skills and knowledge of the university environment, assessed via 25 Likert-scaled (Strongly Agree – Strongly Disagree) multiple choice questions:
 - Language skills, for example: “My greatest weakness as a student is my ability to understand English.”
 - Study habits, for example: “I understand the consequences of poor study habits, and that I myself am responsible for my own success.”
 - Socialisation, for example: “I am comfortable working with students from cultures other than my own.”
 - Academic expectations and environment, for example: “I understand the concept of academic honesty, and the rules which apply at the University of Melbourne.”
- **Composition:** A short essay on an appropriate first year topic.

Two additionally planned ESSA components were excluded on logistical and technological grounds in the 2004 version, namely listening and oral performance components, but these components could well be added later.

5.3 ESSA scoring and cohort classification

A formal scoring specification for ESSA was developed and used to classify students based on their relative scores. Under the ESSA rubric, students are placed into 5 cohorts, based on individual score variance from the mean (< 1 , “OK”; 1–2, “Directed”; > 2 , “At Risk”). For each of these cohorts different support pathways are promoted, and feedback (via email and a formal written letter from the faculty) is provided.

At Risk: Students in this category are strongly directed to attend support classes. The recommendation to this group is to take the entire series of support classes and to seek further assistance. Students in this group receive an informal note from the subject coordinator and a formal letter from the faculty. This approach is motivated by success with similar strategies adopted for at risk students, such as those described by Levy & Murray (2003).

Directed: Students in this category are directed to attend support classes. The recommendation to this group is to consider the value of support classes. Students in this group receive an informal note from the subject coordinator and a formal letter from the faculty.

Recommended: Students in this category are advised, in an informal note from the subject coordinator, to attend support classes. The aim is to provide both appropriate assistance and encouragement.

Encouraged: Students in this category are encouraged to review general transition and support resources. The idea is to promote awareness of support resources and provide positive reinforcement.

Congratulated: Students in this category are congratulated on their performance on the ESSA, and encouraged to review some general transition resources. The aim is to promote awareness of support resources.

5.4 Support pathways

A series of modules are offered by the university’s Language and Learning Skills Unit (LLSU), tailored specifically for an engineering audience. Students who are identified by the ESSA as requiring particular attention in a range of areas are encouraged/directed to the appropriate stream. However, since all students are informed of the availability of these modules, attendance is by no means indicative of an “At Risk” or “Directed” cohort classification. Anecdotal evidence suggests that a significant proportion of students attending the LLSU modules performed well on the ESSA. The modules are:

- **Active reading for engineers:** To improve the comprehension and efficiency of reading engineering texts and interpreting images (graphs, tables, system diagrams);
- **Active listening in lectures and note taking skills:** To provide students with a range of listening skills and techniques for managing information delivered through large group lectures;
- **Developing a professional vocabulary:** To provide strategies to develop and retain vocabulary, both general and discipline specific;
- **Working in collaborative teams:** To develop an understanding of the roles of people in teams and strategies for working efficiently in teams; and
- **Professional communication for engineers:** To develop professional speaking skills in support of delivery of presentations.

6 Evaluation

One of the benefits of the formal compulsory subject offering in 2004 is that standard in situ teaching evaluation methods can be used to assess Making Connections.

6.1 Attendance at core sessions

Table 2 shows attendance statistics for the 97 students who were enrolled in Making Connections (Computer Science) around mid-semester in 2004. One pleasing observation is that almost half of the students did more sessions than the required minimum – they obviously felt that there was value in attending. Sadly, there were also 21 students – a surprising high number – who apparently did not value a “P” on their academic record sufficiently highly that they attended the minimum of four sessions. In the end, some of the non-attendances appear to have been a result of erroneous record-keeping rather than willful absence (see the comments in Section 7.1, below), but even so, compulsion was not as big a stick as we had anticipated.

Classes Attended	Students
0	2
1	1
2	7
3	11
4	33
5	18
6	22
7	3

Table 2: Number of Making Connections classes attended.

ESSA component	Compared to faculty-wide scores
Reading	lower than average
Grammar	higher than average
Self-Assessment	higher than average
Composition	lower than average
Final Score	lower than average

Table 3: Relative ESSA outcomes for Computer Science and Software Engineering students.

6.2 ESSA results

As a result of the ESSA deployment, we acquired empirical data about first-year computer science and software engineering students, and also their place within the first year Engineering cohort. Our finding is that despite significantly differing entrance requirements across the faculty, there is not a significant difference between students enrolled in Computer Science and Software Engineering and other engineering students.

By mid semester 1, 2004, the Making Connections subject in Computer Science and Software Engineering had an enrolment of 97 students, slightly greater than 10% of students in first year Engineering. The overall completion rate was 95%, which is higher than average across all departments (89%).

The number of students classified as “At Risk” in Computer Science and Software Engineering was around the faculty-wide average of 4% of enrolled students. Likewise, the number of students classified as “Directed” in Computer Science and Software Engineering was around the average of 7% of enrolled students. Table 3 summarises other general observations.

A number of transition-relevant observations can be made from the ESSA self-assessment section. Students clearly disagreed with the proposition that English language skills were their greatest weakness as a student, with 80% of students either citing disagreement or strong disagreement. A significant proportion of students (37%) had not established regular study routines based on the recommended hour of study for each hour of contact. This is perhaps more glaring in the face of the timing of the ESSA, which was in week 4 of semester. Almost one-fifth of students (19%) self-identified as lacking knowledge of university-provided counselling and/or emotional support, and of the role of the Language and Learning Skills Unit.

6.3 Student failure

Concerns about the accuracy of attendance records, and some differences between the Making Connections subjects of the six departments, led us to weaken the published assessment criteria, and we granted a pass to students who had attended three sessions. By the end of

	Connections passes	Connections fails
0 subjects failed	63	1
1 subjects failed	16	0
2 subjects failed	2	4
3 subjects failed	6	1
4 subjects failed	1	1

Table 4: Number of *other* first-semester subjects failed for students who passed Making Connections (left) and students who failed Making Connections (right).

semester, two students had withdrawn from their course. Of the remaining 95, 7 failed the subject.

Table 4 shows students’ overall performance across first-semester subjects. For example, of the 88 students who passed Making Connections, 9 failed two or more other subjects. Of the 7 who failed Making Connections, 6 failed two or more other subjects.

While interesting, Table 4 cannot be used to make claims about any effect that Making Connections has on overall performance. There is no control group, the number of students who failed is small, and in any case one would, for any selection of subjects, expect failure in one subject to be correlated with failures in other subjects.

6.4 Student evaluation

To obtain feedback from students, the University of Melbourne uses a standard Quality of Teaching questionnaire with nine common questions, and the ability for lecturers to add subject-specific questions. Student responses are captured numerically using a Likert scale from 1 to 5, with 1 corresponding to “strongly disagree”, 3 to “neutral”, and 5 to “strongly agree”. Students are also invited to write free-form comments.

The results for Making Connections (semester 1, 2004) are summarised in Table 5 (the university’s standard set of questions) and Table 6 (subject-specific questions). Apart from four complimentary comments about the teaching staff, student comments all related to the last four subject-specific questions. Table 6 includes the number of positive and negative comments related to each question.

Suggested improvements to the program included “more technical information about computers use, library resources and later year subjects”, and a desire for the subject to “be more interactive so that it can cater to the needs of every individual.” There were mixed opinions about the value of the program overall, but even the negative comments were tempered by a good deal of sympathy with its aim, for example:

The ESSA was a pain in the neck, but probably necessary. Some parts of the subject would have been more useful if I hadn’t been at college.

It also appears that this type of subject requires careful attention to delivery, to compensate for what students consider a lack of challenging content:

Normally these sorts of subjects annoy me. I hate having things I already know shoved down my throat. However this subject, whilst somewhat not intellectually stimulating, was worthwhile and I took the majority of content on board. This was due to the teaching technique.

	Mean
I had a clear idea of what was expected of me in this subject	3.9
This subject was well taught	4.2
This subject was intellectually stimulating	2.9
I received helpful feedback on how I was going in this subject	2.9
Teaching staff showed an interest in the academic needs of the students	4.1
I felt part of a group of staff and students committed to learning in this subject	3.7
There was effective use of computer-based teaching materials in this subject	3.8
Web-based materials for this subject were helpful	3.4
Overall, I was satisfied with the quality of the learning experience in this subject	3.7

Table 5: Student responses to QoT common questions ($n = 78$).

	Mean	Positive comments	Negative comments
The introductory session helped me settle in to the university and establish my own personal study framework.	3.3		
The session on learning styles helped me to understand how I learn, and how I can maximise my understanding of subject materials.	3.5		
The session on university goals and ideals helped me understand the role that universities play in society.	3.6		
The session on discrimination and diversity helped me understand the need for appropriate behaviour.	3.6	2	2
The session on university organisation helped me recognise the various structures within the university, and how I need to relate to them.	3.8	1	
Requiring all students to complete the ESSA is good idea, and I took the test seriously.	3.3	1	4
Overall, this subject helped prepare me for my life as a university student, and I have benefited from being made to take it.	3.3	7	5

Table 6: Student responses to QoT specific questions.

6.5 Student self-assessment

The ESSA included a self-assessment element, in which students were invited to reflect on the start of their university careers. Some of the questions, and the corresponding mean score (five-point Likert, with “1” meaning “strongly disagree”) are shown in Table 7. There was a marked difference between study schedules in the abstract (with a mean score of 3.9 in the fourth row of the table) and in the flesh (score 2.9, second from last row).

7 Discussion

This section describes some of the student and staff reactions to the way the 2004 program was organised.

7.1 Assessment

Because Making Connections was mandatory in the computing degree programs, we needed assessment; and as assessment criteria included an attendance hurdle, we had to carefully note who came to class. To achieve this in a non-disruptive manner, the faculty invested in hand-held student card scanners, and at the start of each class, students had their student cards read. The result was a spreadsheet of student numbers and attendance times, processed by the Making Connections coordinators.

There were some hiccups with this process. In retrospect, a less technically-complex mechanism may have been easier to administer. Several students claimed, post-results, that they attended all sessions, but were not listed in the spreadsheet; and there were whole sessions that somehow fell off the schedule for the bar-code reader system, and were inserted later manually.

The other problem with assessment was the ESSA – students were required to have “attempted” it in order to be awarded a pass for Making Connections. However, week 4 was relatively early in the semester, and some late-enrolling (and also some early-enrolling) students were unable to access the ESSA web page because they had not finalised their enrolments or their fee payments, and so were blocked by the university system. A second opportunity was created in week 10 to try and catch these students, but by that late stage of the semester some of the impetus had evaporated, and students were less aware of the need to be doing the ESSA, and less motivated to have a go at it. Only three Making Connections students were eventually failed for not doing the ESSA.³

We also ran into an unexpected problem with the assessment: what to do about excellent students who pass

³One fail was later converted to a pass after the student protested that for reasons unknown, they had never been able to access the necessary web site. Because of the card-scanning problems, we also accepted written statements from students who claimed to have attended the mandated number of sessions, and revised two further results.

	Mean
I understand the concept of academic honesty and the rules which apply	4.5
I am comfortable working with students from cultures other than my own	4.4
When I'm in a tutorial I'm able to follow most of the interaction	4.1
Having a planned study schedule is helpful in achieving my study goals	3.9
I think joining a study group is a good idea	3.7
I have joined a student society	3.5
I know what student support services are available on campus, especially the Language and Learning Skills Unit	3.4
I can write well in limited time-frames	3.4
I have established a routine that allows me to study for one hour for each hour of subject lectures, tutorials and lab sessions	2.9
My greatest weakness as a student is my ability to understand English	1.9

Table 7: Student responses to selected self-assessment ESSA questions.

their regular subjects in the semester with good grades, but find that a scholarship or other financial support was at risk because they didn't attend Making Connections. There were students who perhaps didn't really need to attend – because, for example, they were staying in one of the residential colleges, with their own college-based support program – who were quite irked by what they saw as being as over-prescriptive approach to transition.

7.2 Too much structure

The natural inclination of most academics is to lecture, and we were not immune to that failing. In retrospect, we went in to most of the sessions with too much prepared material – including slides to be presented, and topics to be ticked off. One of the lessons we will take into 2005 is that less material should be presented via a script, and more of it by student discussion and discovery. We have worked in technical areas too long to be fully comfortable with slide-less lectures; nevertheless, this is what is predominantly required in the Making Connections classes.

The pressure to “present” was also in part a consequence of our attempting to work within seven classes. Years ago, when transition was just a single lecture, we would probably have felt intimidated by a seven-hour program. But now that we have delivered a seven hour transition package, we can easily see how it might operate as an hour a week for the entire semester.

It may be that in 2005 we seek to add further classes as we progress towards a whole-of-semester arrangement.

7.3 Government reforms

Making Connections needed to have full subject status if it were to be made compulsory in the degree programs. However it was made a zero-point subject so that no student would need to pay deferred or up-front fees for it, and so as to not require any adjustments to the varied – and tightly packed – first year requirements across the faculty.

Unfortunately the Australian Government's recent Higher Education Support Act (HESA) (Australian Government 2003) appears to make it impossible to continue the program in its current form, that is, as a zero-point subject. As of August 2004, we have been informed that it is no longer possible for the university to mount zero-point subjects, because of inequities between

fee-paying students (who can enrol in it for no fees) and subsidised students, who have zero point subjects counted against their learning entitlement.⁴

So we are back to the drawing board in the sense that we will be unable to mandate attendance as part of the degree requirements, or possibly even deliver the ESSA in the absence of a formal enrolment requirement. On the other hand, having run a comprehensive department-based transition program once, we are confident that whatever arrangements are put in place for 2005, we will not go backwards to a lesser arrangement.

Acknowledgements

As in previous years, the Engineering Faculty's 2004 transition program has been generously supported by Esso and Mobil Australia.

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⁴Don't ask any of the authors why this is so, or why it matters. We just know that we have been told that the 2004 arrangement will not be permitted in 2005.

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