

# **Improving the First Year Experience: to set a new culture in place, Faculty of Science style.**

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*Much has been written and discussed about how the university experience can be improved for first year students. With its intake of 1000 students, the Faculty of Science at The University of Sydney has taken a global approach to improve the experience of its new students. A Student Workshop Program, targeting academic and social issues of transition and formation of peer study groups, is held just before the University Orientation period. A significant factor of the workshop is that students meet with others with whom they will be sharing laboratory and tutorial times, thus enabling them to “meet, greet and meet again” in class time for the entire semester. The Student Workshop is accompanied by a Parents’ Program which sets out to share, with parents, knowledge about this transition period in their daughters’/sons’ lives. In addition the Faculty has been encouraging all its coordinators of large first year classes to introduce strategies which help in the transition, and this has been enabled by Faculty teaching development grants.*

## **Introduction**

As the Higher Education sector goes through another round of painful change, we are still faced with the same dilemmas, including the questions about how to improve the performance of students and ensure that they complete their degree within minimum time. Recent research in Australia has highlighted the importance of the first-year experience with respect to satisfaction with academic and social aspects of university life (McInnis, James and McNaught, 1995) and research elsewhere supports this (Tinto, 1989). This was emphasised by Vince Tinto at the Inaugural Pan Pacific First Year Experience (Travelling through Transition) Conference (Tinto, 1996). Tinto stressed the importance of the first few weeks at university and that a poor experience could have a disadvantageous effect on student progression. He argued for a review of our management of the first year experience, quoting that 50% of students in the United States who do not complete a degree leave at the end of the first year (Tinto, 1987) and that we need to address the adjustment period (ie the early stages of the degree) as it is during this period that many students may decide to defer or drop out. One of the solutions suggested is the formation of collaborative study groups, where students with similar academic interests regularly work together. Such groups allow students to assist each other in all aspects of their academic and social university life and provide a buffer for the initial period of the transition (Tinto, 1975; 1989; 1995). The orientation programs that are available for incoming students do not necessarily integrate students’ social and academic adjustment to university life. This is especially so in large and diverse degree programs.

Offering workshops, as a way of introducing students to some aspects of university life, is a strategy that may help students and staff to gain a better insight into what each expects in the coming months. Attendance at workshops may help to make the students feel comfortable within their new learning environment. In 1996 the Faculty of Science hosted a pilot workshop for 150

invited students who were entering the University for the first time. The pilot workshop investigated the feasibility of such an activity for a large faculty and also tested the premise that introducing students to the advantages of peer group activities would foster a feeling of belonging and security within the student group. The pilot workshop was reported previously within this forum (Peat and Jelks, 1996). In 1997 and 1998, the Faculty accepted that encouraging student collaboration of this nature at the very beginning of a student's university life would enhance the early experiences of students. To this end the Faculty now offers a Transition Workshop to all its new first-year students prior to the commencement of university classes. This workshop has subsequently been augmented with a Parents' Program in which the Faculty and others within the University share their thoughts and ideas on students in transition. In addition, at the level of schools and departments within the Faculty, some innovative strategies are being put in place to further enhance the experience. These will be reported, along with a short comment on a project that is looking at the perceptions and attitudes of students in transition, and the ultimate performance of students who attended the workshop and those who chose not to attend.

### **Student Transition Workshop**

The rationale for the 1997 transition workshop was the same as previously reported (Peat and Jelks, 1996) namely to offer a collaborative session for both students and teaching staff which was informal but which centred on the knowledge that those students who work and socialise together are more likely to succeed and are more likely to continue with their tertiary studies (Tinto, 1989, Tang, 1993). The 1996 pilot was modified to enable timetabling much larger numbers of students into concurrent workshop sessions and a more careful management of the space resources during the morning. A Parents' Program was also developed for introduction in 1997. The theme of the workshop (as in 1996) was "Helping to Make the Transition", and a new feature was a Student Orientation Manual, developed by a focus group from the pilot program, which was given to all the students. For 1997 and 1998, all students entering science degree programs were invited by letter (given at enrolment) to attend the workshop. All students at the University of Sydney are enrolled by a common system and subsequently given their own timetable, so it was important that these timetables could be manipulated such that students attending the workshop would see one another again and again (in class) during the semester. On the basis of students indicating their preferred science area, the workshop groups set up were centred around physical sciences, life sciences, mathematics and computer science, and psychology. Timetable manipulation occurred so that within their preferred groups, students were timetabled to meet in class for up to six hours a week. This might have been a combination of laboratory classes (e.g. biology and chemistry, physics and chemistry), or laboratory class and tutorials (e.g. biology and psychology) or just tutorials (e.g. mathematics and computer science). The staff involved in each workshop were from the disciplines highlighted for that specific workshop.

#### *Workshop design*

The workshops in 1997 and 1998 were held in mid February, after enrolment and before orientation, and the activities of the 1998 program are given in the table below.

<b>TIME</b>	<b>ACTIVITY</b>
9.30 - 10.00	Registration
10.00 - 11.00	Welcome Workshop Plans

	Student activities to create peer groups
11.00 - 11.30	Morning Tea Chance to chat
11.30 - 12.45	“Getting your head around university” First Year impressions Student Orientation Manual Evaluation
12.45 - 2.00	Spit Roast
2.00	Welcome by the Dean of Science Welcome by the President of the SRC
2.30 - 4.00	Students Walking Tour of the campus Parents’ Program in Great Hall

As for the 1996 pilot, students were given a nametag, and a “showbag” on arrival. The showbag contained a range of paper-based materials along with a few lollies and some blank business cards. A feature of the showbag (new in 1997) was the inclusion of a Student Orientation Manual which concentrated on information that the 1996 focus group felt was not otherwise easily identified during their first few weeks on campus. The first activity of the workshop was aimed at creating peer groups, utilising a mix of the “introduction game” and exchanging business cards with names and phone numbers on them. This was followed with a discussion on early impressions of the university given by volunteer students from the 1996 and 1997 workshops. In addition a student guided the incoming students through the Student Orientation Manual, thus highlighting some of the information previous students had felt was essential. The involvement of students presenting at the workshop was a powerful feature and much appreciated by those attending the workshop.

### *Evaluation of student workshop*

The students were asked to evaluate the morning program as a separate component of the whole day’s activities. The response by the students was very positive; almost all thought it was worthwhile with the formation of peer groups and related exercises being the most popular activities. Other aspects of the program that were well received included the information provided by staff talks and the Student Orientation Manual, and “first year impressions” talks given by students.

The vast majority of students attending were young (less than 20 years), straight out of school, and had completed their schooling in Australia. Of the attendees returning evaluations, 55% were female, 45% were male. While 60% had one or both parents with a degree, the remaining 40% came from families in which neither parent had obtained a degree. Government (41%), Independent/Private (32%), and Catholic (26%) schools were well represented within the group, although a few (1%) students educated overseas were present. Approximately two-thirds of the students noted that they would have a job during semester, although only a quarter of this group would be working more than 10 hours per week.

To the question “Was it worthwhile attending today?”, the response was a unanimous “yes”. From the responses, the most common reason given was the opportunity to meet fellow students and form peer groups (49%) - with over twenty of these comments specifically praising the common timetabling and grouping of people with similar subjects and career aspirations.

A student from the 1998 program offered this comment before the end of first semester:

I thought I would let you know how wonderful I found the transition workshop. The people I met have become a group of friends that have been fantastic....I have always had someone to sit next to, in lectures, work with in pracs, study with...these may sound trivial but in fact were some of my greatest concerns before I started uni. This group of friends were almost all in the workshop with me, and we find ourselves commenting over and over again how grateful we were to have had each other in those first few weeks.

## Parents' Program

In 1997 and 1998, after students had accepted the invitation to the workshop, a letter was set to their parents inviting them to join their daughter/son in the afternoon of the day of the workshop. The 1998 program is set out in the table below.

<b>1998 Parents' Program</b>	
2.00 pm	<b>The Great Hall</b> Introduction by Dr Mary Peat, Associate Dean, (Teaching), Faculty of Science Welcome by Professor R G Hewitt, Dean, Faculty of Science Welcome by Ms Natasha Verco, Students Representative Council
2.30 pm	<b>Students leave for walking tour of the University campus: Parents remain in the Great Hall</b> "What we know about student transition to University" by Dr Mary Peat "My first year University experience" by Ms Simone Boulding, current student in the Faculty of Science "How parents can help students in the transition to University" by Dr Michael Young, Counselling Service, The University of Sydney
3.10 pm	Questions from the floor, answers from the panel Panel: Professor R G Hewitt; Dr Mary Peat; Ms Natasha Verco SRC; Ms Simone Boulding; Dr Michael Young; Mr Steve Rawling (Director, Careers Centre, The University of Sydney) Moderator: Dr Michael Young
4.00 pm	<b>Finish</b>

### *Evaluation of parents program*

At the end of the afternoon the parents were asked to fill in a short questionnaire. In 1997 about 75% of the attendees responded. The reasons for attending on the day were to demonstrate support for daughter/son (90%), to get more information (4%) and looking for reassurance (6%). Most parents do not appear to have an overt concern about the enrolment of a daughter/son in Science at The University of Sydney. However, the responses to the welcomes and the talks indicated that these did cover concerns of parents and provoked interest. The parents found the welcome addresses and the talks very useful with each one being considered 'useful' to 'very useful' for 85% to 92% of the responses. Panel discussion was also considered to be a most informative part of the program. Some additional comments include

Thank you - lovely to be included.

What an excellent idea - why don't other faculties do it?

It is an excellent addition to your "services" that would have been very welcome 15-20 years ago.

Very good, wish my parents had come/had a program when I went to Uni - and hopefully my son will benefit from this morning's session- because I think it would have made me feel less isolated and unsure when I started Uni in the 70's.

## **Departmental activities**

The Faculty of Science encourages and promotes good teaching and celebrates the outcomes of these. During the last five years the Faculty has supported 50 teaching development projects, 20 of them on issues to improve the first-year experience. Some of these are included below.

### *Biological Sciences*

Over the last ten years, many changes have been made to enhance the learning opportunities of students taking first year biology courses. Strategies for setting up learning communities in large classes include an introduction game in the first laboratory class; group laboratory experiments, field work and poster presentations; specially designed card and board games (to be played by several people at once); and the introduction of computer-based learning materials. These strategies create a sense of belonging for the student body and a safe student-centred learning environment and they promote the development of active learning skills (Franklin and Peat, 1996).

More recently the internet has been used to help maintain a learning environment for students. A Virtual Resources Room has been developed that allows students both flexible access to material, and a means to communicate with staff and with other students ([http://fybio.bio.usyd.edu.au/FYBSOBS/FYB\\_welcome.html](http://fybio.bio.usyd.edu.au/FYBSOBS/FYB_welcome.html)). In addition, with the introduction of semester length courses in the Faculty, a mid-semester "mock exam" has been introduced which enables students to identify if they are "at risk" within any content areas. In addition this offers all students the benefit of experiencing an examination paper, in a formal setting and under examination conditions. Specially designed web-based remedial materials have been created to enhance understanding of areas of "risk" and students are encouraged to use them. Both of these developments have received positive responses from staff and students as good examples of learning support strategies (Franklin and Peat, 1998).

### *Computer Science*

The first year computer science courses are now designed around problem-based learning (PBL). This was first trialed in 1996 when an experimental group of 35 students were given the course in PBL mode only, and their outcomes were compared against a matched sample in the main (traditional) class. On the basis of the trial being considered a success, the problem-based learning approach was adopted for the first year courses in 1997. Essentially, problem-based learning involves presenting students with substantial problems to tackle as the driving force for their learning. Another essential element is that students work and learn in groups. In Computer Science, the teaching staff operate primarily as facilitators in assisting students to plan and evaluate their own learning. This means that the usual lectures have been largely replaced by smaller classes. The

University of Sydney is leading the world in applying this approach to first year computer science teaching (Greening *et al*, 1996, 1997).

Associated with this changed teaching approach, the department has also introduced a new programming paradigm into the first year courses, with the use of Blue - an object-oriented programming language, designed at The University of Sydney specifically for teaching (Kolling & Rosenberg, 1996). Blue is a program development environment, which allows students to create small pieces of program in a controlled environment, which is especially useful for beginners. An added feature of Blue is that it test and debugs the students small pieces of program in an interactive way with them. The benefits of this programming language enable the staff to teach the concepts of programming without the students getting confused with a complex programming environment. Blue was first introduced in 1997 and is the programming language for all first year courses.

### *Geology and Geophysics*

To improve the first year experience in Geology, two approaches have been taken, one a social approach and the other an academic approach. Firstly the students are encouraged to get to know one another as early as possible and this is facilitated by an orientation session for all students in the first week's laboratory class. This first practical revolves around students introducing themselves to each other (essentially the same as the introduction game used in Biological Sciences). They are encouraged to meet, converse with and get to know at least three new people. For those students ill at ease, they are given a few suggestions to get started. The staff circulate and chat with them, finding out names, and joining in on their chat and generally using this activity as an ice breaker. The students are actively encouraged to join the Geology Students' Society by getting the society to run a free barbecue for them early in the semester, attended by all the first year teaching staff. These early activities are aimed at enhancing the students' feelings of belonging somewhere.

The second approach is to help students find out if they are at "risk" in any areas of the course, early enough for remedial action to be taken. This consists (as in Biological Sciences) of a "mock exam" which the students sit during a laboratory session. This exam helps the students identify their risk areas (if any) within the course and then they are invited to join remedial sessions. Student feedback for this activity is positive and encouraging. The overall benefit for the whole class is that they are much less intimidated by the prospect of the coming final course examination because they have been given a chance to test themselves on a paper that is in exactly the same format as the final paper. This year the department organised for students to mark one another's papers immediately after the exam. This had the added benefit that students were concentrating on the answers and what was expected of them at the time of the exam while it was fresh in their minds.

### *Mathematics*

Mathematics and Statistics, at the University of Sydney, is taught to about 3000 students in first year, many of whom come to university fearful of having to take maths as a prescribed course within their degree program (every Science students must take some form of mathematics within their degree). At the beginning of each semester a "Friendly Face Tutorial" is given. In the February semester this is used to introduce the students to the world of mathematics in such a way as to promote comfort zones for the students, especially those fearful of the discipline. In the July "Friendly Face Tutorial", the students are encouraged to comment on the previous semester, including their likes, dislikes etc so that the department can continually appraise its introductory sessions. In addition, like many large first year departments, Mathematics and Statistics maintain a

First Year Enquiries Office staffed as much as possible by the youngest staff who are encouraged to offer special support to this large groups of students.

### *Pharmacy*

In recent years, the Department of Pharmacy has been concerned about the progression rates and level of literacy of all students. The progression rates were considered to be appalling in that it takes on average 3.5 years for students to complete a three year degree, or looked at another way, 67% of students complete in minimum time. Poor completion was thought to be linked to low literacy levels and this was borne out anecdotally by all the departments that taught within the Pharmacy degree (i.e. Physics, Biology, Chemistry). The Department of Pharmacy developed a diagnostic procedure designed to develop a literacy profile of its students and, having identified those with problems, provided them with special skills workshops. The question was asked whether poor literacy was correlated with poor performance and could literacy be a predictor of performance? The answer turned out to be "yes" (Holder *et al*, 1997) and after considering various other avenues of action, the Department now uses a skills test, called STAT (Student Admissions Test) and the TER (NSW Higher School Certificate results) as the two selection criteria for entry.

This selection procedure, along with some early additional skills testing and a more conscious effort to embed skills-based experiences into the curriculum, are now in place in the new four-year degree program.

### *Physics*

First Year Physics was reviewed in 1995 and a totally new set of courses emerged with features that are aimed at targeting improvements in the first year experience. In particular, the physics course for students who have not taken the discipline before is built on a new approach that is based on abstraction, conceptualisation, mathematics as a tool, and problem solving. This approach is considered to be particularly helpful for students in transition who simply lack confidence and think that physics is hard. Specific aspects of the course include progressive tests based on lecture material, which are given in the laboratory session, to provide feedback and to identify students needing help; workshop tutorials where students work collaboratively on specially designed problems (Sharma, 1998); collaborative assignments where students can work in teams and promote student networking; and a four week laboratory-based project for students to investigate their ideas such as "Do sunglasses block UV radiation". Team log books have been introduced in the labs to stress collaborative learning.

### *Psychology*

There have been several initiatives in First Year Psychology at The University of Sydney during the last two years. Following the restructure and revision of the tutorial program, a new type of small group teaching format was developed, the "Demonstration/Tutorial". This is a two-hour small group teaching class in which one hour is devoted to "tutorial" activities, such as discussion, debate, group work and presentations by the tutor; and one hour is devoted to "demonstration" activities, such as videos about famous psychology experiments, demonstration of psychological phenomena, and computer based instruction and experiments. By integrating these two components within a single two hour class considerable flexibility of presentation is possible to suit different topic areas. This new format has proved more cost-effective, and it has received considerably improved student evaluations since the revision of course material. At the same time, a new format for the

presentation of both student and tutors notes to accompany these classes has been developed (Dalziel, 1997).

Another major innovation developed for First Year Psychology is a Web-based multiple choice formative and summative assessment system, called "WebMC" (Dalziel & Gazzard, 1998). This generic, flexible system for the presentation of practice and test questions has been used in 1997 and 1998 with considerable success, including very high student evaluations. The design of this system allows for multiple layers of feedback, and can be used for secure classroom testing. As the structure of this system is generic, it can be used in any content area that can use multiple choice questions. The system is currently being developed as a commercial product, and an example of its use can be viewed at

<http://www.psych.usyd.edu.au/WebMC/p1001.html>

A number of additional Web-based teaching resources have been developed and used in classroom settings in First Year Psychology. In particular, a Web-based tutorial in *Reasoning and Argument in Psychology* has been developed for the new tutorial course (Gazzard & Dalziel, 1997) which can be seen at

<http://www.psych.su.oz.au/teach.htmls/Welcome.html#P1001>

Other research being conducted in relation to the teaching of First Year Psychology includes ongoing work on the use of students as subjects in psychology experiments and the educational value of this experience (Dalziel, 1996a); and research on the background characteristics and expectations of First Year Psychology students (Dalziel, 1996b).

### **Fostering collaborative learning during student transition**

A project has been set up to investigate the relationship between transition experiences and student academic and social adjustments. Entitled "Fostering collaborative learning during student transition to tertiary education: An evaluation of academic and social benefits" (Dalziel and Peat, 1998a), this project takes the form of a follow-up survey of students who attended the 1997 workshop (treatment), students in the Faculty of Science who were offered the workshop but did not attend (control group 1), and students in the other faculties that do not have transition programs (control group 2). The survey consisted of questions from various survey instruments (see Dalziel and Peat, 1998a) with additional questions covering dropping out, collaborative learning and social contacts. Controls for extroversion, school performance and learning preference were included in the survey. A summary of the findings show that students attending the workshop are

- less likely to have considered dropping out or deferring
- more likely to have been involved in collaborative learning activities
- more academically motivated
- more likely to have a well-developed sense of purpose and identity
- more appreciative of their courses
- more likely to adopt a deep approach to learning

A detailed analysis of academic performance is currently being conducted. Initial analysis indicates that when adjustment is made for the effect of TER (NSW High School examination score) on WAM (weighted average mark) - which correlates in this study - there is still a significant and positive effect associated with age (younger students obtained higher marks than older students, gender (male students obtained higher marks than female students) and attendance at the workshop. These studies are ongoing and reported elsewhere (Dalziel and Peat, 1998b).

## **The future?**

### *Helping academic staff to understand about the transition.*

The Faculty of Science is committed to improving the experiences of all students and is continuing to encourage all departments and schools to consider ways of helping students in the first crucial weeks of their university life. Studies show that students and staff have differing views on the importance of various factors in contributing to student success or failure (Killen, 1994; Bruce and Gerber, 1995). In his study Killen asked students and staff to respond to two items: "List the five factors that you think are most important in contributing to students' success at university" and "List the five factors that you think are most likely to lead to student failure at university".

A new development for the Faculty of Science will be to compile training materials for academic staff to help them understand about the transition and to enable them, within their discipline, to develop suitable strategies to improve the experience of first year students. Crucial to the development of the materials will be to ask Killen's items of both the staff teaching in first year and the current students. The training materials will also help facilitate the development of a faculty culture to foster more collaborative teacher-student learning contexts and staff will be introduced or reoriented to the background issues associated with these strategies (peer study and mentoring, collaborative learning etc). The importance of these student activities will be put in the context of helping students to settle in to their new learning environments in the knowledge this should help their academic performance and ultimately increase both the retention rate and the completion rate. This project is being funded by the University of Sydney's College of Sciences and Technology 1998 Strategic Development Grant scheme.

### *Web communication with students*

The Faculty is looking at the way in which information is presented to students and in particular to first year students. The use of Web templates is being investigated for setting up discipline specific information so that each course will have the same look and feel, thus making it easy for students to navigate and find the information they require. As well as administrative information, course coordinators will be encouraged to set up mechanisms for students to communicate with staff and with one another (see CyberTutor and Discussion Lists in Franklin and Peat, 1998). In time, it is hoped that other course materials would also be available in this manner.

## **Conclusion**

The Faculty of Science at the University of Sydney has a track record for encouraging, promoting and rewarding teaching and teaching performance. In the last ten years, much has been done to improve the facilities and equipment and to improve the communication between staff. A coordinated strategy was put in place in 1990 to enable building refurbishment, in particular teaching space; a three-year teaching renewal equipment grant was set up in 1992; a faculty teaching committee with a brief to target effective teaching practices and advise on matters pertaining to teaching activities was created in 1993; a teaching development fund was set up in 1994 and in the five years to date has invested over \$600,000 in projects; travel support is given to junior academic staff for dissemination of teaching developments at conferences; and an Early Career Award for Teaching is available every two years to the most

outstanding junior academic staff member. Better teaching space has encouraged teachers and students to extend themselves within their teaching environment; modern equipment has allowed for the introduction of new teaching ideas; and special teaching development funding has been considered critical in that it provides seed money for innovations, some of which have been described in this paper. All of these actions, events and activities give out a message about how good teaching is rewarded; scholarly research into teaching is encouraged; and dissemination of teaching ideas and materials are promoted.

Concerns about the first year experience are being met with innovative and structured strategies by the Faculty. Incoming students are encouraged to attend a transition workshop which targets fostering the development of peer groups, whilst their parents are invited to a parents' seminar to share an understanding of the transition issues from a university perspective. In Departments and Schools innovative programs are in place to help students both during their first year, but more importantly during their first few weeks. A supportive culture has developed between the staff involved and they are sharing in a sense of coherence and vision. The "Transition Program" is becoming a model and is being taken up by others within the institution.

As Candy, Crebert and O'Leary say (1994),

"...the most single factor in shaping whether or not graduates choose to be continuing learners, is the climate of the institution. This nebulous construct, which embodies the views and values of senior staff, the attitudes and practices of academics and support staff, and the history and culture of the organisation, intangibly yet inexorably influences and shapes the orientations of students, determining whether or not the institution encourages, endorses, enhances and enables the pursuit of lifelong learning".

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