

Annual Report 2007

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Executive Summary

In 1984, the University of Sydney established a Mathematics Learning Centre to provide academic support for undergraduate students who, because of their background in mathematics, are considered academically “at risk” when studying mathematics or mathematics-based courses.

In 2007, the Mathematics Learning Centre was a unit of Student Services.

The operational goals of the Mathematics Learning Centre are:

To provide a comprehensive range of academic support programs in mathematics and statistics to address the development of our students’ learning in mathematic and statistics;

To conduct research and development projects in the fields of mathematics and student learning of mathematics and statistics and disseminate outcomes through publications and conference presentations.

Mathematics Learning Centre’s operational goals are closely aligned to University of Sydney Strategic Plan 2007-2010: the student experience. By pursuing these goals, we endeavour to give our students the best possible experience of University life by providing support to help them successfully learn mathematics.

A wide range of teaching programs have been developed to meet the needs of those undergraduate students who enter the University without the mathematical knowledge, skills and confidence that are needed for studying first level mathematics or statistics units of study at university. Students attend the Centre’s programs voluntarily.

Programs and resources available to students in 2007 included:

- Bridging courses in mathematics and statistics (fee paying);
- A Drop-in Centre where students can receive individual assistance;
- Supplementary tutorials and lectures;
- Web-based resources for self-paced study.

The Mathematics Learning Centre provides academic support for and oversees the University Preparation Courses in mathematics and acts as faculty liaison in mathematics for the University of Sydney Foundation Program.

The primary purpose of the Mathematics Learning Centre is the support of eligible undergraduate students. During 2004, it was determined that postgraduate student groups would be eligible for assistance only with funding from the appropriate Faculty.

Staff profile 2007

The number of Mathematics Learning Centre staff in 2007 in continuing positions was unchanged with 2.5 full-time equivalent academic staff (2.5 Senior Lecturers), and one 0.57 administrative staff member. Two members of academic staff took periods of Long Service Leave during 2007. A 0.5 Associate Lecturer was employed for Semester 1 to partially replace one of these staff members. Eight casual teaching staff were employed during 2007.

The Mathematics Learning Centre Week

A description of a busy week during Semester will give the reader a snapshot of the teaching activities of the Mathematics Learning Centre.

Week 8 was the fourth busiest week in Semester 1 with the Drop-in Centre attendance being 247 student hours (student hours = no. of students \times no. of hours in attendance). The mean attendance for the Drop-in Centre for Semester 1 was 200 student hours. During Week 8, the Drop-in Centre was open for 35 hours during which time 121 students visited with 36 students making multiple visits. There were a total of 188 visits with each visit lasting approximately 1 hour 19 minutes. There were nine supplementary tutorials run in this week covering seven units of study in mathematics and statistics. The supplementary tutorials were attended by 60 students in total. Two lunchtime lectures in calculus were given, which were attended by, on average, 15.5 students. In addition, in a typical week, students frequently seek advice from the academic staff. There are many telephone calls requesting advice of a varying nature from within the University or externally. These frequently require the attention of an academic staff member.

Student attendance

Since 2004, we have had access to the HSC data of commencing students. These data include information on the level of mathematics studied for the HSC and the mark attained by the student. We used these data in 2007 to further refine our targeting strategies for the Centre's programs.

There was a 10% increase in the number of students enrolled in bridging courses in 2007 compared to 2006. There was a 1.3% decrease in the number of students attending the Centre's programs in 2007 compared to 2006. Table 1 below summaries the student enrolments for the years 2004 to 2007.

Table 1: Number of students all sources for the years 2004 to 2007

Source	2004	2005	2006	2007
Bridging courses	185	211	250	276
University Preparation Course	100	90	89	89
Drop-in Centre	628	608	623	615

In 2007, there was a 2% decrease in the total student hours of attendance from all sources compared to 2006. Drop-in Centre attendance increased by 2% in 2007 compared to 2006 while supplementary tutorial and lecture attendance decreased by about 15% compared to 2006. Table 2 gives a comparison of student use of the Centre's programs for the years 2004 to 2007.

Table 2: Student hours of attendance for the years 2004 to 2007

Student hours attendance all sources	2004	2005	2006	2007
Drop-in Centre	4793	4783	6081	6194
Tutorial classes	1577	1887	1826	1549
Total	6370	6670	7907	7743

Student Profile 2007

Undergraduate students made up 88% of our total enrolments (a decrease from 91% in 2006). There were more **female** students than **male** students in our enrolments – 59% compared to 41%, a similar ratio to 2006. The percentage of students enrolled in the **Faculty of Science** was 45% compared to 42% in 2006. The percentage of students enrolled in the **Faculty of Arts** was 15% compared to 17% in 2006. The percentage of students enrolled in the **Faculty of Economics and Business** was 7% a decrease from 13% in 2006. There was an increase in the percentage of students in the **under 21 year age group** from 54% in 2006 to 58% in 2007. In 2007, 23% of the Centre's students spoke a **language other than English** as their first language compared to 30% in 2006. **International** fee paying students made up about 10% of the Centre's enrolments compared to 11% in 2006. International postgraduate students for the Faculty of Economics and Business were catered for in mathematics workshops on specific topics relevant to their disciplines. Six workshops were organised in 2007 to meet the needs of these students.

Highlights of research and scholarship in 2007

- Dr Sue Gordon was Appointed Honorary Adjunct Faculty of Education & Social Work: March 2007-March 2010 in recognition of “significant contribution to the teaching and research” of the Faculty.
- Dr Sue Gordon continued as principal supervisor of a PhD candidate, Ms Jen Tindale, in the Faculty of Education and Social Work.
- Dr Collin Phillips continued the study of exact solutions to the basic state induction, momentum and heat equations to produce basic state fields as a starting point for linear stability analysis. These solutions were submitted for publication to (and since accepted) by the Journal: *Geophysical and Astrophysical Fluid Dynamics*. Importantly, the solutions were extended to non-zero basic state magnetic field and anisotropic thermal diffusivities.

- Dr Collin Phillips, in conjunction with Dr D Ivers (School of Mathematics and Statistics), extended their analysis of anisotropic thermal diffusion in a rapidly rotating fluid sphere and, in particular, the interaction of the velocity field and temperature distribution through thermal convection.
- Dr Sue Gordon continued her collaborative research project (with Associate Professors Petocz and Reid) into international educators' ideas on teaching and learning statistics as a service course at university. A journal article and refereed conference paper appeared during 2007. A further journal article on the research methodology is in preparation.
- Dr Sue Gordon continued a collaborative research project (with Associate Professor Schuck and Dr Buchanan) to investigate strategies for enhancing teaching and learning of tertiary educators and critiques the current processes and protocols. A conference paper was published and a journal article has been accepted for publication. A further paper is in preparation.
- Dr Collin Phillips, in conjunction with Dr D Ivers (School of Mathematics and Statistics), started work on developing a scheme for investigating magnetoconvection under the influence of anisotropic thermal diffusion with anisotropies enhanced or diminished by rotation and a strong toroidal basis state magnetic field.
- Dr Sue Gordon commenced a project (with Associate Professors Petocz and Read) to investigate university educators' ideas about effective teaching approaches in diverse disciplines, the impact and outcomes of awards for excellent teachers.
- Staff contributed to the reviewing work of research journals and conferences.

1 Overview

1.1 Introduction

In 1984, the University of Sydney established a Mathematics Learning Centre to provide academic support for undergraduate students who, because of their background in mathematics, are considered academically “at risk” when studying mathematics or mathematics-based courses. The Mathematics Learning Centre assists students to develop the mathematical knowledge, skills and confidence that are needed for studying first level mathematics or statistics units of study at university.

In 2003, the Mathematics Learning Centre User Advisory Committee confirmed that the primary function of the Centre was to provide academic support to eligible undergraduate students. During 2004, it was determined that postgraduate student groups would be eligible for assistance only with funding from the appropriate Faculty. A grandfather provision was included in this policy to cover a small group of postgraduate students in the School of Public Health as these students had been supported by the Centre for many years.

1.2 Target groups

Students are eligible to attend the Centre’s programs if they do not have the assumed knowledge in mathematics they need for their first level mathematics or statistics units of study.

The Centre targets students from the following groups:

- People who have not studied the appropriate level of mathematics at school which is assumed for their university studies;
- Mature age students who have not studied mathematics for several years;
- Students from overseas who may find gaps in their mathematical knowledge, or who are not familiar with mathematical terms in English;
- Students whose studies have been interrupted by either illness or accident or some other cause;
- Students from equity groups;
- Anyone who lacks confidence in their ability to learn the mathematics or statistics needed for their first level units of study.

1.3 Initial visit

When a student first visits the Centre, his or her mathematical background is assessed against the assumed knowledge for their units of study. The student is then advised about Mathematics Learning Centre programs that are suitable for his or her needs. Students, who are not considered eligible at this first visit, are referred back to the appropriate teaching staff in their unit of study.

2 Attendance

In 2007, students attending the Centre were enrolled in degree courses in the Faculties of Agriculture, Food and Natural Resources, Arts, Economics and Business, Education and Social Work, Engineering and Information Technologies, Health (Medicine and Pharmacy), and Science.

Information about the Centre's services is provided to students through announcements at orientation programs and at lectures during the first or second week of Semester. In 2007, HSC data of students enrolled in the major mathematics or statistics units of study were used to target eligible students. The students, identified as those who did not have the assumed knowledge for their units of study or for whom HSC data was not known, were emailed directly.

Students are asked to fill out a registration form when they first come to the Centre. The students also sign a sheet each time they use the Centre recording the hours spent working at the Centre. However, some students who attended the Centre do not formally register with us, and others forget to record their attendance every time they attend. Therefore, attendance statistics may underestimate the Centre's use. All attendance in the Centre's programs is voluntary.

2.1 Summary statistics for 2007

2.1.1 Enrolment and attendance statistics for 2007

Table 3: Number of students all sources for 2007

Source	No. of students
University Preparation Courses	89
Bridging courses	276
Drop-in Centre and tutorial and lecture programs	615*

*420 registered students, 195 unregistered students

Table 1: Number of students all sources for the years 2004 to 2007

Source	2004	2005	2006	2007
Bridging courses	185	211	250	276
University Preparation Course	100	90	89	89
Drop-in Centre	628	608	623	615

Table 2: Student hours of attendance for the years 2004 to 2007

Student hours attendance all sources	2004	2005	2006	2007
Drop-in Centre	4793	4783	6081	6194
Tutorial classes	1577	1887	1826	1549
Total	6370	6670	7907	7743

Table 4: Attendance data all sources for 2007

Daytime Attendance	Semester 1	Semester 2	Total
Student hours in classes	973	576	1549
Student hours in Drop-in Centre	3284	2672	5956
Other attendance	238		238
Total student hours attendance	4495	3248	7743

The total student hours of attendance in 2007 was 7743 compared to 7907 in 2006 and 6670 in 2005. This was a decrease of 2% from 2006, and an increase of 16% from 2005. Figure 1 shows the total number of hours of student attendance for ten years from 1998 to 2007. It is difficult to identify the reasons for the yearly variations in attendance. For example, the large increase in demand in 2006 was unpredicted and is not readily explained.

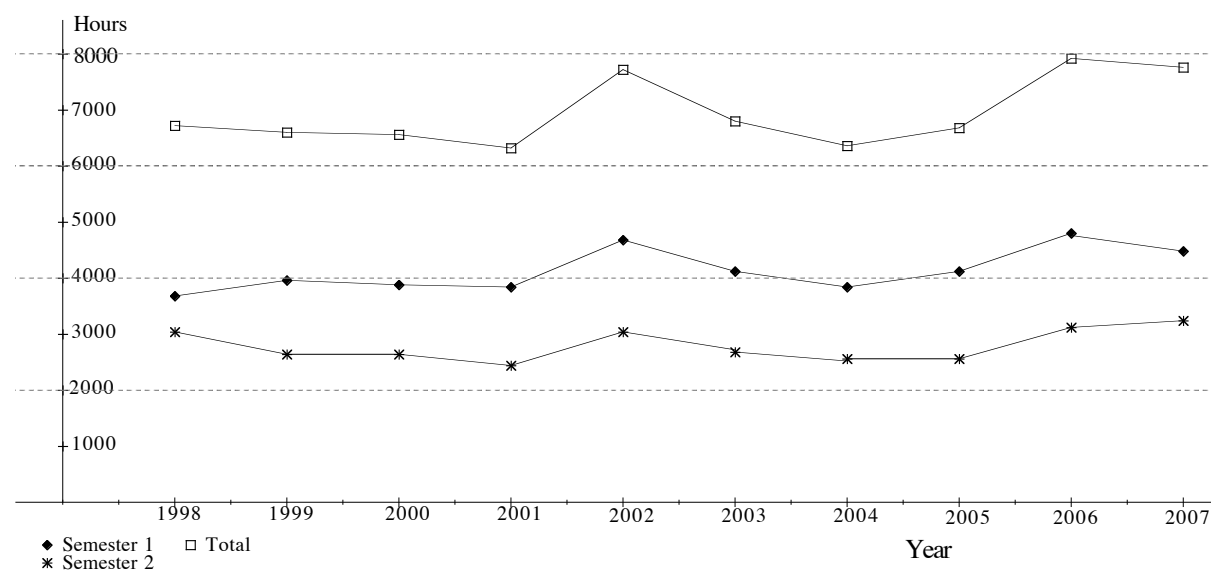
Figure 1: Student hours of attendance 1998 to 2007

Table 5: Percentage of undergraduate and postgraduate registrations of Mathematics Learning Centre for the years 2005 to 2007

Degree	Percentage of MLC registered students		
	2005	2006	2007
Undergraduate	87.5	90.6	88.3
Postgraduate	8.8	3.8	4.3
Other	3.7	5.6	7.4
Not known	0.0	0.0	0.0

Table 6: Student enrolment in the Mathematics Learning Centre by faculty

Faculty	Percentage of total MLC enrolments			% of university enrolment (2007)
	2005	2006	2007	
Science	42.7	42.4	45.2	11.7
Arts	12.2	17.4	15.2	16.2
Engineering and IT	11.5	7.0	13.2	6.8
Economics and Business	13.4	13.1	6.9	17.4
Medicine	5.8	6.3	1.4	5.8
Education and Social Work	1.5	1.6	1.1	5.9
Agriculture	3.8	5.8	4.8	1.7
Other	9.5	6.4	12.1	34.5

2. 1. 2 Gender and age profile

Gender

In 2007, 59.0% of the students attending the Centre were female. Table 7 gives comparative data for the years 2005 to 2007.

Table 7: Percentage of the Mathematics Learning Centre registrations from 2005 to 2007 by gender

Gender	Percentage of total MLC registered students		
	2005	2006	2007
Female	58.8	59.4	59.0
Male	41.2	40.6	41.0

Age

The Centre has a sizable population of mature aged students. In 2007, about 41.4% of the Centre's students were over 21 years in age. This percentage was decreased from 45.6% in 2006. A breakdown in age is given in Table 8 together with the total enrolment for the University in those categories. However, it should be noted that as the Centre caters mainly for first year undergraduate students, a direct comparison is inappropriate.

Table 8: Distribution of ages for students attending the Centre from 2005 to 2007

Age in years	% of total MLC enrolments			% of total university enrolments (31/03/2007)
	2005	2006	2007	
Under 21	56.3	54.0	57.6	36.2
21-24	21.1	23.7	21.7	32.3
25-29	10.9	9.2	7.6	14.6
30+	11.1	12.7	12.1	16.9
Not stated	0.6	0.4	1.0	

2. 1. 3 Cultural diversity

The Centre has a culturally diverse student population. In 2007, 23.3% of the Centre's students reported speaking a language other than English as their first language. This percentage decreased from 29.9% in 2006. A three-year comparison is given in Table 9.

Table 9: Percentage of Centre students who speak a language other than English as their first language for years 2005 to 2007

Student characteristic	% of MLC total enrolment		
	2005	2006	2007
Language other than English as first language	25.0	29.9	23.3

International fee paying students

In 2007, about 10% of the Centre's students were international fee paying students compared to 11% and 13% in 2006 and 2005 respectively.

3 Teaching Activities of the Centre

The Centre provides support for students in the form of lectures, workshops, small group teaching, self paced study and individual assistance in the Drop-in Centre. Students attend the Centre on a voluntary basis and as frequently as they wish.

3.1 Drop-in Centre

Students can attend the Drop-in Centre at any time during opening hours. We have one lecturer available to help students at all times.

The Centre was open this year from 10 am to 5pm on Monday, Wednesday and Thursday, from 10 am to 3 pm on Friday and from 10 am to 7 pm on Tuesday (7pm close only during teaching weeks), during teaching weeks, stuvac and the examination period. The Centre was closed for two weeks in each of January, July and December. The Centre was open during other university vacation periods on a restricted basis.

In 2007, attendance at the Drop-in Centre accounted for about 80% of total attendance.

The Drop-in Centre is an informal environment where individual assistance is tailored as far as possible to each student's needs. We aim to develop a learning culture – one where students are expected to understand the mathematics they are studying and learn to think for themselves.

The informality of the Drop-in Centre allows students to meet others with similar difficulties. Students are encouraged to work together, and to explain concepts to each other. Frequently, students who meet in the Centre form groups to study mathematics as well as other subjects. In the past, these study groups have continued into higher years.

Students value the ease of access, the individual assistance and being in an environment with students with similar needs. Some typical responses to the question: The best thing about the individual assistance at the MLC was:-

“Their [the tutors] patience and willingness to explain basic principles though they might appear obvious. You guys are a life saver!”

“Able to work at my own pace, ask any question without getting embarrassed, ...we can just go to the MLC 'anytime'.”

“It was explained well and thoroughly until the tutor knew that I knew what was happening.”

“It focuses on the questions that I didn't understand and not all the other fundamental stuff”

(Student surveys, 2007)

3.2 Small group tutorials

During 2007, supplementary tutorials were held for students in the following units of study: ECMT1010, ECMT1020, MATH1001/2, MATH1003, MATH1013, MATH1014, MATH1015, MATH1111, PSYC2012, PSYC3010, and PUBH5018.

Students are encouraged to join one of our supplementary tutorials whenever possible, both for reasons of efficiency and because we believe group discussion and co-operative work lead to more effective learning.

The students value the supplementary tutorials as an important opportunity to learn mathematics or statistics and also as a forum for meeting other students with similar difficulties. These points are raised again and again in the student surveys.

In 2007, some of the supplementary tutorials were scheduled at 8 am reflecting the difficulty of finding a tutorial time to suit all interested students .

Snapshot of two supplementary tutorials

Two supplementary tutorials for the unit of study PSYC2012, Statistics and Research Methods for Psychology, ran on Mondays and Wednesdays for 13 weeks during Semester 1. Twenty students attended at least 7 out of 13 classes. The final mark for fifteen of the twenty students was obtained (the marks for five students were not available at the time of analysis). Fourteen students out of the fifteen passed the unit of study with an average mark of 61%.

Of the fifteen students for whom the final grade is known, one student did not supply information about the previous level of mathematics studied. Of the fourteen students who did supply this information, seven students had studied mathematics up to year 10 level or less. One student of the seven failed and six students passed the unit of study. One student had studied mathematics until the end of year 11 and achieved a credit. Six students had studied mathematics previous to the end of year 12, one, four and one of these students achieved a pass, credit and distinction respectively.

The students rated the supplementary tutorial very highly. In a survey administered in these classes attended by sixteen students, all fourteen students who answered the question rated the supplementary tutorial as excellent, the highest category on a five point scale. A typical comment was: *“I think the PSYC2012 tutes are fantastic, they are really helpful and run at a pace that makes it easy to learn and keep up. ... It made me realise stats isn't so difficult, you just need it explained and to put the work in. I failed the first assessment but have passed the next 2 and credit the MLC for my pass results.”*

3.3 Short lecture courses

Calculus from Scratch

An introductory calculus course, “Calculus from Scratch” was taught in Semester 1. The classes were organised as a response to the large number of students enrolled in the Mathematics for Life Sciences units of study who had not studied calculus before or who had studied calculus some time ago. Students who attended the Mathematics (2 Unit) bridging course were also encouraged to attend to consolidate their knowledge and skills. The class met for 24 hourly sessions at lunchtime with an average of 10 students attending each session. Students were provided with access to lecture notes at the beginning of each week via the internet. Some students who were not able to attend one of the lectures each week due to another class, nevertheless attended every other one and kept abreast of the lectures by using the notes provided on-line.

Calculus lectures for students from the Faculty of Agriculture, Food and Natural Resources

In 2007, a series of 10 calculus lectures were organised and taught during Weeks 2 to 6 of Semester 2 for students enrolled in the unit of study Biometry (BIOM1003) in the Faculty of Agriculture, Food and Natural Resources. Students who had not studied HSC Mathematics (or a higher level mathematics course for the HSC or equivalent), or who had achieved a result in HSC Mathematics of less than Band 4 (70%) were encouraged to attend. Nineteen students attended the lectures at least once with, on average, 12 students attending each lecture. Thirteen students attended six or more lectures.

3.4 Mathematics workshops

In 2007, a series of workshops were organised and taught for undergraduate and postgraduate students in the Faculty of Economics and Business. These workshops were a joint initiative of the Faculty of Economics and Business and the Mathematics Learning Centre, and funded by the Faculty of Economics and Business. Three workshops were run in each semester and were attended by an average of 23 students. The students rated the workshops highly with an average of 90% rating the workshops in the highest two categories on a five point scale.

3.5 Self paced study

The staff of the Centre have spent considerable time developing and writing workbooks on many topics in mathematics and statistics. Students are encouraged to use them for self-paced study. The number of workbooks available in this series is 18, currently selling for \$5 + GST to students from the University of Sydney and \$8.00 + GST to others. In 2007, a total of fourteen were available on-line.

An extensive collection of Mathematics Learning Centre lecture and workshop notes are also available on-line.

Students have access to a range of computer based mathematical materials in the Drop-in Centre. These include commercial software for developing concepts in statistics and calculus and the Computer Algebra System, Mathematica™. Students can also use the Centre's computers to access their unit of study materials on the internet.

3.6 Consultations

In addition to the formal teaching activities of the Centre, we spend a considerable time advising students about matters concerning assumed knowledge in mathematics and bridging courses. Students who intend to apply or have applied for entry to the University approach us for advice about their preparation for the study of mathematics based courses at university. We provide advice to prospective students about suitable bridging courses by phone and in person via the Bridging Course booth at the University's information days for prospective students in January and August.

3.7 Bridging courses

The Mathematics Learning Centre organises bridging courses in mathematics and statistics in February each year. Students pay a fee for these courses bringing in a modest income for the Centre.

3.7.1 Mathematics

During February, the Centre, jointly with the School of Mathematics and Statistics, offered *Bridging Courses in Mathematics* at the Mathematics (2 Unit) and Mathematics Extension 1 (3 Unit) level. The courses ran for 24 hours over 12 working days and a fee of \$305 was charged. In 2007, 240 students attended these courses compared to 217 students in 2006. The students are taught in classes of between 15 and 20 students for 2 hours per day and are encouraged to come to the Drop-in Centre for a further two hours where assistance is available.

In 2007, additional mathematical materials were made available for the Mathematics Extension 1 bridging course students on our website.

3.7.2 Statistics

The Centre again offered its *Bridging Course for Statistics* course in February 2007. This course ran for eighteen hours over a two-week period and a fee of \$230 was charged. Thirty six students, who were enrolling in PSYC2012 Statistics and Research Methods for Psychology, STAT1020 General Statistical Methods or PUBH5018 Introductory Biostatistics for postgraduate students in Public Health, attended this course. The course aims to introduce students to some of the concepts they will study in statistics, to provide a mathematical base

for the future study of statistics and to ameliorate the fears students may have about studying statistics.

Again in 2007, parallel courses were taught with students allocated to a stream according to their unit of study enrolment. This allowed for the courses to be more finely tuned to the needs of the students.

The courses were highly rated by the students. In a survey at the end of the courses, over 91% of students surveyed (32 of 35) rated the courses in the two highest of five categories. About 97% of students reported that their confidence in learning mathematics had increased.

“It catered for people at bottom low level of maths like myself. It was delivered in a nice friendly atmosphere encouraging questions and answers.”

(Introductory Biostatistics student, 2007 survey)

“It has increased my confidence in so many ways. Going over the fundamentals has filled so many huge gaps in my knowledge and allowed me to understand how things fit together in mathematics. I have always approached anything mathematical with fear and frustration and avoided these things wherever possible. ... I now enjoy maths and the challenge of using the other side of my brain.”

(Psychology student, 2007 survey).

3.8 Continuing Education courses

The Centre offers academic support to students enrolled in a University Preparation Course in mathematics. University Preparation Courses prepare students, who do not meet the usual entry standards and who satisfy other selection criteria, to enter a university course. This course is the recommended University Preparation Course for a wide range of degree programs. The assumed knowledge for this course is Year 10 advanced mathematics.

In 2007, 89 students enrolled in the course *Preparatory Mathematics*. Thirty-four students completed the course (excluding four students who deferred the final exam) of whom 26 passed the course with 13 students gaining a grade of credit or better.

3.9 New initiatives

The Mathematics Learning Centre developed and implemented the following initiatives in 2007:

- The support program for students enrolled in the unit of study Biometry (BIOM1003) in the Faculty of Agriculture, Food and Natural Resources was reassessed and delivered in a different format. The new format was a response to the pattern of attendance of students in the previous year’s program.
- The short tutorial program, initiated in 2006 for students in the advanced statistics unit of study PSYC3010, was continued and developed. This tutorial program ran for 6 weeks during Semester 2 and was available to those students who had previously

attended the Centre's program for PSYC2012 Statistics and Research Methods for Psychology.

3. 10 Challenges faced in 2007

The biggest challenge faced by the Mathematics Learning Centre staff and students in 2007 was the continued increase in demand for the Centre's services from 2005 levels. In particular, student demand for the Drop-in Centre service increased by a further 2% from that of 2006, even though overall student attendance decreased by 2%. The total demand for our Drop-in Centre service has increased by a total of 30% from that of 2005. At the same time, student attendance in our tutorial programs has decreased by 15% from that of 2006, and 18% from that of 2005.

There is difficulty each year in finding a class time suitable to all interested students resulting in an increasing number of classes scheduled at 8 am. This and an increase in the number of students in paid work, and the number of hours they work may be significant factors contributing to the decrease in class attendance and the subsequent drift to and increase in Drop-in Centre attendance.

4 Research and Scholarship

4.1 Research projects

The Mathematics Learning Centre has a strong research culture and national and international reputation for high quality research. All current academic staff members are researchers in either mathematics (or statistics) education or mathematics.

This section gives details of the research projects of the Centre. Full publication details are given in section 4.2.

Project: Experiences of Teaching Service Statistics Courses

Researchers: **Dr Sue Gordon**, Associate Professors Peter Petocz and Anna Reid

The project investigates international statistics educators' experiences of teaching and learning statistics and ways of developing professionally. The research is a collaborative project with Associate Professor Anna Reid, Institute of Higher Education & Research & Development, Macquarie University, and Associate Professor Peter Petocz, Dept of Statistics, Macquarie University.

A series of in-depth, asynchronous e-mail interviews was carried out with university statistics educators from around the world and focused on "service courses", where statistics is taught to groups of students from various disciplines, such as psychology, public health, education and business. Email interviews were conducted with 37 members of the International Association for Statistics Education (IASE). Participating educators are from many countries including Argentina, Australia, Belgium, Brazil, Israel, Italy, Netherlands, New Zealand, Slovenia, Spain, Uganda and the USA.

A series of papers have been written pertaining to the project including a journal paper and refereed conference paper in 2007 (Gordon, Reid & Petocz, 2007; Gordon, Petocz, & Reid, 2007). A further journal paper on the research methodology is in preparation. The project is having considerable impact on the statistics education community including receiving a full-page research synopsis in the Educational Statistician SIG Spring Newsletter of the American Educational Research Association (2007, 4(1), p.8). Please see section 4.2 for details of the publications.

Project: Processes for Enhancing Teaching Quality in Higher Education

Researchers: **Dr Sue Gordon**, Associate Professor Sandy Schuck, Dr John Buchanan

This collaborative project was initiated in 2006 with Dr John Buchanan and Assoc/Prof Sandy Schuck of the Faculty of Education, University of Technology, Sydney. The project

investigates strategies for enhancing teaching and learning of higher educators and critiques the current processes and protocols in operation. It considers ways in which teaching is viewed and discusses the methods available for evaluating good teaching. Methods of supporting teaching and teachers at university are reviewed. A conference paper was published in the proceedings of the 14th Improving Student Learning Symposium. (Schuck, Buchanan & Gordon, 2007). A journal paper has been accepted for publication (Buchanan, Gordon & Schuck, forthcoming). A further journal paper is in preparation. Please see section 4.2 for details.

Project: Educators' Views of Effective Teaching Approaches in Diverse Disciplines

Researchers: **Dr Sue Gordon**, Associate Professors Peter Petocz and Anna Reid

The aim of this collaborative research is to investigate university educators' ideas about effective teaching approaches in diverse disciplines, the impact and outcomes of awards for excellent teachers, opportunities and challenges for teachers in higher education and educators' conceptions of student diversity as it impacts on teaching and learning.

This project builds on the researchers' previous investigation into views about statistics education at university and extends the project to researching educators' ideas about teaching and learning at the introductory level in an array of disciplines and fields. These include statistics, mathematics, engineering, psychology, medical science, teacher education, art and design and accountancy. A literature review and preparation of ethics application and recruitment of participants are under way. The data collection will commence during the Special Study Program to be carried out by Sue Gordon in 2008.

Project: Anisotropic Thermal Diffusion Models For the Earth's Core Under the Influence of Strong Rotation (Coriolis Force)

Researchers: **Dr Collin Phillips** and Dr David Ivers

This project is to investigate the influences of anisotropic thermal diffusion on magnetohydrodynamic models. Since this is the first investigation of the influence of anisotropic thermal convection in a conducting fluid sphere much emphasis is placed on confirming preliminary results. The choice of model to be considered for this project is critical. Much effort has been devoted to determining a problem that is analytically tractable, numerically practical and physically realistic for the Earth's core.

The project includes extensive research into past work on the topic. Thus the project is to investigate anisotropic thermal diffusion with a preferred direction given by the direction of the rotation axis. Such an anisotropic thermal diffusion can be compared with the results of

anisotropic thermal free decay in oblate and prolate spheroids conducted by Niven C. (1880) and Ivers D.J. (2002)

The project involves developing a set of numerical routines in the programming language Fortran 90 to investigate anisotropic thermal diffusion. The isotropic diffusion thermal free decay problem in homeoidal oblate and prolate spheroids (considered by Ivers 2002) are compared with the anisotropic thermal diffusion problem in a sphere.

The project has been extended to include analysis of the temperature distribution of the model. The temperature field has been resolved for a cycle of an oscillating critical value solution of the linearised magnetoconvection problem. This temperature field is plotted and the directions of temperature flux during the cycles are illustrated for the interior of an electrically conducting fluid sphere. Such plots and illustrations give valuable insight into the convective and conductive components of the magnetohydrodynamic interactions. These plots constitute an important part of a current publication.

Ivers D.J. (2002). Thermal instabilities of an oblate spheroid, 8th symposium Study of the Earth's deep interior, Grandlibakken, USA.

Niven C. (1880). On the conduction of heat in ellipsoids of revolution, *Phil. Trans. Roy Soc. Lond.* 171, 117-151

Project: Anisotropic Thermal Diffusion Models for the Earth's Core with Anisotropy Modified by Rotation and Azimuthal Magnetic Field

Researcher: **Dr Collin Phillips**

This project significantly extends a recent project to model anisotropic diffusion with anisotropy in the rotation (axis) direction by extending the turbulent anisotropic thermal diffusion tensor to have preferred directions given by rotation and strong azimuthal magnetic field.

An analysis was conducted to determine if such a project is theoretically and practically feasible.

A linear stability problem requires exact solutions to a basis state problem. These exact solutions were determined feasible and the solutions were derived. These exact solutions were previously unknown and allow study of a new field of research. A study of whether such a problem is numerically tractable given current computer facilities was conducted and a "plan of attack" was determined.

4. 2 Publications, presentations and scholarly work

4. 2. 1 Journal articles

Gordon, S., Reid, A. & Petocz, P. (2007). Teachers' conceptions of teaching service statistics courses. *International Journal for the Scholarship of Teaching & Learning*, 1(1). Online at: http://www.georgiasouthern.edu/ijstol/v1n1/gordon_et_al/index.htm

Forthcoming

Buchanan, J., **Gordon, S.** & Schuck, S. (Forthcoming). From mentoring to monitoring: The impact of changing work environments on academics in Australian universities. *Journal of Further and Higher Education*, 32 (3), 241-250.

Submitted under review

Ivers D.J. and **Phillips C.G.** Anisotropic Turbulent Thermal Diffusion and Thermal Convection in a Rapidly Rotating Fluid Sphere. Submitted to *Geophysical and Astrophysical Fluid Dynamics*.

4. 2. 2 Refereed conference proceedings

Gordon, S., Petocz, P. & Reid, A. (2007). Tools, artefacts, resources and pedagogy-stories of international statistics educators. In Australian Association for Research in Education 2006 Conference Papers, compiled by P. L. Jeffery, AARE, Adelaide. Online at: <http://www.aare.edu.au/06pap/gor06358.pdf>

Schuck, S., Buchanan, J. & **Gordon, S.** (2007). Teaching to improve students' learning: Questions we should be asking ourselves? In C. Rust (Ed.), *Improving Student Learning Through Teaching*. Proceedings of the 14th Improving Student Learning Symposium. Oxford: The Oxford Centre for Staff and Learning Development.

4. 2. 3 Conference presentations

Gordon, S. (2007). Teaching service statistics — variation in conceptions. Paper presented at *The First Australasian Workshop on Applications of Phenomenography in Engineering, Computing and Science Education*, Sydney (February 21-22).

Buchanan, J. & **Gordon, S.** (2007). From mentoring to monitoring: Implications for growth and learning of higher educators and their institutions. Paper presented at the *2007 Conference of the International Society for the Scholarship of Teaching and Learning (ISSOTL)*, Sydney (July 2-5).

Nicholas J (2007). The Mathematics Learning Centre at the University of Sydney: Issues, successes and failures. Paper presented at the Carrick Symposium on Learning Support in Mathematics and Statistics, Brisbane, Australia, July 2007.

4. 2. 4 Work in progress

Reid, A., Petocz, P. & **Gordon, S.** (In preparation). Research Interviews in Cyberspace.

Schuck, S., **Gordon, S.** & Buchanan, J. (In preparation). What Are We Missing Here? Problematising Wisdoms On Teaching Quality And Professionalism In Higher Education.

Phillips C. (In preparation) Vector and Scalar Spherical Harmonic Spectral Equations for Rapidly Rotating Anisotropic Alpha-Effect Dynamos.

Ivers D. & **Phillips C.** (In preparation). Scalar and Vector Spherical Harmonic Spectral Equations of Rotating Non-linear and Linearised Magnetohydrodynamics.

4. 3 Research supervision

Dr Sue Gordon continued as Principal Supervisor of PhD candidate, Ms Jen Tindale, in the Faculty of Education and Social Work in 2007. The Faculty partially funds her supervision. Ms Tindale's project is titled: Learning through participation: Spoken language as a resource in a Master of Accounting program.

Publications and Presentations Tindale 2007

Tindale, J. (2007). Responding to linguistic and cultural diversity in higher education. *International Journal of Knowledge, Culture and Change Management*, 6(7), 29-36.

Tindale, J. (2007). Classroom discourse and participation in diverse university classrooms. *Invited paper presented at the University of Sydney Faculty of Education and Social Work 'Communities and Change' Research Festival, Sydney (23 October).*

Tindale. J. 2007. Recontextualising professional discourse in postgraduate accounting classrooms. *Paper presented at Discourses and Cultural Practices Conference, Sydney (29 November – 1 December).*

5 Contributions to the University, the Profession, and the Community

5.1 Contributions to the University

The staff of the Mathematics Learning Centre participate in the following activities:

- Prospective Students Information days in August and January
- SWOT (Sydney Welcome Orientation and Transition)
- Broadway Orientation
- Faculty Orientation sessions
- International Student Support Unit information sessions
- Faculty of Economics and Business Students at risk program

Individual staff contributions to the University were:

Dr Sue Gordon

Acting Head of Department 17/09/07 to 12/10/07

Principal Supervisor to PhD candidate, Faculty of Education and Social Work

Member of the Exam Committee for the University Preparation Course in Mathematics

Ms Jackie Nicholas

Faculty liaison (mathematics) with the University of Sydney Foundation Program

Dr Collin Phillips

Acting Head of Department 15/10/07 to 09/11/07

Acting Head of Exam Committee for the University Preparation Course in Mathematics

Acting Faculty liaison (mathematics) with the University of Sydney Foundation Program

5.2 Contributions to the profession and the community

Throughout the year, all Mathematics Learning Centre staff provided advice to current and prospective students and members of the general community about mathematical matters. This includes advice about the assumed mathematical knowledge required for various university courses, and details of the bridging and preparation programs available in Sydney and elsewhere.

Other contributions to the profession and the community were:

Dr Sue Gordon

Appointed Critical Reader for Research Proposal, Faculty of Humanities, University of the Witwatersrand, South Africa. Reviewed proposal of candidate for Doctor of Philosophy and made recommendations as to acceptances, July 2007.

Served on the International Advisory board of journal: Studying Teacher Education

Invited by the International Programme Committee to review papers and provide formative feedback to participants of the joint ICME/IASE Study: Statistics in School Mathematics, to be held in Mexico June 30-July 4, 2008.

Reviewer of research papers and conference papers:

- Higher Education
- Studying Teacher Education (successive reviews)
- Annual Meeting of the American Educational Research Association (successive reviews).
- Joint Study International Commission on Mathematical Instruction (ICMI) / International Association for Statistical Education (IASE) (successive reviews).
- Australian Association for Research in Education

5.3 Visitors to the MLC and visits to other Centres

Dr Anders Berglund, Department of Information Technology, Uppsala University, Sweden visited the Centre in February 2007.

Ms Jackie Nicholas visited the Sigma Centre for Excellence in the Provision of University-Wide Mathematics and Statistics Support in October 2007. It is located jointly at the University of Loughborough and Coventry University and is the UK's only Centre of Excellence in mathematics and statistics support.

6 Professional Development

As a part of the Centre's professional development activities, the staff attend conferences and seminars in their discipline area. Administrative staff undertake appropriate internal training.

6.1 Appointment

Dr Sue Gordon was appointed Honorary Adjunct Faculty of Education & Social Work: March 2007-March 2010 in recognition of "significant contribution to the teaching and research" of the Faculty.

6.2 Conferences, seminars, forums and workshops

Dr Sue Gordon

Dr Gordon presented a paper at the *2007 Conference of the International Society for the Scholarship of Teaching and Learning (ISSOTL)*, Sydney (July 2-5).

Dr Gordon presented a paper at *The First Australasian Workshop on Applications of Phenomenography in Engineering, Computing and Science Education*, Sydney (February 21-22).

Dr Gordon participated in the following training/workshops/forums:

- Focus group for the University Brand Project, University of Sydney (October, 2007);
- Training workshop for MyHROnline, USyd (October, 2007);
- Training workshop for Entourage, USyd (October, 2007);
- Statistical Society of Australia Inc. (SSAI) Workshop on Integrating Statistical Ideas into Mathematics, Macquarie University (25 July, 2007).

Ms Jackie Nicholas

Ms Nicholas presented a paper at the *Carrick Symposium on Learning Support in Mathematics and Statistics*, Brisbane, Australia, July 2007.

Dr Collin Phillips

Dr Phillips attended and presented work at the Dynamo Group series of seminars and lectures organised by the School of Mathematics and Statistics, University of Sydney.

Ms Cathy Kennedy

Ms Kennedy participated in the following training and workshops:

- Understanding and Management of Clients with Mental Illness (April 2007);
- Training workshop for MyHROnline, USyd (October, 2007).

7 Future Directions

This report has outlined the teaching programs and research activities of the Mathematics Learning Centre in 2007.

The teaching programs represent our on-going commitment to the needs of our diverse student community. The following teaching initiatives are being planned for 2008 and beyond.

- Continued development of bridging course and supplementary tutorial program.
- Continued development of on-line and electronic resources for students.

The following initiatives are being planned to further develop the Centre's research activities.

- Continuing scholarship on project to explore the ideas of international statistics educators about the teaching and learning of statistics service courses at university. A journal article on the research methodology will be submitted to the *Qualitative Research Journal*.
- Continuing progress on a collaborative project on enhancing and supporting teaching quality in higher education. A journal paper is in progress and will be submitted in 2008.
- Supervision of doctoral candidate, Ms Jennifer Tindale, Faculty of Education and Social Work.
- Commence a project to examine how statistics educators use examples in teaching statistics at university. A conference paper will be prepared.
- The research project: Educators' View of Effective Teaching Approaches in Diverse Disciplines will be implemented during Semester 1 Special Studies Program.
- Conduct a feasibility study to determine which models are computationally practical for the problem where anisotropic thermal diffusion is influenced by rotation (Coriolis forces) and toroidal magnetic fields.
- Continue to revise research on anisotropic alpha-effect dynamos in order for it to be published in the scientific literature.
- Continue to develop research on anisotropic thermal diffusion in a strongly rotationally dominant conducting fluid sphere.
- Conduct research to determine the influence of anisotropic thermal diffusion with strong rotation and azimuthal magnetic fields.

8 APPENDIX 1 2007 Student Surveys

During 2007, twelve surveys were conducted by the Centre. Reports of six surveys together with a report from the 2007 SCEQ are included in this section.

8.1 Bridging course for statistics surveys

This course was introduced in 1988, and is run annually in February. A survey is conducted at the end of the course each year and these surveys are used to further develop and modify the course. Thirty-six students enrolled in the Bridging Course in 2007. Again in 2007, the students were divided according to their unit of study and two similar parallel courses were taught. These groups will be referred to as the Psychology students and the Introductory Biostatistics students.

The students were asked to give an evaluation of the Bridging Course for Statistics in their last class. Thirty five students returned the survey—Sixteen Psychology students and nineteen Introductory Biostatistics students. The students were asked background information, open ended questions and asked to rate the Mathematics/Statistics course they received on a five point scale. A summary of their evaluations appear below.

Table 10: Overall evaluation of the Bridging Course for Statistics 2007: Psychology students

	Poor		Fair		Excellent
Scale	1	2	3	4	5
Count	0	0	0	3	13
%	0%	0%	0%	19%	81%

N=16

Open ended questions: Psychology students

The best things about the course at the Mathematics Learning Centre were:

Nine students commented that the clear explanations of the concepts from first principles and five students commented on the quality of the workbooks as the “best thing about the course”.

The following quotes summarise the students’ responses.

- The friendly environment and the ability to ask any question. The demystifying of maths. The confidence the tutors had that we’ll get it in the end AND that we weren’t stupid.
- Although I had some relevant knowledge on the topics covered, explaining the areas from first principles has given me a better understanding of the concepts that I learnt by rote many years ago.
- Teachers were very patient, started everything from scratch plus they made it very fun .

What things didn't work and how could we improve them?

When asked to comment on negative aspects of the course, eleven students left it blank or said “nothing” or wrote positive comments. One student thought there were possibly too many booklets and they could be condensed into one. One student thought it would be more helpful to cover the content of statistics in the bridging course rather than focus on algebra and numerical skills. One student said:

- To explicitly teach a concept that was covered in the workbook. Texts were at times too verbose and required interpretation and led to confusion after a concept was understood.

Table 11: Overall evaluation of the Bridging Course for Statistics 2007: Introductory Biostatistics students

	Poor		Fair		Excellent
Scale	1	2	3	4	5
Count	0	0	3	9	7
%	0%	0%	16%	47%	37%

N=19

Open ended questions: Introductory Biostatistics students

The best things about the course at the Mathematics Learning Centre were:

Six student commented that it was useful to go over concepts last done in school and eight students commented favourably about some aspect of the teaching or how the course was delivered. The following quotes summarise the students' responses.

- The teaching of concepts — the approach that was taken. Although, the subject rather (at the beginning) was relatively simple, the conceptual approach to teaching made me understand better things that were supposed to be taught at a primary/secondary school level back in my home country.
- Teachers trying their best to make us understand. The nice booklets, which describes all the details.
- It catered for people at the bottom low level of maths like myself. It was delivered in a nice friendly atmosphere encouraging questions/answers.

What things didn't work and how could we improve them?

Six students commented that there was insufficient time in the course to go over all the content with several of those students making specific suggestions for improvement. One students commented that the pace was a little too fast. The following quotes summarise the students' responses.

- Its too complex for starters. I think more time is needed for this eg 4 more days to make 10 days.
- The last two lectures probability/ normal distribution were a bit more difficult and confusing, would have liked to spend more time on them.
- Some things felt like they were left unfinished before beginning the next topic.

Two students suggested that the booklets could be improved by providing space for students to work on the questions. The following quotes summarise the rest of the students' responses.

- It seems that some concepts that will be used in biostatistics were not covered. If most of those concepts can be covered, it will be of great help.
- No clear summary of course, give a summary of the course at the start. Have worked out answers step by step.
- The timing — should be in the morning, should have more computers and if possible an audio-visual system to make things more clear.
- An exam or exercise at the end to assess my understanding and hence confidence therein.

8.2 Supplementary tutorial surveys

MATH1013 Calculus

Teacher: Dr Collin Phillips

This survey was conducted at the end of Semester 2 during a supplementary tutorial for MATH1013 students. Seventeen students returned a survey. The students were asked background information, open ended questions and asked to rate the overall service of the MLC and their confidence in learning mathematics as a result of attending the supplementary tutorial on a five point scale.

Table 12: Overall evaluation of the service of the supplementary tutorial for MATH1013 in 2007

As a result of attending the supplementary tutorials my confidence in learning maths has:

	Decreased		Stayed the same		Increased
Scale	1	2	3	4	5
Count	0	0	0	6	11
%	0%	0%	0%	35%	65%

N = 17

I would rate the overall service of the MLC:

	Poor		Fair		Excellent
Scale	1	2	3	4	5
Count	0	0	1	7	8
%	0%	0%	6%	41%	47%

N=17

Responses to two open ended questions are summarised here.

The best thing about the supplementary tutorial is:

All the students responded to this question. The following responses represent their views.

- Colin goes through everything clearly and at a steady pace. It gives us the necessary tools to pass the course.
- Tutor is really good at explaining concepts and giving reasons for why we are doing things. Perfect slow pace. Confidence building — leave feeling more confident
- If it weren't for these extra tuts I would be failing. They have helped enormously and I am very grateful.
- It was very helpful as the tutor answered questions which were not covered in the normal tutorial. Help with the quiz.

The worst thing about the supplementary tutorial is:

Eleven students left this blank or responded ‘nothing’. The following responses represent the comments made by the remaining students.

- I didn’t hear about it early enough. It only goes for one hour.
- That it is only on once a week.
- Sometimes the pace can be a bit slow.
- Hard to fit into my timetable.

PSYC2012

Teacher: Dr Sue Gordon

This survey was conducted in the supplementary tutorials in Week 11 of Semester 1. Sixteen students returned a survey. The students were asked background information, open ended questions and asked to rate teaching/instruction in the supplementary tutorial on a five point scale.

Table 13: Overall evaluation of the teaching in the supplementary tutorial for PSYC2012 in 2007

I would rate the teaching in the Mathematics Learning Centre statistics tutorials as::

	Poor		Fair		Excellent
Scale	1	2	3	4	5
Count	0	0	0	0	14
%	0%	0%	0%	0%	100%

N=14, 2 missing

The students were asked to evaluate the supplementary tutorials by commenting on the best things about them, the worst things about them and suggestions for improvement.

The following statements taken from the survey encapsulate the range of their responses.

- The supplementary tutorials are excellent. Sue is great at explaining the concepts and just getting the concepts into my head. I would be absolutely lost without this tutorial. Something that could be improved is the time. ... It would be great if the tutorial went for 1-2 hours but other than that this supplementary tutorial is very useful for maths illiterates like me.
- These tutorials are the best thing about statistics! Sometimes the lectures proceed at a rapid pace, so rapid that I am surprised anyone understands. ... Sue finds the perfect balance between explaining the concepts and giving us the tools and the confidence to do the work.
- They are great! Put in a simple way, unravels the problem, makes the subject seem ‘do-able’. Wish there were more!

8.3 Mathematics Workshop surveys

Seven mathematics workshops were held in 2007. The workshops were constituted to cover some areas of basic mathematics that were needed in economics and business units of study. A survey was conducted at the end of each workshop. The survey results of the same workshop from each Semester are included here.

Working with Quadratic, Exponential and Logarithmic Graphs Workshop

Teacher: Ms Jackie Nicholas

This workshop was held in Week 3/4 of Semester, and was attended by 9 students in Semester 1 and 43 students in Semester 2.

Table 14: Overall evaluation of the Mathematics Workshop in Semester 1 2007

I would rate this Maths workshop as:

	Poor		Fair		Excellent
Scale	1	2	3	4	5
Count	0	0	0	5	3
%	0%	0%	0%	63%	38%

N=8

Table 15: Overall evaluation of the Mathematics Workshop in Semester 2 2007

I would rate this Maths workshop as:

	Poor		Fair		Excellent
Scale	1	2	3	4	5
Count	0	0	5	7	16
%	0%	0%	18%	25%	57%

N=28

The students were asked to respond to the following open-ended questions. The following quotes illustrate the students' responses.

The best things about this Maths workshop were:

Semester 1

- I learned useful stuff about log functions which has useful application in my study.
- The whole thing! I liked how the notes followed the instruction.

Semester 2

- Brushed off a few cobwebs.
- Good revision of basic concepts.
- The best lecturer ever, the best lecture notes.

What things didn't work and how could we improve them?

Semester 1

All but one student left this blank or made a positive comment.

- There is a lot of principles that have been introduced (eg a lot of rules without proving), so I'm a little bit nervous about this. Maybe give some brief proofs will be better.

Semester 2

Twenty students left this blank. Other responses include:

- Times were not very flexible and there should be more courses about maths.
- Frequency of holding this kind of workshop should increase.
- Jumped around a little (from topic to topic).

8.4 Drop-in Centre surveys

In 2007, we conducted a survey of the Drop-in Centre in Semester 2. The students were invited by a sign only to participate in the surveys during two weeks at the end of the Semester. Fifty-three students returned a Centre survey. The students were asked to rate the overall service they received from the Centre and whether their confidence in learning mathematics had increased, stayed the same or decreased after attending the Centre. The students were asked a series of open-ended questions about their experience of learning mathematics in the Centre. The results were as follows:

Table 16: Overall evaluation of the service of the Mathematics Learning Centre in Semester 2 2007

	Poor		Fair		Excellent
Scale	1	2	3	4	5
Count	0	1	3	23	26
%	0%	2%	6%	43%	49%

N = 53

Table 17: Self assessment of confidence in learning mathematics as a result of attending the MLC in Semester 2 2007

	Decreased		Stayed the same		Increased
Scale	1	2	3	4	5
Count	0	1	6	20	26
%	0%	2%	11%	38%	49%

N = 53

Open ended questions:

The best thing about the individual assistance at the MLC was:

Many students (17) singled out the teaching for particular mention. It was described as “friendly, helpful and patient”, “very knowledgeable”, and “easy to understand”. Ten students appreciated the opportunity to ask questions, with six stressing the importance of being able to do so without being judged. The following statements taken from the survey encapsulate the range of their responses.

- I was able to work at my own pace and ask any question without getting embarrassed. The time for lectures and tutorials are limited, but we can just go to the MLC “anytime”.
- Their [the tutors] patience and willingness to explain basic principles though they may appear obvious. You guys are a lifesaver!
- The teachers catered to my individual needs. XXXX helped me very well by allowing me to figure out problems with assistance, and would then gauge how good my understanding of that question was. This allowed her to explain to me the areas in which I was making mistakes.

- The immediate feedback that you receive from the tutors stopped me running around in circles with my maths accelerating my learning.

What things didn't work and how could we improve them:

Twenty-seven students left this question blank or commented that they like it the way it was. Thirteen students suggested that more tutors be employed during busy times, and seven students identified waiting for assistance during busy periods as a problem. Four students commented that some tutors spent too long with one student or were unhelpful. The following quotes summarise the students' responses.

- Great as it is. Some tutors spend a very long time on just one person, even when the room is full. I think towards exams have 2 tutors on at busy times.
- During quiz weeks, sometimes there isn't enough space.
- Waiting for long periods of time to receive help, since there was only one person working in the room. This can perhaps be improved by having two people moving round and even working in small groups especially when a quiz is drawing near.
- Increase opening hours so I can visit more often 365 days a year if possible.

8.5 2007 SCEQ undergraduate student survey

In 2007, the Institute of Teaching and Learning carried out a Student Course Experience Questionnaire (SCEQ) survey of undergraduate students. The survey sought feedback from students on their experiences of student support and administrative services as well as University teaching. Questions about the Mathematics Learning Centre were included in this survey. The results of the survey question are given below together with comparative data from previous surveys.

SCEQ 2007 Undergraduate Survey – Mathematics Learning Centre question

Table 18: SCEQ responses of undergraduate students in all years and commencing first year students on the quality of MLC service in 2007

The quality of the service was:

All Years N=159		Responses	Commencing 1 st Year Students N=42	
N	%		N	%
45	28.3	Excellent	10	23.8
77	48.4	Good	22	52.4
25	15.7	Average	7	16.7
9	5.7	Poor	2	4.8
3	1.9	Very Poor	1	2.4

Since 2003, the SCEQ has been administered every other year. SCEQ mean scores of all undergraduates and all first year commencing undergraduates from all surveys administered from 2001 are given in Figure 2.

Figure 2: SCEQ mean scores of all undergraduates and commencing first year undergraduate students on the quality of MLC service for the years 2001, 2002, 2003, 2005 and 2007

