Mathematics Learning Centre

Annual Report 2015

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Introduction and Strategic Plan

The Mathematics Learning Centre (MLC) is one of the central units of the Deputy Vice-Chancellor (Education). The Mathematics Learning Centre assists eligible undergraduate students to develop the mathematical knowledge, skills and confidence that are needed for studying mathematics or statistics at university.

A wide range of teaching programs have been developed to meet the needs of those undergraduate students who enter the University of Sydney without the ‘assumed knowledge’ in mathematics they need for their first level mathematics or statistics units of study.

The Centre, therefore, targets students from the following groups:
- Students who have not studied the appropriate level of mathematics at secondary school which is assumed for their university studies;
- Mature age students who have not studied mathematics for several years;
- Students from overseas or interstate who may find gaps in their mathematical knowledge or who are not familiar with mathematical terms in English;
- Students whose studies have been interrupted for some reason including those students who have taken a ‘gap year’; or
- Students from equity groups.

Attendance at all MLC programs is voluntary.

When students first visit the Centre, their mathematics background is assessed against the assumed knowledge for their units of study. Students are then advised about MLC programs that are suitable for their needs. Students who are not considered eligible at this first visit are referred back to the appropriate teaching staff in their unit of study.

There are three key goals of the Mathematics Learning Centre that are achieved through seven strategies.

Goal 1: Enhance learning support for students by providing leadership and academic support programs in the fields of mathematics and statistics

Strategy 1: Provide bridging programs
Strategy 2: Provide semester programs to support our target groups of students
Strategy 3: Provide eLearning resources

Goal 2: Further develop the research and evidence basis which informs teaching and learning enhancement

Strategy 4: Producing high quality research and scholarship in the field of mathematics, teaching and learning in higher education, or mathematics or statistics education and to disseminate outcomes through publications and conference presentations
Strategy 5: Leadership in the profession and the University

Goal 3: Ensure governance to evaluate, review and enhance MLC functions

Strategy 6: Evaluate and Planning: Plan to ensure the provision of coherent teaching and learning support
Strategy 7: Internal capacity building: Maintain a professional, supportive, collegial work environment for MLC staff
Overview for 2015

2015 was another year of transition for the MLC. There was a major restructure of the DVC Education Portfolio. From October, the MLC was positioned, with the Learning Centre, in the Academic Enrichment group headed by Dr Bronwyn James, Head of the Learning Centre.

Nevertheless, the MLC continued to provide all ‘business as usual’ student support programs.

Jackie Nicholas was on long service leave for three days per week during Semester 1. Dr Leah Neves was employed on a fixed term contract to cover her teaching duties.

Mr Collin Zheng’s two year fixed term contract came to an end in July 2015.

Summary statistics for 2015

About 780 individual students attended MLC programs with more than 560 students attending our semester programs and 257 students attending bridging programs (some students attended multiple programs). The faculty breakdown for the students who attended the Drop-in Centre and supplementary tutorial program is given in Table 1.

Table 1: MLC Drop-in Centre and Supplementary Tutorial Participants

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Number</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and Environment</td>
<td>22</td>
<td>3.9</td>
</tr>
<tr>
<td>Arts and Social Sciences</td>
<td>112</td>
<td>20.0</td>
</tr>
<tr>
<td>Business School</td>
<td>15</td>
<td>2.7</td>
</tr>
<tr>
<td>Education and Social Work</td>
<td>6</td>
<td>1.1</td>
</tr>
<tr>
<td>Engineering and Information Technologies</td>
<td>103</td>
<td>18.4</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>22</td>
<td>3.9</td>
</tr>
<tr>
<td>Science</td>
<td>238</td>
<td>42.5</td>
</tr>
<tr>
<td>Veterinary Science</td>
<td>32</td>
<td>5.7</td>
</tr>
<tr>
<td>Other faculties</td>
<td>10</td>
<td>1.8</td>
</tr>
<tr>
<td>Total</td>
<td>560</td>
<td>100</td>
</tr>
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</table>
Goal 1: Enhance learning support for students by providing leadership and academic support programs in the fields of mathematics and statistics

Strategy 1: Provide bridging programs

Key Achievements

The MLC organises bridging courses in mathematics and statistics in February each year. Students pay a fee for these courses.¹

Mathematics Bridging Courses

The MLC, jointly with the School of Mathematics and Statistics, offered Mathematics Bridging Courses at the HSC Mathematics (2 unit) and HSC Mathematics Extension 1 level. The courses ran in two formats (day and evening) for 24 hours over 12 working days. Two hundred and eighteen students attended: 132 2 unit students and 86 Extension 1 students. The Drop-in Centre was open for 24 hours during the bridging course with 197 student hours of attendance.²

Statistics Bridging Courses

The MLC again offered two Statistics Bridging Courses: a day course for students enrolling in PSYC2012 and an evening course for students enrolling in PUBH5018. Each course ran for 18 hours over 6 days in a two-week period for a total of 32 hours of class time. A total of 39 students attended the statistics bridging courses including 20 Australia Award students for whom attendance was a condition of their university enrolment.

Strategy 2: Provide semester programs to support our target groups of students

Key achievements

The MLC semester programs of supplementary tutorials, workshops and the MLC Drop-in Centre continued in 2015. The total number of student hours of attendance in these programs is given in Table 2. The programs are discussed below.

Table 2: Student hours of attendance for MLC semester programs

<table>
<thead>
<tr>
<th>Source</th>
<th>Semester 1</th>
<th>Semester 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop-in Centre</td>
<td>3381</td>
<td>2506</td>
<td>5887</td>
</tr>
<tr>
<td>Tutorial</td>
<td>368</td>
<td>121</td>
<td>489</td>
</tr>
<tr>
<td>Workshops for Economics Students</td>
<td>310</td>
<td>120</td>
<td>430</td>
</tr>
<tr>
<td>Total</td>
<td>4059</td>
<td>2747</td>
<td>6806</td>
</tr>
</tbody>
</table>

¹ A small number of scholarships were available for mathematics bridging course students.
² A student hour is our measure of Drop-in Centre attendance. It is the number of students \( \times \) the number of hours, so if 2 students spend 0.5 hour each studying in the Drop-in Centre, that equals one student hour.
Drop-in Centre attendance decreased by 18% in 2015 compared to 2014. This brings Drop-in Centre attendance back to 2013 levels. Supplementary tutorial attendance decreased by 40%. We will reassess the relevance of our supplementary tutorial program if this level of attendance continues in 2016.

**Drop-in Centre**

Students can attend the Drop-in Centre at any time during opening hours. It is an informal environment where individual assistance is tailored as far as possible to each student’s needs. We aim to develop a learning community – one where students are expected to understand the mathematics they are studying and learn to think for themselves. All attendance is voluntary.

In 2015, the Drop-in Centre was open for 35 hours per week during semester time, 33 hours per week during Stuvac and in the exam periods for a total of 1128 hours.

Drop-in Centre attendance accounted for 86% of the total attendance in our semester programs.

A description of a busy week will give a snapshot of the operation of the Drop-in Centre. Week 8 in Semester 1 2015 was the third business week in the semester with 299 student hours of attendance. The mean weekly attendance for the Drop-in Centre for Semester 1 2015 was 211 student hours. During Week 8, the Drop-in Centre was open for 35 hours during which time 101 students visited. Forty-three students (43%) made multiple visits with an average of three visits per student. Ten per cent of students who made a visit in this week made at least 4 visits. There were a total of 187 visits with a mean time spent per visit of one hour 36 minutes.

**Supplementary tutorials**

During 2015, supplementary tutorials were held for students in the following units of study: MATH1001/2, MATH1003, MATH1011, MATH1013, MATH1014, MATH1111, PSYC2012 and PUBH5018.

The supplementary tutorials are held (in most cases) once a week from Week 2 to Week 13 for a total of 116 hours of class time.

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.

Some tutorials were not well attended in 2015. The program will be reassessed in 2016 if this trend continues.

**Workshops for School of Economics students**

In the first eight weeks of each semester, a series of workshops were held for students studying economics units of study in the School of Economic, Faculty of Arts and Social Sciences. The workshops covered topics in mathematics and probability that would be useful for students studying economics and statistics.

A total of 12 two-hour classes were held. Over 65 students attended at least one class.
Strategy 3: Provide eLearning resources

Key Achievements

MLC staff have produced learning resources for our students since 1986. In 2010 we received a HEPPP grant to produce eLearning resources for our Mathematics Bridging Course students and have been producing short videos covering topics in mathematics ever since. In 2015 we added 27 new videos to our eLearning resources.

‘Just in time’ videos

In 2015, a series of 23 ‘Just in time’ videos were produced for students enrolled in MATH1111: Introductory Calculus. These short videos were linked to their unit of study tutorial material and covered a topic in the tutorial questions that was likely to cause the students difficulty. They were released progressively during the semester in the days following the relevant tutorial. An indication of their use is given in Table 3.

Modelling and Calculus videos

The Modelling and Calculus eLearning project continued with Dr Collin Phillips and Mr Collin Zheng making an additional four audio-visual modules. One module explained and solved the logistic differential equation while the remaining modules covered the three possible cases that can occur when solving a second order differential equation with constant coefficients. This project focuses on helping first year mathematics students with the language and techniques of mathematical modelling and is relevant for students enrolled in MATH1013 and MATH1003.

Student use of MLC web resources

Table 3 gives a court of visits and page views for the resources on our web pages from 1 January to 31 December 2015.

Table 3: Count of visits and page views for MLC web resources for 2015

<table>
<thead>
<tr>
<th>Web material</th>
<th>Visits</th>
<th>Page views</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper based materials</td>
<td>13078</td>
<td>15599</td>
</tr>
<tr>
<td>MATH1111 'Just in time' videos</td>
<td>1560</td>
<td>1818</td>
</tr>
<tr>
<td>Modelling and calculus videos</td>
<td>215</td>
<td>265</td>
</tr>
<tr>
<td>Mathematics Bridging Course videos</td>
<td>4772</td>
<td>5846</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19625</td>
<td>23528</td>
</tr>
</tbody>
</table>
Goal 2: Further develop the research and evidence basis which informs teaching and learning enhancement

Strategy 4: To produce high quality research and scholarship in the field of mathematics, teaching and learning in higher education, or mathematics or statistics education and to disseminate outcomes through publications and conference presentations

Key Achievements (MLC staff in bold)

C1 Refereed journal articles


C3 Article in a professional journal


E2 Conference paper (Abstract refereed)


2015 PhD awarded

Candidate: Ms Jennifer Anne McPherson

Title of thesis: Comparing ‘apples with apples’: Professional accounting practices in university classroom discourse.

Principal Supervisor: Dr Sue Gordon
Strategy 5: Leadership in the profession and the University

Key achievements

This strategy was realised in the following ways.

Presentation at an inaugural international conference

In June 2015, Ms Jackie Nicholas gave a presentation at the inaugural conference on Barriers and Enablers to Learning Maths: Enhancing Learning and Teaching for All Learners. The conference was organised by Institute of Mathematics and its Applications and hosted by the University of Glasgow.

Professional consultancies

Ms Jackie Nicholas was the Faculty Liaison in mathematics for the University of Sydney Foundation Program, Taylor’s College.
Goal 3: Ensure governance to evaluate, review and enhance MLC functions

Strategy 6: Evaluate and Planning: Plan to ensure the provision of coherent teaching and learning support

Key Achievements

All MLC bridging courses are assessed for their relevance and quality by student survey, and changes are made as needed. In 2015, 32 of the 34 students who returned a survey at the end of the statistics bridging courses reported that their confidence in learning statistics had increased and 32 of out 34 students (94%) rated the bridging courses as either good or excellent.

Statistics were tallied weekly to track the student attendance in the Drop-in Centre. Adjustments were made to the teaching schedule as needed.

Strategy 7: Internal capacity building: Maintain a professional, supportive, collegial work environment for MLC staff

Key Achievements

MLC staff are provided with financial support to attend conferences both in Australia and overseas. In 2015, Ms Jackie Nicholas received partial funding to attend the IMA Conference on Barriers and Enablers to Learning Maths, in Scotland in June.
Staff of the Mathematics Learning Centre 2015

Academic Staff
Ms Jackie Nicholas BSc (Hons) MSc Hull DipLaw LPAB GradDipLegalPrac College of Law
Head | Senior Lecturer

Dr Collin Phillips BSc (Hons) DipEd PhD Sydney
Senior Lecturer

Mr Collin Zheng BSc (Hons) Sydney
Associate Lecturer (0.5 until August 2015)

Dr Leah Neves BMath (Hons) UoN PhD Sydney
Associate Lecturer (0.5 February to June 2015)

Professional Staff
Ms Susan Robinson BA Sydney

Academic Research Affiliates
Dr Sue Gordon BSc (Hons) MSc Witw DipEd DipDatametrics SA PhD Sydney

Casual Academic Staff
Dr Nahid Banihashemi BA Amir Kabir U Tech MSc Chamran PhD UniSA

Dr Jo Bellanca BA WC MA PhD SUNY

Dr Peter Geelan-Small BA DipEd Sydney GradDipAppLing CDU 8LandWaterSc PhD Sydney

Dr Erwin Lobo BSc (Hons) PhD Sydney

Mr Alex Majchrowski BSc (Hons) Sydney

Dr Krishnasamy Muraleedaran BSc Sri Lanka MSc PhD Sydney

Mr George Papadopolous BSc (Hons) MSc Sydney

Mr Geoff Phillips BSc (Hons) Sydney

Mr Collin Zheng BSc (Hons) Sydney