

MANSW Conference 2008, Sept. 19-21

Novotel Northbeach, Wollongong

NOTES BY DEREK BUCHANAN

FRIDAY

9-10: Board of Studies Update - Secondary with Peter Osland, Margaret Bigelow and Chris Thompson

Feedback from submissions:

Content:

General: There was support for splitting it into Gen. 1 and 2. However there was some concern for the level of difficulty of Gen. 1.

Adv./Ext. 1/Ext. 2: There was support for maintaining rigour, introducing statistics and removal of conics and reduction of Harder Ext. 1. There were however concerns that it would be too hard for Stage 5.2 students from year 10 and that there is too much in Adv. Prelim, and that that part of the course was too hard.

Assessment:

Use of technology needs to be clarified.

MC: There was some support for this, but also a lot of teachers have rejected it.

Question still to be resolved: Should a formula sheet be provided for all maths courses?

It has been decided that 10 min. reading time will be included and writing will be allowed during this time.

Note that despite advice by Bill Pender and others to delay the release of the final syllabus, the Board has decided to release it in December 2008 as originally planned and that it is to be programmed for during 2009 and implemented in 2010.

Resources:

Draft syllabuses:

http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/mathematics-advanced-st6-draft.pdf

http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/mathematics-extension-1-st6-draft.pdf

http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/mathematics-extension-2-st6-draft.pdf

http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/mathematics-general-1-stg6-draft.pdf

http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/mathematics-general-2-stg6-draft.pdf

http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/preliminary-mathematics-draft-course-content.pdf

Sample papers:

http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/maths-sample-hsc-draft-st6.pdf

Bill Pender's submission (reproduced with permission):

<http://community.boardofstudies.org/attachment.php?attachmentid=16657>

IEU's submission:

<http://community.boardofstudies.org/attachment.php?attachmentid=16640>

MANSW's submissions:

<http://www.mansw.nsw.edu.au/members/stage-6-review/MANSW-Advanced-Ext-1-Ext-2-response.pdf>

<http://www.mansw.nsw.edu.au/members/stage-6-review/MANSW-General-1-2-response.pdf>

Derek Buchanan's submission:

<http://www.angelfire.com/ab7/fourunit/submission3.pdf>

National Curriculum to be implemented in 2011:

Latest document is

http://www.ncb.org.au/verve/_resources/National_Mathematics_Curriculum_-_Framing_Paper.pdf

and submissions for this are due by Feb. 28, 2009.

Also, the National Curriculum Board is to be replaced by the Australian Curriculum, Assessment and Reporting Authority in accordance with the Australian Curriculum, Assessment and Reporting Authority Bill 2008:

[http://www.comlaw.gov.au/ComLaw/Legislation/Bills1.nsf/0/A7331E620B89771FCA2574EB000423B4/\\$file/R3100B.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/Bills1.nsf/0/A7331E620B89771FCA2574EB000423B4/$file/R3100B.pdf)

This Bill has passed both Houses of Parliament and becomes an Act of Parliament upon receiving Royal Assent from the Governor-General, the date of which will be revealed on the Attorney-General's website, www.comlaw.gov.au.

10:30-12: One English Educator's Perspective on Mathematics Education with Paul Brock

Commencing with his reflections on his earlier experience as a student of Mathematics, Dr Brock explored some of the relationships between the knowledge, understanding and skills of the English language, and those of Mathematics. In doing so he referred to the findings of the National Numeracy Review Report, commissioned by the Council of Australian Governments (COAG), which was completed in May this year. He drew attention to one of the greatest, yet virtually forgotten, 18thC Mathematicians, whose obscurity is due to the fact that she was a woman. Dr Brock then proceeded to address the serious issue of the lack of sufficient numbers of properly qualified Mathematics teachers in Australian secondary schools. In doing so he reinforced and expanded upon some of the most salient recommendations from the Commonwealth Government commissioned research report *Maths? Why Not?*, released in April this year. His paper highlights the key findings of the Mathematics component of the AESOP research project, chaired by Professor John Pegg and Dr Brock, published as *Exceptional Outcomes in Mathematics Education* (Pegg, Lynch and Panizzon 2007). Dr Brock concluded his paper by referring to the broader responsibilities for Australian educators articulated in *The Adelaide Declaration on National Goals for Schooling in the Twenty-First Century*.

1-2: Multiple Choice in Yr 12 examinations with Garry Webb and Chris Thompson

Multiple choice items are effective measurement items that are used for assessing mathematical knowledge and skills in many contexts from primary education through to tertiary. Multiple choice items have been used in NSW HSC examinations for many years in the non-calculus courses. The draft examination specifications for the new syllabuses include multiple-choice and other objective-response items in the calculus-based courses for the first time from the 2011 HSC examinations. This session examined how this type of item can contribute to effective assessment of achievement in these courses.

2-3: Logarithms (with a bap) with Stuart Palmer

Many students meet logarithms for the first time in Year 12 (or very late in Year 10) For many of them, it is a baffling topic indeed, especially if the early lessons are rushed in order to get to the calculus bits. During this session, participants saw some novel and unusual methods for building student confidence and understanding. What is a BAP? Base Answer Power. Or Bread And Powder. Participants also ate Bread And Powder provided free of charge by Baker's Delight!

3-4: Surface area of a pyramid with John Mack

Recently, via the AAMT community list, Anthony Harradine reported on a nice problem (which came to him from Mike Evans) that he had given a Year 10 class wanting a challenge. The problem appealed to John because it combines geometry, symmetry and some simple algebra in an interesting way, and has a link to both a well-known simpler problem about a triangle and to a less well-known and by no means simple problem. Here is its statement: \mathcal{P} is a pyramid on a square base $ABCD$ with vertex V at height h above the base. What position of V makes the sum of the areas of the four sloping sides of \mathcal{P} a minimum? There are many ways to solve this problem. John described one that uses coordinate representation to convert the problem into algebraic form. He began by presenting the Fermat Point problem for triangles and ended by sketching a far-reaching generalisation. Anthony and John hope

to soon write a short paper on this.

Resource:

<http://www.mansw.nsw.edu.au/pd/conference/2008/presentations/Mack-Surface-Area-of-Pyramid.doc>

4:30-5:30: Data in a calculus course with Russell Brown

In the new Preliminary Mathematics Advanced course the unit PMA6: Data analysis requires students to describe and summarise data, compare related sets of data visually and analyse data in order to make conclusions about trends. In this session participants used the interactive TI-Nspire CAS computer software to explore this topic from graphical visualisations through to spreadsheets. The use of technology such as spreadsheets is encouraged in this topic, enabling students to use real data to produce a variety of graphs and tables. Interactive visualisations of the process of finding a least squares line of best fit, correlation and regression can also be addressed using technology.

SATURDAY

9-10:15: Multiples of 3 - Code Breaking with John Mack

In mid-1939, the Imperial Japanese Navy (IJN) introduced a new, high-level operational radio signal code for use across its bases and warships. British codebreaker John Tiltman determined the two-stage structure of this system within a few months, but the task of learning how to decrypt radio messages sent in it was much more difficult, in that little had been achieved by the time of the infamous Japanese attack on Pearl Harbor in December 1941. This stimulated a much greater Allied effort in attacking this coding system. That, together with some critical blunders made by the IJN, led to the interception and decryption of messages in this code becoming a principal source of intelligence to the Allies for the rest of the Pacific War, from the May 1942 Battle for the Coral Sea onwards. Some interesting statistical techniques were developed to exploit the 'multiples of three' blunder underlying the structure of this code, referred to by the Allies as the JN-25 system. John described the code and its structure and explained how its weaknesses were exploited by Allied codebreakers.

11-12: Mathematics for Engineering with Mary Coupland

In this presentation, examples were given of applications of mathematics to selected engineering subjects at university. Mary went from straight lines to linear algebra, from calculus to differential equations, and considered some interesting applications of integration.

1-2: HSC & UAC results - scaling with Simon Price and Peter Hargraves

This presentation explained the various scaling procedures that are used by the BOS and UAC. This included an overview of scaling of HSC results and the UAI. The Tertiary Entrance Scores (Scaled marks) for many 2007 HSC subjects were compared. The effect of Standardisation and Multi Linear mapping were compared for inschool scaling. Participants are able to download Powerpoint and Excel files to use after the presentation for demonstrations and PD back at their own school.

Resources:

<http://www.mansw.nsw.edu.au/pd/conference/2008/presentations/Price-Hargraves-HSC-UAI-07.xlsx>

http://www.mansw.nsw.edu.au/pd/conference/2008/presentations/Price-Hargraves-HSC_UAI-Scaling-2008.pptx

<http://www.mansw.nsw.edu.au/pd/conference/2008/presentations/Price-Hargraves-SCALINGMARKSvsMULTILINEARMAPPING.xlsx>

<http://www.mansw.nsw.edu.au/pd/conference/2008/presentations/Price-Hargraves-TESTSTUDENT.UAI>

2-3: Mathematics Guide to the NSW Global website with Allan White and UWS trainees

Participants were given a draft guide to the NSW Global Education Site www.globaleducation.edna.edu.au. The guide is structured along the NSW 7-12 Mathematics Syllabus. It is designed to assist teachers access to this “gold mine” of resources.

Resource:

<http://www.mansw.nsw.edu.au/pd/conference/2008/presentations/White-Draft-Guide-Global-Education.doc>

3-4: Graphics Calculator - Data Analysis with Marian Kemp

The Draft Syllabus for Preliminary Mathematics Advanced Stage 6 encourages the use of technology for teaching and learning at this level. In this hands-on workshop, we explored some of the ways in which a Casio fx-9860G AU graphics calculator can be used effectively for this purpose by students and teachers in the Data Analysis topic, including work with correlation, regression and the normal distribution. No previous experience with graphics calculators was assumed.

4:30-5:30: Graphics Calculator - Simultaneous Equations with Russell Brown

Whilst graphing calculators are not allowed to be used in examinations their use is encouraged for explorative and learning purposes in the classroom. Use the TI-Nspire CAS handheld to explore several ways of solving simultaneous linear equations that will enhance student understanding. In this hands on session we used step by step algebraic methods, standard built-in solve functionality, graphical (visual) approaches and matrix methods to solve a selection of both linear and non-linear simultaneous equations. No previous experience using a graphics calculator was necessary for this workshop.

SUNDAY

9-10: Visualisation in Mathematics with Chris Longhurst

In this workshop Chris outlined, briefly, the main points that the movie and book “The Secret” highlight and relate this to visualization in mathematics and its effect on confidence and learning. He drew on his doctoral research and case studies using visualization as a tool to show how this can be used in mathematics education to promote learning and the confidence of students in the subject. This workshop provided some interesting insights for the teaching and learning of mathematics and explored how we might be able to use non-traditional approaches.

10-11: Assignments for Focus Studies with Dawn Bartlett

This workshop explored some assignments that have been used with students in a content endorsed course that has a similar structure to the focus studies in the new General 1 course. During the workshop we also explored how to develop and implement assignments for the new course using what was provided in the draft syllabus documents. Also, there was discussion of some of the issues in assessment using assignments for students with low levels of literacy and numeracy, eg., doing a large amount of the assignment in class time to prevent cheating.

11:30-12:30: Data Analysis in Mathematics Advanced with Neville Weber

This presentation focussed on the PMA6:Data Analysis topic in the Draft Syllabus for Mathematics Advanced. The theme “Putting it Together” is a reference to a song in Stephen Sondheim’s “Sunday in the Park with George”, emphasising how different statistics help us build a picture about the behaviour of a population. We reviewed means and variances, correlation and regression. The Data Analysis section can lend itself to some interesting mathematics. Some alternative ways of presenting the regression line were presented for more able students.

Resource:

<http://www.mansw.nsw.edu.au/pd/conference/2008/presentations/Weber-Data-Analysis.pdf>

12:30-1:30: Teaching Ext. 2 Mathematics with Rodney Miller

According to Rodney, teaching Extension 2 can be a daunting, lonely and stressful experience for some. This session provided encouraging advice in teaching and exam setting so that any Mathematics teacher can have the tools and confidence to undertake the very rewarding experience of teaching Extension 2 Mathematics.

Resource:

<http://www.mansw.nsw.edu.au/pd/conference/2008/presentations/Miller-Anyone-can-teach-Ext-2.ppt>

Note: Other resources for this and previous conferences are available at

<http://www.mansw.nsw.edu.au/pd/conference.htm>