

# Upskilling Student Numeracy

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# Session Overview

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- Brief history of issues

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# Brief History – Numeracy Issues

- students have found calculations difficult dating back to 1930's in both Australia and USA (Eastwood, Boyle, Williams & Fairhall, 2011; Faddis, 1939)
- UK studies – many health studies students make errors in drug calculations (Wright, 2005)
- NZ – “difficulties with proportional reasoning, medical calculations, calibrations and conversion of volumes” (Hobbs, 2014)
- math prerequisite:  or not

# Brief History – Responses to Issues

- common across many institutions:
  - tutorials, workshops, embedding, learning advisor support, online support
- NZ – PASS, strategies to reduce anxiety (Hobbs, 2014)
- Aus – address concepts, problem solving, clinical setting contexts (Coyne, Needham & Rands, 2012)
- USA – multi-faceted, innovation, technology (Hunter & McCurry, 2013)
- UK – 3 stage approach: concepts, formulae, clinical practice (Wright, 2005)

# Early Response by ACU

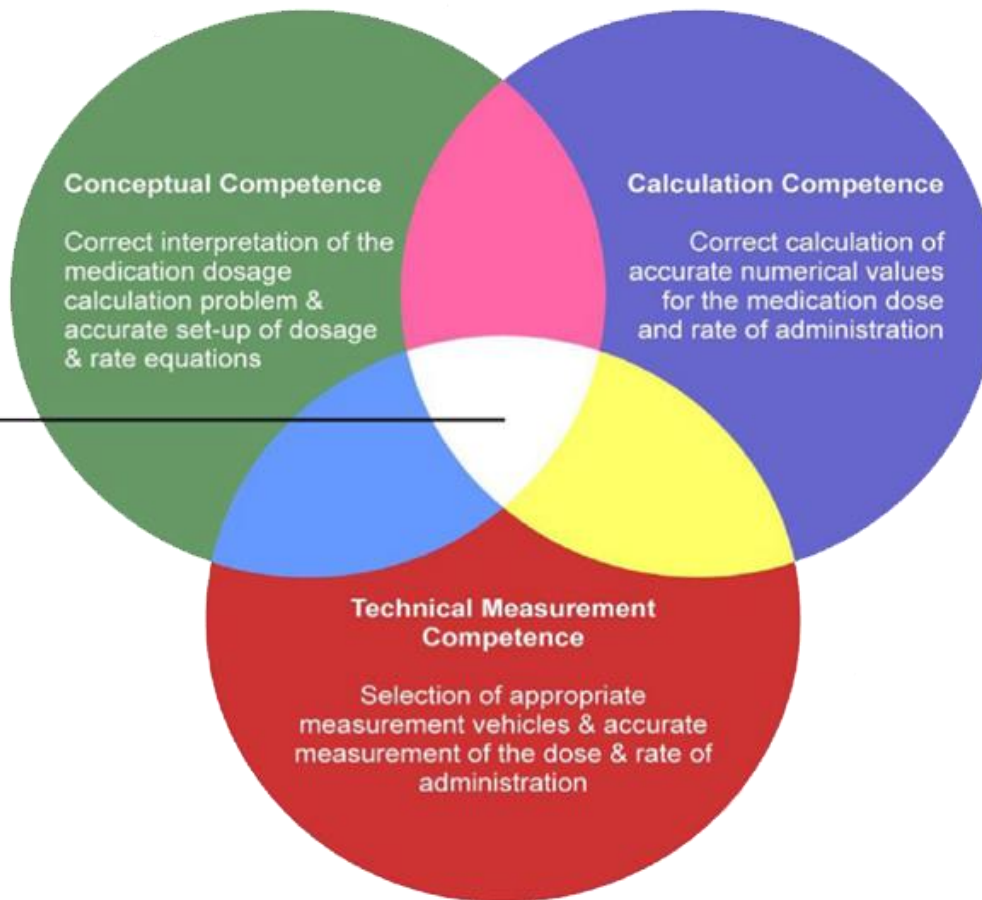
**“ACU is Australia’s largest educator of nurses and teachers”**



(Quote from Australian Catholic University *International Student Guide* 2016)

# ACU Response

Competence in Medication Dosage Calculation Problem Solving



Coben and Weeks (2014) hold that the intersection between literacy and numeracy is critical to effective assessment of competence in drug calculations

Benseman, Sutton & Lander (2005) recommend that numeracy should be taught by specialists rather than the lecturer.

Adapted from: Educational Studies in Mathematics (2014) 86:253–270  
DOI 10.1007/s10649-014-9537-3

# ACU Response

- Bertozzi (2016):
  - effectiveness of lectures alone
  - blended learning favoured
  - online materials and lectures/tutorials
  - students who utilised mixed resources performed better than students who attended lectures only

# ACU Response

- promotion: faculty heads, e-billboards, flyers
- “cameo” sessions in lectures for nursing, midwifery
- idea for a diagnostic tool to identify potential strugglers
- pre-exam tutorials on drug dosage calculations
- informed by Hutton, as quoted in Wright (2007, 279): A revision program for 184 out of 231 students who scored less than 75% on a 50-item maths test

# Diagnostic Tool – Sample Questions

1. Write one half as a fraction.
2. Which is larger:  $\frac{2}{3}$  or  $\frac{2}{5}$ ?
3. Arrange in order from smallest to largest: 0.54, 0.6, 0.312
4.  $\frac{1}{5} \times \frac{2}{3} =$                        $\frac{2}{3} \times 5 =$
5. You have a bottle of 100ml of medicine. The strength of the medicine is 5mg per 2 ml. If you administer 10 ml, how many mg are you giving?
6.  $5 : 8 = x : 20$ ,  $x = ?$                       (Many students found this difficult)

# Results . . .

[illegible]

Problems involving reading and understanding the question, and deciding which strategy to use to solve the problem or answer the question.

# ACU Response

- September 2012 – p/t numeracy advisers all campuses
- consultation appointments & drop-ins began increasing
- wider cohort of students incl. Ex Sci., Accounting and Psych.
  - concerns included mechanics, formula manipulation & statistics
- 2013, advisers for all campuses p/t but greater
- diagnostic quiz: final modification, fully embedded

# LANTITE – Literacy and Numeracy Test for Initial Teacher Education

- national collaborative project
- preparing students to sit for the LANTITE test
- develop a series of resources including:
  - live face-to-face workshops
  - online workshops using Adobe connect
  - quizzes, tip sheets, pdf worksheets
  - videos using Adobe Captivate
  - sample/practice questions
  - practice at doing the test online

# LANTITE – ASU Support

ASU support for ACU students sitting LANTITE



Association for Academic Language and Learning

## CONFERENCE 2017

1st - 3rd November | Geelong, Australia

A wide banner image showing a coastal scene at sunset. In the foreground, there's a grassy area with a few palm trees and some small structures. In the middle ground, a long, curved pier extends into the water. The sun is low on the horizon, creating a warm, golden glow. The text '21ST CENTURY LANGUAGE AND LEARNING' is overlaid on the left side of the image in a large, white, serif font.

# 21ST CENTURY LANGUAGE AND LEARNING

13th Biennial Conference of the  
Association for Academic Language  
and Learning

**ACU**

Office of  
Student Success

# Graduate Attributes

- think critically and reflectively
- demonstrate values, knowledge, skills and attitudes appropriate to the discipline and/or profession
- solve problems in a variety of settings taking local and international perspectives into account
- locate, organise, analyse, synthesise and evaluate information

([http://www.acu.edu.au/about\\_acu/our\\_university/for\\_employers/employ\\_acu\\_students/graduate\\_attributes](http://www.acu.edu.au/about_acu/our_university/for_employers/employ_acu_students/graduate_attributes))

# Academic Skills Unit Response

- looked at numeracy concepts in different courses
- decision to develop generic workshops \*
- initially:
  - Problem solving
  - Basic algebra
  - Applied algebra
  - Interpreting graphs and tables
  - Ratio and proportion
- also [tip sheets](#), summary sheets, animated powerpoints to explain processes and methods

# Academic Skills Unit Response

- more recently added PowerPoints on:

Terminology

Unit conversions

Percentages

Estimation (Adobe Captivate)

Rates



- in the pipeline:

Basic statistics, Fractions & operations, Basic geometry  
Adobe Connect workshop\*

- All resources comply with UDL guidelines\*

# Academic Skills Unit Response

The screenshot shows an Adobe Live Workshop session. The main presentation slide is titled "Application to Exercise Science" with the ACU logo. It contains an exercise question about sugar concentration in blood and a solution. On the right, a poll is active asking if the concentration is in the normal range. The poll shows 100% "Yes" votes. The left sidebar contains notes and resources. The bottom right shows a chat window.

**Notes**

Just starting? Look over here:

Welcome to the Preparing for Numeracy Workshop.

Your hosts are:  
Michael Russo  
Kate Nolan

Michael will be presenting the workshop.

Kate is your go-to person for any issues or if you need help during the workshop.


On the lower right corner of your screen is the chat box. Please use this to communicate with us.

On the centre of the menubar above is the "hands up" icon. At times, the presenter may ask you to use this to answer a question.

Below are some useful links that may be helpful during the workshop. Copy them into your web browser when needed.

**Workshop Resources**

Online calculators:  
<http://www.calculator.net/scientific-calculator.html>  
<http://www.online-calculator.com/online-scientific-calculator/>

**Application to Exercise Science**   
AUSTRALIAN CATHOLIC UNIVERSITY

**Exercise:** In a person whose body contains 5.1 L of blood, there are 4.692 g of sugar. Is this in the normal range of 0.8 – 1.1 mg/ml?

**Solution:**

Convert 5.1 L to 5100 ml and 4.692 g to 4692 mg.

Divide 4692 mg by 5100 ml

$$4692 / 5100 = 0.92 \text{ mg / ml}$$

This reading is in the normal range.

**Is this in the normal range of 0.8 - 1.1 mg/ml?**

View Votes Edit End Poll

Is this in the normal range of 0.8 - 1.1 mg/ml?

☐ No 0% (0)

☒ Yes 100% (1)

☐ Impossible to calculate 0% (0)

☐ No Vote

☐ Broadcast Results

**Hosts (1)**

Michael Russo

**Presenters (0)**

**Participants (0)**

**Chat (Everyone)**

Everyone

## Academic Skills Unit LEO (**L**earning **E**nvironment **O**nline) Page

- pdf files of workshop presentations
- other ppts incl Terminology, Misleading Graphs & Tables
- interactive tutorials e.g. converting between metric units of measurement
- Captivate videos: equation solving, statistics tricks . .
- other resources in development, eg Self correcting quizzes with feedback for topics already resourced.
- resources viewable on all devices

# Further Resource Development

- project – resources suitable for all devices (tablets, phones, computers, etc.)
- on-line quizzes (eg [Percentages](#))
- further workshops, based on student feedback:
  - build your speed and accuracy in calculations
  - use number patterns and logic to simplify calculations
  - expand basic statistics skills
  - solve equations logically

# Collaborative exercise

Name	Institution	email

# Collaborative exercise

## Interactive/Sharing

How is numeracy support conducted/delivered at your institution?

What types of resources have been developed?

What do you think provides optimum support?

What software applications have you used?

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