A model to embed academic numeracy at University

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Outline

• Intro (10 mins)...broad Aust context
• Discuss your context (20 mins)
• Outline a model(20 mins)
• Workshop other models (30 mins)
• Conclusion (10 mins)
1993:
“it was apparent that even within the one institution, many staff were not aware of their institution's preparatory programs, or were misinformed about prerequisites or the undergraduate programs which accept this entry method. In many instances, this state of affairs existed despite repeated attempts by relevant staff to keep others informed.” … many academic and non-academic staff alike are unaware of the exact target and purpose of such [i.e. Access and Equity] programs offered by their own university. This internal lack of awareness of programs also contributes to problems in gaining uniform recognised guidelines across all faculties within any one institution.” (para 2)
Cobbin, Barlow and Gostelow (1993)
2005

• How is success defined in bridging mathematics activities?
• What are the numeracy demands on entry to ‘non-mathematical’ university study?
• What are effective ways to support that study?
• Are successful bridging students successful university students?
• Is it more than mathematics?
Support staff in 1999/2007

• 23/35 to 32/39
• a Mathematics Department (40/44%).
• Student Services types of structures (30/0%).
• a dedicated standalone section, such as a ‘Mathematics Learning Centre’ (12/41%).
• Both Maths Dept and Central (0/16%)
Learning support in mathematics and statistics in Australian universities

A guide for the university sector

ERROR

The requested URL could not be retrieved

While trying to retrieve the URL: http://silmaril.math.sci.qut.edu.au/carrick/
• 2010: 4/44 maths
• 2013: 21/102 maths/numeracy/stats

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NCVER

- **2010 report & forum**
- Language, Literacy and Numeracy Program (LLNP)
- Workplace English Language and Literacy (WELL)
- Seeking the N in Numeracy
Media release

Leading VET researchers head to Rockhampton

Leading vocational education and training (VET) researchers from across Australia and New Zealand head to Rockhampton this week to discuss equity, engagement and the evolution of VET at the 25th National Vocational Education and Training Research Conference ‘No Frills’.
Your reality

• Sector
What is your story

• Where is the maths support?
• Where is the maths?
• Where is the research?
• Where is the service teaching?
• Are you an “academic?”
• Are you full time?
• Time for scholarship?
• Links to other services/support?
• Relationship to literacy?
• Relationship to context?
..... Literacy

- Digitacy
- Mathematical literacy
- Quantitative literacy
- Statistical literacy
- Financial literacy
Pathways

Galligan, 2013a, p.736
Academic numeracy

• mathematical **competence** in the particular context of the profession and the academic reflection of the profession at the time;

• **critical** awareness of the mathematics in the context and in students’ own mathematical knowledge and involves both cognitive and metacognitive skills; and

• **confidence** highlighting its deeply affective nature
Model

(1) At the university level  (2) At the program level  (3) At the course level

Galligan, 2013a, p. 740
University level

Keimig (1983)
Program level

Willison and O’Regan (2007) model for research
Course level

Taylor and Galligan (2002)
Individual level

(4) At the student and teacher level
9 approaches

1. Administer self-assessment (3 c’s)
2. Identify stuck points
3. Research
4. Link/develop appropriate material
5. Activate students developing numeracy
6. Show alternatives and link to graduate attributes and or university expectations
7. Provide flexibility
8. Staff development
9. Cooperation between staff
What is often done...

- Diagnostic testing
- Remedial
- Scattergun and short term solutions
- Cyclic
Diagnostic

- access to diagnostic testing with student enrolment (Kemp et al. 2011).
- James Cook University (2013) developed (PENAs) with follow-up support.
<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
<th>Trials/ research</th>
<th>Discipline</th>
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<tbody>
<tr>
<td>Pre 1998</td>
<td>Paper based maths testing (competence); Anxiety scale and approach to study inventory</td>
<td>(Galligan et al., 1994)</td>
<td>Engineering, psychology, business, science</td>
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<tr>
<td>1998</td>
<td>Convert to online Self-Test (competence only)</td>
<td>Research focussing on the reliability of Self-Test (Taylor 1998)</td>
<td>Engineering</td>
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<tr>
<td>1999-2005</td>
<td>Adapt Self-Test to other disciplines</td>
<td></td>
<td>Statistics, Economics, Nursing, Enabling mathematics courses</td>
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<tr>
<td>2006</td>
<td>Embed Self-Test into new Nursing Course (included confidence scale)</td>
<td></td>
<td>Nursing</td>
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<td>2008</td>
<td>Developing academic numeracy framework (reflection component trialled)</td>
<td>Research into academic numeracy for nursing (Galligan 2011a;b;2013a)</td>
<td>Nursing</td>
</tr>
<tr>
<td>2009</td>
<td>Self-Test for Education (included 3 components of academic numeracy)</td>
<td>Trial</td>
<td>Education</td>
</tr>
<tr>
<td>2012</td>
<td>Embed Self-Test into Education Course (3 components)</td>
<td>Research into academic numeracy education for Engineering &amp; Education (Galligan et al., 2012)</td>
<td>Engineering; Engineering</td>
</tr>
</tbody>
</table>
• Lawrence (2008) Re-thinking diversity in higher education: the 'deficit-discourse' shift
Methodologies

• Haggis (2009)
• Barnett (2011)
• Shay (2012)
• Roth & Lee (2007)
• Wells and Edwards (2013)
A person involved in mastering a skill is no longer lacking that skill, nor is the skill present in its fully-fledged form. The skill is coming into existence. The phenomenon here is quasi structured. Rudiments of the skill can be detected in the flow of conduct, yet nobody can say for sure that the skill as such already exists (2001, p.105)
Journey of devpt

Powerful, comprehensive, joint research and development base

Galligan 2013b, p. 30
Your turn...

• other ideal “worlds”
Questions

• What are the issues around academic numeracy and mathematics at university and elsewhere: awareness raising, recognition.....?
• Other issues particularly to numeracy: anxiety, technology, success,....
• Research – depth, quality, recognition, time, combining theoretical understandings?
• Networks – ALM type, need conference and journal connections....?
• Is there a crisis?
• Other?
References

• Galligan, L. (2002). I can only do it with Aspirin. In G. Crosling & G. Webb (Eds.), *Supporting Student Learning: Case Studies, Experience and Practice from Higher Education* (pp. 81-87). London: Kogan Page.


