The Academic Numeracy Framework: A tool to embed numeracy in tertiary courses, programs and study-support initiatives

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Abstract

Academic numeracy is critical to succeed in a wide range of studies and in the workplace. A systematic approach to academic numeracy by tertiary institutions is crucial to effectively embed numeracy into the curriculum and learning-support initiatives. Using action research and a mixed-methods approach, this project will produce a mature, tested and trialed Academic Numeracy Framework based on an initial version developed at UniSQ. The Framework will be updated to include 'confidence' and contextual 'critical awareness' elements, refined via feedback from teaching and study support staff, and trialed in a commencing course. This initiative will provide a tool to facilitate the systematic embedding of numeracy across disciplines in tertiary institutions. The current Framework will be presented, and participants will be invited to provide feedback.

Proposal

Rationale

This study will develop a mature, tested and trialed Academic Numeracy Framework, based on an initial version developed at UniSQ. Academic numeracy is critical to succeed in a range of studies and the workplace (Shomos & Forbes, 2014). However, a proportion of students fail to meet numeracy expectations throughout their studies (Quinnell & Thompson, 2010). This is exacerbated by a lack of mathematical pre-requisites in many Australian universities, resulting in an assumed knowledge gap, which is particularly important for students pursuing non-mathematical courses requiring numeracy skills. Developing numeracy entails selecting appropriate mathematics in context, using it with competence and confidence, and ensuring that the solution aligns with the situation (Bell et al., 2020).

To address this gap, it is critical to develop academic numeracy together with course content (Frith et al., 2010), including 'confidence' and 'critical awareness' elements (Galligan, 2013a), and adopting a systematic approach encompassing university, program, and individual (student & teacher) domains (Galligan, 2013b). This approach contrasts with current practices, in which numeracy development may result in multiple, fragmented, and ineffective initiatives. The latter can fuel mathematics anxiety, when the learner is unable to appreciate their own needs within confounding structures (Dowker et al., 2016). The Framework will support the

systematic embedding of academic numeracy in all domains via assessing and comparing the target, assumed and actual numeracy of students, thus informing curriculum design, delivery of courses, programs, and learning support initiatives.

Approach / method.

The study will employ an action research approach and mixed methods to advance three projects: First, interviews and focus groups will gather feedback from academics and study support staff on the design and utilisation of the Framework to embed numeracy skills in courses, programs and learning support initiatives. This feedback will be used to enhance the Framework. Second, the Framework will be expanded to include confidence and critical awareness elements. Third, a trial will be conducted to assess the effectiveness of the Framework in embedding numeracy skills in a pathway or first-year course at UniSQ. The ultimate outcome of this research program will be a mature, tested and trialed Academic Numeracy Framework. The Framework will inform and empower academics seeking to systematically embed numeracy into university curricula and learning support initiatives. This is expected to improve numeracy outcomes for students.

Questions for audience discussion

1. What are the most pressing challenges regarding the mathematics needs of students, and how could they be understood and addressed via the Academic Numeracy Framework?
2. How do you envisage that you could use the Academic Numeracy Framework to embed academic numeracy in courses, programs, and study-support initiatives?
3. What key changes in the current design of the Academic Numeracy Framework could be implemented to facilitate its adoption by teaching academics and study-support staff?

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