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# Mathematics Bridging at the University of Adelaide

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#### Outline

#### Introduction

About Me The "What", and the "Why" of my Research

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#### About Me

- Lyron Winderbaum
- Ph D in Mathematics
- Teaching at UofA since 2011.





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#### My Research Question

#### How can MathsTrack be improved?



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#### What is MathsTrack?

MathsTrack is a mathematics bridging course offered through the Maths Learning Centre (MLC) at the University of Adelaide (UofA).



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# Mathematics Bridging

Mathematics bridging courses attempt to catch students that would otherwise "fall through the gaps" in our education system, providing them with a path towards a tertiary mathematics education that might otherwise be unavailable to them. They serve a crucial stop-gap role in our education

system and our society more broadly.



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#### The Mathematics Problem

Partiticipation in mathematics education has been steadily declining for over three decades. In the meantime, the Australian and international industries and economies have been becoming steadily more dependant on a mathematically educated workforce.



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#### Motivation

The "Mathematics Problem" has two key consequences:

- Struggling economies due to reduces supply of capable workforce.
- Increased disadvantage in the job market for people without access to a mathematics education. Flip side: Social Mobility.





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#### Introduction

I conducted two parallel avenues of research:

- A literature review, and
- A curriculum mapping,

finally making recommendations based on the synthesis of both.



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### Lit. Review Summary

- Secondary-Tertiary Transition (Clark & Lovric, 2008)
- Maths Anxiety (Ramirez, Shaw, & Maloney, 2018)
- Negative Affect towards Maths more broadly (King & Cattlin, 2015)
- Self-Efficacy (Klinger, 2011)



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#### Take-Home Message

"... although attitudes and beliefs about mathematics are important for students enrolled in bridging programs, the programs can change students' attitudes and beliefs about mathematics as well as their achievement."

-Galligan and Taylor (2008)





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# Curriculum Mapping

The aim is to have students be successful. One component of this is to ensure students leaving the bridging course have (at least) the same content knowledge and skills as students leaving highschool.





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#### Relevant Curricula

The relevant curricula considered are:

- Australian Curriculum Senior Mathematical Methods and Specialist.
- SACE Stage 1 Mathematics and Stage 2 Mathematical Methods and Specialist.
- MathsStart and MathsTrack.





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#### Recommendations

- SET CLEAR EXPECTATIONS.
- Encourage social interaction between students.
- Adjust content to better align with the national curriculum but with an eye on students affective reactions to the content.



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# Impact & Conclusions

Bridging courses have the opportunity to:

- provide students with a path towards a mathematics education, and the social mobility that entails,
- change students' affect towards mathematics,
- help students to succeed in their future study, and
- contribute to the slow paradigm shift of harmful public perceptions of maths.

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# APST

- 1.1: Physical, social and intellectual development and characteristics of students
- 1.2: Understand how students learn
- 2.1: Content and teaching strategies of the teaching area
- 2.2: Content selection and organisation
- 2.3: Curriculum, assessment and reporting
- 3.6: Evaluate and improve teaching programs
- 4.1: Support student participation
- 6.3: Engage with colleagues and improve ADELAIDE practice

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# Questions?



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#### References I

Clark, M., & Lovric, M. (2008, Sep 1). Suggestion for a theoretical model for secondary-tertiary transition in mathematics. *Mathematics* Education Research Journal, 20(2), 25–37. Retrieved from https://doi.org/10.1007/BF03217475 Galligan, L., & Taylor, J. (2008). Adults returning to study mathematics. In H. Forgasz et al. (Eds.), Research in mathematics education in *australasia 2004-2007* (pp. 99–118). Rotterdam Sense Publishers

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References

#### References II

King, D., & Cattlin, J. (2015). The impact of assumed knowledge entry standards on undergraduate mathematics teaching in australia. International Journal of Mathematical Education in Science and Technology, 46(7), 1032–1045. Retrieved from https://doi.org/10.1080/ 0020739X.2015.1070440



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References

#### References III

Klinger, C. M. (2011, Feb). 'connectivism': A new paradigm for the mathematics anxiety challenge? Adult Learning Mathematics: An International Journal, 6(1), 7–19. Retrieved from https://eric.ed.gov/?id=EJ1068259

Ramirez, G., Shaw, S. T., & Maloney, E. A. (2018). Math anxiety: Past research, promising interventions, and a new interpretation framework. Educational Psychologist, 1-20