

# AMSI CHOOSE**MATHS** RESEARCH

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Teacher Confidence, Education & Experience:

## CHOOSE**MATHS**

TEACHERS SURVEY 2016

*in brief*

# Teacher Confidence, Education and Experience: CHOOSEMATHS Teacher Survey 2016

Inge Koch and Ning Li

Australian Mathematical Sciences Institute

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## Executive Summary

The 2016 CHOOSEMATHS survey of teachers provides information about educational background, training and experience of teachers, their level of confidence and competence regarding mathematics content and teaching of the mathematics curriculum, as well as their competence in curriculum documentation. CHOOSEMATHS of the Australian Mathematical Sciences Institute (AMSI) worked with 85 Australian government, independent and catholic schools at the time of the data collection in 2016. A total of 620 teachers from these primary, secondary and combined primary/secondary schools completed the survey and the data collected represent their self-assessments.

Of the 492 primary teachers 87% are female, and 97% of primary teachers are trained to teach mathematics at primary level. The primary teachers are confident regarding mathematics content, but their level of competence in curriculum documentation is considerably lower. The largest difference in confidence and competence was seen between teachers with little or no previous teaching experience and those with 5 – 10 years of teaching experience. Most teachers welcome the opportunity of professional development, with less experienced teachers feeling in need of professional development in almost all aspects of mathematics content, teaching and curriculum documentation.

Of the 128 secondary teachers nearly 65% are female. More than 75% of teachers are trained to teach mathematics at secondary level, yet 32.5% of teachers regard themselves as out-of-area. Relatively more female teachers and more than half of the less experienced teachers are among the out-of-area teachers. Our analysis shows that the out-of-area teachers are considerably less confident and competent than their counterpart in almost all aspect relating to mathematics content, teaching and curriculum documentation.

The 2016 survey represents the first in a series of annual surveys. One aim of the surveys is to assess the efficacy of CHOOSEMATHS over time. In the concluding paragraphs of this report we discuss the findings, present hypotheses and explanations and outline future directions.



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## Conclusions, Hypotheses and Future Directions

CHOOSEMATHS has been regarded very positively by principals and teachers in 2016, and schools expect gains in terms of improved knowledge, skills and teaching practices of teachers which will have a positive flow-on effect on the mathematical education of the students, and is hoped to lead to increased participation of all students in mathematics.

A comparison of primary and secondary teachers based on their own assessments shows the following.

- 86.6% of primary teachers are female, compared to 64.8% of secondary teachers.
- 97% of primary teachers are trained to teach mathematics at primary level, but only 75.6% of secondary teachers are trained to teach mathematics at secondary level and 32.5% of secondary teachers are teaching mathematics out-of-area.
- The distribution of less experienced teachers is about the same in primary and secondary schools: 37.2% of primary teachers have a teaching experience of less than five years compared to 34.1% of secondary teachers.
- Overall secondary teachers are more confident in mathematics content-related areas and considerably more competent in curriculum documentation than primary teachers, while primary teachers are better at including practical examples into their teaching than secondary teachers.
- The majority of teachers welcomes or is in need of professional development, and more than 70% of primary and secondary teachers regarded PD on access to a wide variety of resources as very important.

For secondary as well as primary teachers the self-assessed levels of confidence and competence in mathematics content and teaching of mathematics appear to be high. There are two reasons for the higher than expected levels of confidence.

- Less than 50% of teachers in the CHOOSEMATHS schools participated in the survey in 2016. It is very likely that many of the less confident teachers did not complete the survey.
- Bias occurs in the self-assessment during the initial phase of a new program, or as Fullan (p40, 2001) puts it 'a dip in performance and confidence [occurs] as one encounters an innovation that requires new skills and new understandings'.

From 2017 onwards we will conduct the teacher survey electronically as part of staff meetings or PD sessions in the CHOOSEMATHS schools. Such meetings should lead to higher response rates and therefore also capture less confident teachers. However, as a consequence of a higher response rate and the performance dip, we



expect the confidence and competence levels to decrease initially, before they rise in later years as a result of continued engagement of schools with **CHOOSEMATHS**.

The biggest difference in confidence and competence among primary teachers exists between teachers with little or no previous teaching experience and those with 5 – 10 years of teaching experience. School principals and the **CHOOSEMATHS** Schools Outreach Officers are aware of maths anxiety among primary teachers, but it was not possible to find convincing evidence of this in the 2016 data. It is likely that teachers who exhibit maths anxiety did not complete the survey in 2016. Capturing responses from this group of teachers is essential in obtaining better insight into the degree of maths anxiety and the needs of the teachers. Based on a better understanding it will be possible to make recommendations for improvement.

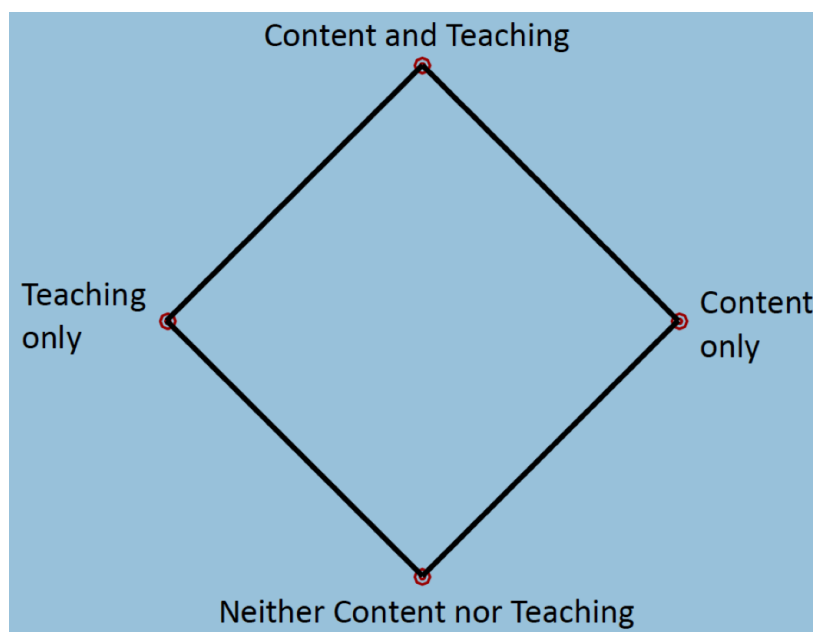


Figure 19: Components in tertiary mathematics content and mathematics pedagogy degrees.

For secondary teachers out-of-area teaching is a serious concern. According to Weldon (2016) out-of-field teachers are those who are at the lowest vertex in Figure 19, all others are in-field. Teachers without tertiary mathematics content and without pedagogy knowledge are clearly inadequately prepared to teach mathematics. This report does not focus on this group, but is concerned with the groups represented by the vertices on the left and right of Figure 19.

In the 2016 **CHOOSEMATHS** teacher survey we aimed to gain insight of teachers' perception and self-assessment regarding their out-of-area/in-area status. The self-



assessment resulted in more than 32% of teachers regarding themselves as out-of-area teachers.

A key question is: Why do these teachers regard themselves as out-of-area? In the 2016 survey data nearly 37% of the out-of-area teachers are trained to teach mathematics at secondary level, and some have B.Sc. degrees majoring in mathematics. These teachers belong to the three vertices comprising in-field. What is lacking in their education and training? In the search for answers to this question, the 2017 **CHOOSEMATHS** teacher survey will, in more depth, examine the training, the components of mathematics content and pedagogy their degree(s) contain and the adequacy of their training and degree(s) in their in-service mathematics teaching. Obtaining such insight from larger sample sizes than those of the 2016 secondary teacher survey will yield information on what is lacking in teacher education and, as a consequence, will lead to recommendations on how to address this lack and prepare teachers more adequately for their mathematics teaching in secondary schools.

