

Creating a culture of continued improvement to increase student outcomes and engagement in mathematics

Case study – Mathematics Growth Team

Woolgoolga High School, located 25km north of Coffs Harbour on the NSW North Coast, is home to Mathematics Growth Team (MGT) trainer, Rachel Winter. Working with colleagues and students, Rachel is based at the school to support, challenge and improve the pedagogical and assessment practices of mathematics educators in both primary and secondary contexts.



An initiative of the NSW Mathematics Strategy and the Best in Class Teaching unit the MGT's end goal is to improve student outcomes in mathematics and redefine the mathematical mindsets of children, parents and communities (Anderson, Boaler and Dieckmann, 2018). Being school-based with a 0.4 teaching allocation within a school allows team members to maintain currency with constraints and challenges faced by current teachers. It also improves their ability to provide personalised professional learning at the point of need for relevant individuals and teams of teachers (Martinovic et al., 2017). Embedding the MGT into schools also allows for mentoring and coaching to occur with staff in situ over a sustained period of time, which is a crucial part of implementing long-term changes in teaching practice (Cartwright, 2020).

Existing staff in schools where the MGT operates have scheduled relief face-to-face (RFF) time to facilitate regular lesson observation, structured discussion on pedagogy, reflection on practice and to action research.

Case in point: Woolgoolga High School

Woolgoolga High School is part of the far north coast's Northern Beaches Community of Schools and has a current enrolment of approximately 840 students, including 120 Aboriginal and Torres Strait Islander students. Students come from varied backgrounds including a large Sikh community. Set in a natural bushland and coastal environment, Woolgoolga High School is situated on the traditional lands of the Gumbaynggirr people whose language is part of the school curriculum.

Key focus areas for the MGT at Woolgoolga High School

Focus 1

Increasing student numbers in calculus-based courses

Staff at Woolgoolga High School, in partnership with Rachel, the MGT trainer, have identified areas for improvement in teaching practice to build student capability within the junior school at skills required to be successful at the calculus-based courses. This has included integrating spaced learning, developing growth mindset and increasing student independent study and enthusiasm for mathematics.

The fostering of student independent study and motivation is also essential for creating future learners. Both the Mathematics Boardroom (a learning space using vertical whiteboards created in 2020) and mathematics staff volunteering spare time to assist students has helped to push students to seek educational success.

Focus 2

Professional learning across the faculty

The Mathematics Growth Team allows for tailored and integrated professional learning where support can be provided to trial new teaching methods. Staff are engaging in learning, researching, designing and implementing new strategies. The use of data, and open and reflective individual and faculty discussions helps to identify areas for improvement.

“As a beginning teacher, working with Rachel and the Mathematics Growth Team has allowed me to get set up for my career moving forward. I feel I am already able to contribute so much to the team and have engaged with theory in a more relevant context than most of what is presented through university study.”



Patrick Mullan, Mathematics teacher

Focus 3

Engaging with the wider mathematics community

Developing leadership capacity in staff to engage in the wider mathematics community, share their expertise and participate in developing resources that can be shared statewide deepens teacher understanding, increases enthusiasm and promotes interaction with research.

Staff across schools including Woolgoolga and others in the region, have participated in the department’s Mathematics Curriculum Team’s Desmos roll-out and spreadsheet initiatives. They have also created professional learning modules which have included interacting with colleagues in the department’s Rural and Remote Team, Learning Designers and the HSC Strategy.

Focus 4

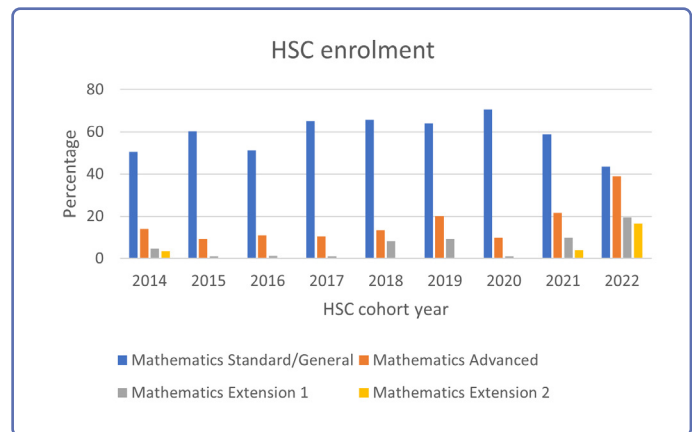
Creating an environment of continued improvement

Fostering a safe environment for staff to reflect and trial new strategies has been essential for improvement in pedagogy at Woolgoolga High School. Staff have engaged in trialling and critiquing resources, particularly assessment tasks, to ensure maximum effectiveness. Changing engrained and long-standing practices can only occur in a positive and supportive staff environment where collaboration and deep discussion are prevalent.

Observable impacts

The observable impact of the Mathematics Growth Team at Woolgoolga High School is visible through a wide range of different elements including:

- Staff are choosing to engage in readings and sharing interesting information they have found. The quality of discussions has deepened, and staff have considered next steps, including implications on their teaching practice and further research required.
- Student numbers in all calculus-based courses has increased significantly. Building skills from Year 7 to allow greater accessibility to these courses has also significantly improved.



- Spaced learning is seen throughout all academic levels and is being built into formative assessment practices and programs.
- There have been significant changes to assessment practices. Staff are using a variety of formative and summative approaches, rather than relying on a traditional test. This has also been extended into developing ongoing competency testing where students can reattempt to demonstrate their understanding.
- Staff are openly reflecting on faculty processes and investigating improvements to their practices. They follow an improvement cycle, using data and research to inform their decisions and review impacts. With the support of the MGT trainer, staff have developed individual improvement projects then presented as part of professional learning sessions during faculty meetings.

- Using technology as a tool to support learning is growing, with staff now using a variety of online tools such as MS Excel, Google Sheets and Desmos. Staff are sharing resources they've created for feedback from colleagues. The resources are also tested across multiple classes to assist in reviewing their success.

“The opportunity to develop and implement spreadsheet skills has been invaluable for teachers and for the students that we're trying to prepare for futures in the 21st century world of technology-enhanced mathematics.”

Chris Young, Mathematics teacher

- The Mathematics Boardroom is popular with senior students for independent study. Students regularly seek assistance from mathematics teachers, even if they aren't their classroom teacher, to improve their understanding of taught concepts. Mathematics teachers happily give their time throughout the school day and outside of school hours to assist students. Staff willingness to give their time to students outside of class time is also evident in the high level of attendance by staff at the Academic Achievement Centre (Woolgoolga High School's after school homework centre).

Find out more

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