

# Building Resilience and Success in Problem-Solving

## Embedded Instructional Leader Pathway, Mathematics Growth Team

Gosford High School, located on the NSW Central Coast, is home to Embedded Instructional Leader (EIL), Joshua Price. Working with colleagues and students, Joshua supports, refines and improves the pedagogical practices and toolkit of secondary mathematics educators in an academically selective context.



The Embedded Instructional Leader Pathway (EILP) is a workstream of the Mathematics Growth Team (MGT), comprising secondary teachers who participate in structured mentoring and coaching from the MGT to build skills to support, challenge, strengthen and improve teaching and assessment practices of educators within their school context. Through this work, they develop a strong understanding of and experience in improving student learning outcomes within their KLA and redefining the mindsets of students, teachers, school and local communities.

Being school-based and continuing to teach within the school allows team members to maintain currency with constraints and challenges faced by teachers. It also improves their ability to provide personalised professional learning at the point of need for individuals and teams of teachers (Martinovic et al., 2017). Embedding the Pathway into schools also enables mentoring and coaching with staff over a sustained period of time, which is a crucial part of implementing long-term changes in teaching practice (Cartwright, 2020).

At schools where the EILP operates, teachers participate in a range of contextualised professional learning formats. These include lesson observation, structured discussion on pedagogy, reflection on practice and action research.

### Case in point: Gosford High School

Gosford High School is situated on Darkinjung Country, under the custodianship of the Darkinjung people. The waterfront of Gosford and surrounding shoreline areas of Brisbane Waters have historical records and archaeological evidence of large communities of people.

As an academically selective school, it serves a multicultural and geographically diverse student population. The school is committed to fostering each student's academic and personal growth through tailored teaching practices that address individual learning and wellbeing needs. Programs promoting creative and critical thinking, self-reflection, and skill development enable students to thrive in a supportive environment.

As a recognised leader in High Potential and Gifted Education the school offers enriched opportunities for students to extend their capabilities. Student voice is central to the school's ethos, empowering active participation in learning and decision-making. Wellbeing initiatives foster meaningful connections and diverse opportunities for personal development. Leadership programs amplify student voices, fostering a sense of ownership in shaping the school's direction.

### Key focus areas for the EILP at Gosford High School

#### Focus 1

#### Improve the problem-solving toolkit and resilience of students

Joshua has worked with his faculty, with the support of his Mathematics Growth Team Trainer Leanne Hancock, to investigate how Year 7 students approach problem-solving with non-routine questions and where they tend to "give up" during the problem-solving cycle. Joshua collaborated with staff to implement improvements in teaching problem-solving by tailoring evidence-based teaching strategies to the unique needs of students at Gosford High School.

A variety of pedagogical practices were used in the classroom including:

- Explicit teaching of Polya's problem-solving strategies to Year 7 students.
- Promotion of mathematical discussions within the classroom.
- Peter Liljedahl's Building Thinking Classrooms activities using vertical non-permanent surfaces to improve students' mathematical collaboration and communication.
- Goal-free problems with a focus on problem-solving and developing student ability to devise and carry out a plan.

## Focus 2

### Build the capacity of staff in teaching about, for, and through problem-solving

Joshua has designed, tailored and delivered quality professional learning to his faculty based on the needs of staff and students at the school.

Joshua worked with his faculty to investigate how problem-solving is taught to the Year 7 cohort, what problem-solving in mathematics is, and what evidence-based teaching practices would be effective in improving the quality of student responses to problem-solving questions within the unique context of Gosford High School.

The Mathematics faculty engaged with professional learning through: collaboratively creating a problem-solving rubric tailored to their students; learning about current mathematics pedagogies, and; incorporated new teaching strategies for their students.

The professional learning focused on examining staff perceptions of problem-solving and how it is taught, with the aim of improving students' capacity to work mathematically and persevere when stuck in the learning pit (Nottingham, 2017).

## Find out more

For more information regarding the Embedded Instructional Leader Pathway contact:

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## Observable impacts

The impact of the EILP at Gosford High School is visible through:

- Increased collaboration, sharing of resources and discussions surrounding problem-solving in the staffroom. Staff engage in regular discussions about how to support student learning and how to teach for and through problem-solving. Joshua supported colleagues with a framework to critically reflect on the intended and enacted problem-solving teaching strategies in their classrooms. Faculty time is used to investigate evidence-based teaching practices.
- Active student participation in lessons. Joshua conducted and modelled lessons utilising vertical whiteboards and group activities. This increased the discussion of mathematical concepts amongst students and improved their skills in communicating problem-solving strategies.
- Increased engagement with mathematics education research, theories, and teaching practices within the faculty. Staff engage with mathematical research and collaborate during professional learning sessions at faculty meetings.
- Consistent increase in the median performance of students in the working mathematically section of assessment tasks throughout the year, surpassing that of the remainder of the cohort in the final examination. Joshua implemented evidence-based teaching strategies in his Year 7 classroom to build the resilience of his students when solving non-routine problems and improve the quality of their responses.
- Increased access to professional learning. Joshua provided professional learning to his faculty at Gosford High School. The faculty engaged with: current research on teaching for, about, and through problem-solving; building resilience in students; and sharing experiences with different teaching practices.
- Increased engagement with wider Central Coast Schools community through High Potential Gifted Education professional learning masterclasses. Joshua provided professional learning across the school network on engaging and differentiating for High Potential Gifted Education students in the new curriculum, and James Nottingham's Learning Pit for network primary school teacher colleagues.