



Maths teacher collaborative pedagogy project

Educator Story

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This year, a group of 10 teachers from St Peter Claver College participated in a collaborative pedagogy project. The aim of the project was to use Aboriginal pedagogies as the basis for developing quality teaching practices in maths.

Teachers attended a conference in January where they learned about Tyson Yunkaporta's 8ways framework and various ideas for hands-on activities and reflective techniques for the maths classroom. They began developing an approach to teaching students with these ideas at its core.

The school received funding through the *Make it Count* project for teachers to collaboratively design, implement and observe lessons which used the 8ways of Learning as their basis. Professor Peter Grootenboer from Griffith University assisted teachers with the design of the lessons. He suggested some very practical ways to teach the concepts which students were currently studying. His ideas inspired teachers to begin experimenting with hands-on 'discovery' learning activities in their maths classes.

The project included three groups of teachers in Years 8, 9 and 10. Each fortnight, teachers delivered a lesson to a targeted class then met as a group to discuss the lesson and prepare the next. An important aspect of the project was providing teachers with the opportunity to visit each other's classrooms. However, the emphasis was less on teachers observing each other's teaching, and more on teachers observing the effect of the activity on improving learning for all students, especially Aboriginal students. Each class of approximately 30 students included between two and four Aboriginal students. As the project developed, teachers agreed that it was not so much about catering for Aboriginal students, but more about learning from Aboriginal pedagogies how we can better cater to all students.

In Year 8, students investigated the sum of interior angles in a polygon. This lesson involved students drawing polygons, shading and cutting off the angles, then putting them back together to discover the relationship between the number of sides and the sum of all angles. Teachers observed students using different methods to develop a rule on their own. Of course, the students could have been simply presented with the rule. However, because students were given the time to develop their own conceptual understandings, they became confident solving for more complex shapes. For the next lesson, students began learning about statistics and probability by investigating whether people's writing hands held more than their non-writing hands, using plastic cubes. Both activities emphasised hands-on learning and reflective techniques.

In Year 9, what began as a simple "Guess the number of lollies in the bag" competition transitioned into students constructing back-to-back stem and leaf plots. Students wrote their answerw on laminated boards and shared them with the class. They investigated whether practice improved the accuracy of their guesses. Judging from students' participation and enthusiasm, all of the Year 9 classes were highly engaged For the next lesson, students used "Guess my age" quizzes and similar tricks to begin investigating algebraic formulas.

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In Year 10, students calculated the greatest possible volume for a box made from one sheet of A4 paper. This involved calculating surface area and volume, using Excel to create tables and graphs, then analysing the data, justifying answers and writing conclusions. Next, they tried to find the optimal design for a can of soft drink with a volume of 240mL. Students presented their findings in a report. What started out as a fairly simple question developed into a full scale investigation in which students learned about independent and dependent variables, algebraic relationships, and advanced use of Excel.

In each of these activities, the emphasis was on real problems with real solutions. The teacher observer monitored on-task/off-task behaviour every 5 minutes. All of the activities also emphasised group work and learning through talk. This proved more successful in Years 9 and 10 than in Year 8 where students were less familiar with cooperative learning. This is something we can work on. There is one more cycle of planning/demonstration/ observation/reflection this year and, given the success of the lessons so far, hopefully teachers will continue to design regular activities of this kind.

Throughout this project, teachers have discovered that 8ways is good pedagogy for all students, and not just in maths. The project has inspired teachers to look for opportunities to use a similar approach in other classes and in other subjects. The project has given teachers the opportunity to learn new pedagogies which will become part of the way we teach maths at 'Claver'. It also produced a model for collaborative professional learning that can be applied in other subject areas. I thank the 10 teachers who through their work have committed to improving the numeracy of the students they teach.



Finding 3.6

Realise that responsive mathematics pedagogy builds on student voice, recognition of diverse ways of learning mathematics and connection to worlds beyond the classroom (both local and non-local).



Finding 3.13

Recognise that the most effective practices for Indigenous students are also of benefit to all students; avoid segregation of mathematics curriculum.



Finding 6.1

Have a focused, structured approach to what you want to achieve as a team and establish common core values and attitudes.



Finding 6.5

Foster the openness and courage necessary for a school to adapt diverse models to your school's unique model, based on common beliefs and values.



Finding 6.9

Engage critically with external resources to gauge their appropriateness and relevance for Indigenous learners and compatibility with your aspirations for pedagogical improvement.