

YuMi Deadly Maths (YDM) is a mathematics teaching program developed by the YuMi Deadly Centre (YDC) at QUT. The program emerged from a 2010–12 research project with Indigenous and low SES schools, funded by Queensland Department of Education and Training (DET) and titled Teaching Indigenous Mathematics Education (TIME). One hundred and thirty-seven schools in Queensland and Victoria have received or are receiving training in YDM within their schools from train-the-trainer professional learning (PL) sessions, resources and support supplied by YDC, 102 schools as part of TIME and 35 funded by the schools themselves in projects using a program titled YuMi Deadly Maths Teacher Professional Learning (YDM PL). Most of these schools were and are low to very low performing in mathematics, with students predominantly from low SES backgrounds.

Training in TIME and YDM PL is train-the-trainer oriented providing resources and online support (but not in-school support) to help trainers when they return to their schools. The training has an action-research approach where trainers are encouraged to provide YDC with reflective portfolios documenting evidence of the effectiveness of in-school training and trials. As well, YDC has run: (a) discussions in PL sessions around trainers' implementation of YDM, and (b) Sharing Summits at the end of 2011 and 2012 at which trainers and teachers have reported on their implementation of YDM; both have been strong sources of data. However, in TIME, there was no funding to check the trainers' responses, responses were often incomplete, and the response rate was near 50% for two years as it was voluntary. Data gathering in YDM PL is and has been more systematic with journal templates and follow-up interviews to ensure a high return of the same information from each trainer.

In mid 2013, YDC received funding to set up a study, called LongTIME (to run 2013–14), to evaluate YDM's long-term effectiveness; in particular, to determine the effect of TIME YDM training on NAPLAN results. To do this, we are combining feedback from teachers and schools on the extent and success of YDM implementation and changes in NAPLAN test results from Years 3 and 5 to Years 5 and 7 two years later. The results of this study should be out in the first half of 2014.

TEACHER AND SCHOOL FEEDBACK

Teacher-trainer feedback in surveys, reflective portfolios, discussions and presentations reveals that: (a) the YDM PD sessions are excellent (it is rare for any sessions to be rated below 4 on a 5-point scale although the content is a challenge); (b) using YDM in their classroom markedly improves student attendance, engagement and behaviour and performance in mathematics (and, in particular, student ability to talk about mathematics); (c) teaching with YDM is more enjoyable and encourages teachers to go beyond worksheets to activities, class discussions and problem solving; and (d) knowledge from YDM gives teachers the ability to plan and teach mathematics lessons which have powerful outcomes with regard to mathematics knowledge as shown in pre-post tests. In particular, in the first YDM PL cohort, all 48 trainers returned portfolios, all 48 documented improved engagement and discussion, and 40 documented improved performance.

School feedback from administrators is that YDM: (a) improves mathematics teaching and learning and positively affects both teacher practices and student performance; and (b) enables teachers to develop their own units and lessons; and schools, as a whole, to be renewed with regard to teaching mathematics.

CENTRES FOR EXCELLENCE

The implementation of YDM in some schools was sufficiently strong for five schools to be appointed as Centres for Excellence in YDM, namely Beenleigh, Kingston, Marsden and Vincent state schools in Queensland and Sunshine Harvester primary school in Victoria. These schools are living examples of the effectiveness of YDM and can be contacted and visited by any interested school. Their success is evidence that YDM can be a compelling force for positive change in mathematics teaching, change which is sustainable by schools.

YDM PL PROJECT SCHOOLS

These schools are paying for YDM training from their school funds. YDM training is a complete investment in a full school program, therefore it has a cost that is higher than a textbook system. Its training regime also requires a commitment from teachers and schools. The fact that 35 schools have so far contracted the program is evidence for the effectiveness of YDM.

PRE-POST DATA

There is some quantitative evidence of student improvement in the many examples of positive pre-post assessments from school trials sent as part of portfolios by trainers. Eight examples are given in Appendix A.

However, this data should be treated with care. It reflects results from schools that wished to share their successes. As well, although most classes had important performance improvements for students, the lack of control classes means that results could be due to maturation or other effects.

NAPLAN DATA

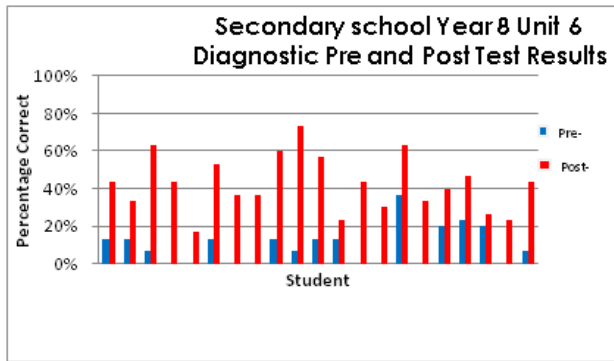
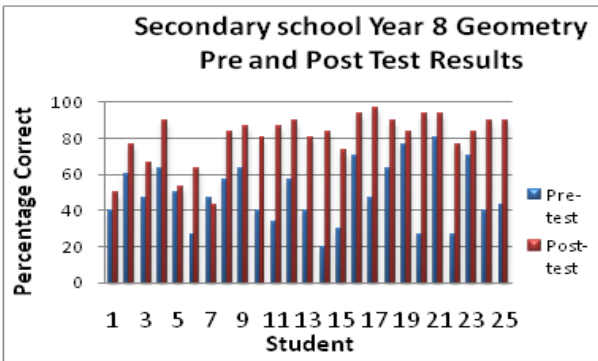
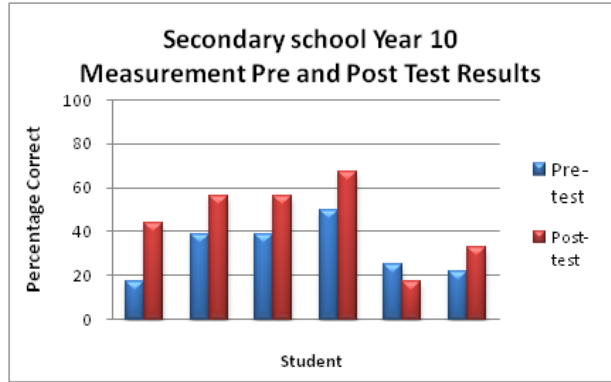
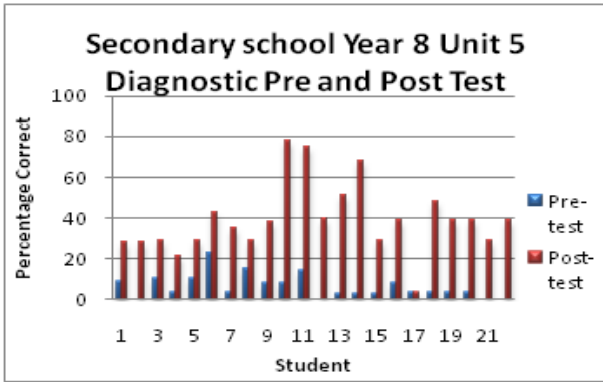
In order to evaluate the effect of YDM training on NAPLAN results, we compared school NAPLAN results for Years 3 and 5 with results for Years 5 and 7 two years later. This was to enable analysis to see if implementing YDM had improved NAPLAN results for a cohort of the same students. Because Years P–3 YDM training started in 2010 and Years 4–7 YDM training started in 2011, we evaluated YDM's effect on NAPLAN test results by comparing: (a) Year 3 NAPLAN results in 2009 with Year 5 results in 2011; and (b) Year 5 NAPLAN results in 2010 with Year 7 results in 2012. This was to ensure that there was no YDM effect on the first NAPLAN results and YDM effect on the second NAPLAN results two years later.

To maximise the chances that the school being analysed had implemented YDM, the NAPLAN results were compared for the 20 schools that started YDM training in 2010 and continued it in 2011. To give some credibility to findings the NAPLAN results were compared in two ways; (a) in relation to the Australian **NAPLAN average** – NAPLAN results were re-calculated as a percent of the national NAPLAN average for the year they were collected to enable comparison in relation to average; and (b) in relation to the percent of students whose NAPLAN results were above the **national minimum standard (NMS)**.

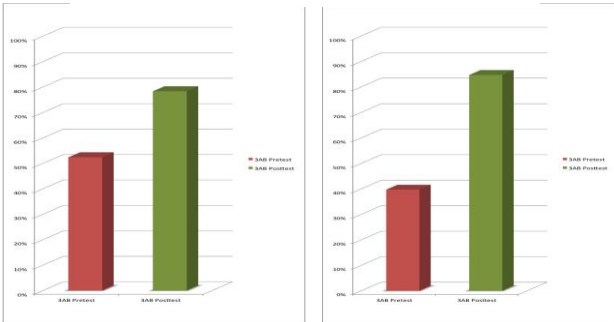
The results of this analysis are shown in Appendix B.

Overall, this initial analysis of NAPLAN data is positive in that there are improvements, but they are not strong. However, the schools have not been trained for very long and it is unlikely that YDM was fully implemented when final data was collected.

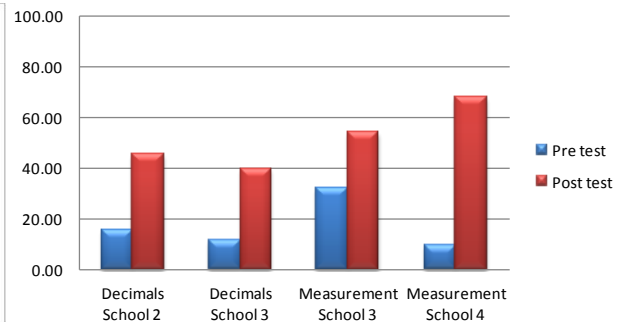
APPENDIX A: PRE-POST DATA



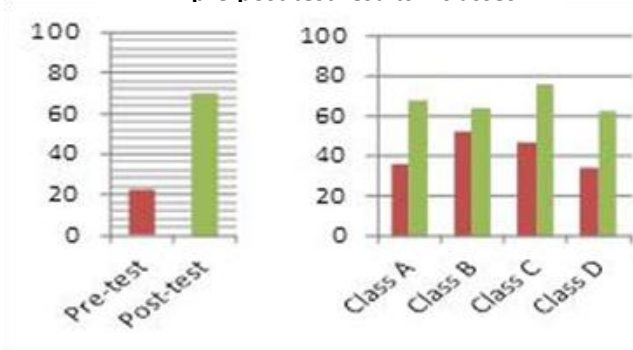
Primary Year 4 common fractions pre-post test results – classes



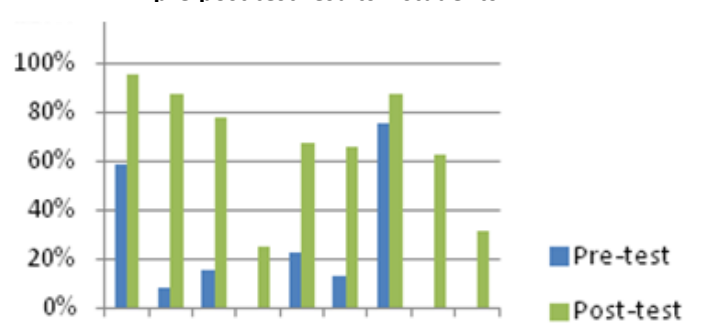
Secondary Year 8 decimals and measurement pre-post test results – classes



Year 4 place value and geometry pre-post test results – classes



Year 2 numeration pre-post test results – students



APPENDIX B: NAPLAN DATA

1. NAPLAN average. The Years 3 to 5 and Years 5 to 7 comparison graphs in relation to national average are as below in Figure 1.

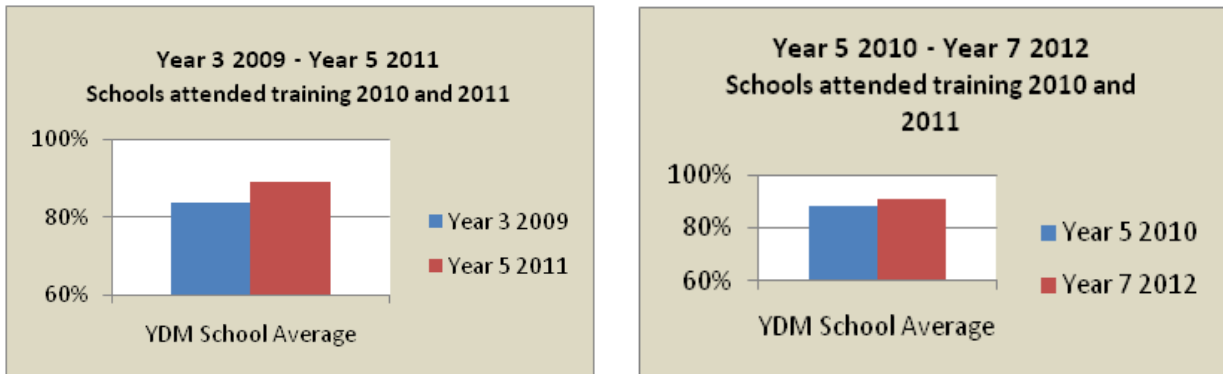


Figure 1. Comparison of NAPLAN results pre-post TIME/YDM in relation to national average

The NAPLAN results as a percentage of the national average improved 5% from Year 3 to 5 and 4% Year 5 to Year 7. Although this is not large, it is important to note that 18 of the 20 schools' NAPLAN results improved from Years 3 to 5 and 17 of the 20 improved from Years 5 to 7.

2. NAPLAN national minimum standard (NMS). The Years 5 to 7 comparison graph in relation to percentage above NMS was as below in Figure 2. The NAPLAN results in terms of NMS improved 4% for the YDM schools; the Australian average of percentage of students above NMS for the same period held steady at 94%. Again, it is important to note that 17 of the 20 schools showed an increase in the percentage of students above NMS in the progression from Year 5 in 2010 to Year 7 in 2012.

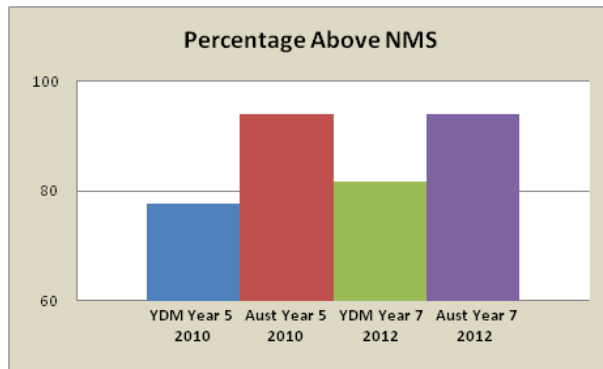


Figure 2. Comparison of NAPLAN NMS results pre-post TIME/YDM