Evaluations of the 2006 Secondary Numeracy Project

Foreword

In 2005, the Secondary Numeracy Pilot Project (SNP) was introduced in a selection of secondary schools to:

- improve outcomes for students by raising their achievement in mathematics, particularly in number and algebra
- enhance the teaching of mathematics so that the needs of individual students are addressed
- enhance the mathematics communities of practice in each participating department
- improve collegiality in and between mathematics departments.

The SNP was expanded in 2006. This report presents the research undertaken alongside the SNP in the second year of its implementation. Teachers have continued to make progress in developing their pedagogy, and students continue to show improved understanding of mathematics. The two chapters in this report have identified aspects of the SNP that need further development and make valuable suggestions for future directions in the project. They also tell a promising story of the progress being made to help students understand mathematics.

Impact of the SNP on Teachers and Facilitators

In Chapter One, "Evaluation of the 2006 Secondary Numeracy Project", Roger Harvey and Joanna Higgins evaluate the impact of the SNP on teachers and in-school facilitators. Based on the feedback they received from teachers and facilitators (both external and in-school) through surveys and some semi-structured interviews, they recommend a further expansion of the SNP to a greater number of secondary schools, the development of guidelines to assist in selecting effective in-school facilitators, and the continuation of support for current SNP schools.

Teachers and in-school facilitators commented very favourably about the impact the SNP has had on their knowledge of teaching mathematics and their knowledge of how students learn mathematics. They rated the diagnostic interview as a very useful tool for supporting and influencing changes in mathematics teaching.

The part that equipment can play in the learning of mathematics in a secondary environment drew several comments, mostly favourable. Harvey and Higgins suggest the identification of "powerfully pedagogical" equipment for secondary classrooms.

Although the Numeracy Development Project support booklets were deemed useful, a need for the inclusion of selected topics specifically for secondary schools was expressed.

The in-school model of facilitation in the SNP is seen as a strength of the project. Practicing teachers are released from some of their teaching load to facilitate the SNP with up to 12 year 9 teachers, usually all at the same school. Teachers recognise that this means that the facilitator knows the culture of the school and how to work effectively in it. It also enhances the credibility of the SNP because teachers can see facilitators implementing the project in their own classrooms. Having an in-school facilitator allows for continuous support of teachers and has an impact on the nature of pedagogical discussions at departmental meetings. If there is an issue with the facilitation model, it is in situations where a facilitator works with more than one school. Further resourcing support is suggested by the researchers to assist facilitators in these more demanding situations.

Student Performance and Progress

In Chapter Two, "Performance of SNP Students on the Number Framework", Andrew Tagg and Gill Thomas continue their analysis of the progress of students in the SNP, measured against the Number Framework. With the SNP in its second year of implementation, comparisons could be drawn between the effects of the SNP for students in 2005 and 2006.

Tagg and Thomas's analysis indicates that the SNP has continued to have a consistently positive impact on student achievement in year 9. For schools new to the project in 2006, significant shifts were achieved in raising the proportion of the student population that could perform in the top two stages of the additive, multiplicative, and proportional domains. These figures are very similar to the gains achieved in the first year of the SNP in 2005 for those domains. Consistent with previous findings, New Zealand European students performed better than Māori or Pasifika students, male students performed slightly better than female students, and students from high-decile schools performed better as a group than students from medium- or low-decile schools.

Schools that entered the SNP in 2005 were also required to re-assess their students at the end of year 10. The results indicate that while these students performed better than the year 9 students in all aspects except the proportional domain, the differences in performance were not great. Anecdotal comments from in-school facilitators and my own observations suggest that many schools in their second year of the SNP spent significant time revisiting their teaching approaches to year 9 in order to consolidate the progress they had achieved in 2005, despite the evidence from the end-of-year 9 interviews in 2005 that signalled further work for 2006. As a consequence, few shifts in achievement occurred in year 10. This is, as the researchers point out, a cause for concern.

Tagg and Thomas draw attention to the proportion of students who perform at stage 5 or lower on the Framework for both the strategies they bring to bear and the knowledge they can quickly recall to help solve a problem. Between 16% and 32% of year 10 students have remained at stage 5 or below in the knowledge domains. This has serious implications for their future understanding and achievement in mathematics. Without a sufficient body of easily recalled knowledge, students are not able to develop more sophisticated strategies to solve problems. As a consequence, their likelihood of succeeding in senior high school mathematics is compromised.

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