

# Secondary Teachers' Responses to the New Mathematics Syllabus

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## New 7-10 Syllabus (2002)

“There should be opportunities for students to engage in genuine mathematical activity and to develop the skills to become flexible and creative users of mathematics.”  
(p.45)

“Teachers are encouraged to extend this list of statements by creating their own Working Mathematically experiences for students to engage with each of the five processes.” (p.44)



## Research focus

What do teachers think about the new syllabus and its implementation?

How do teachers interpret *Working Mathematically*?

What impact is the new syllabus having in the classroom?

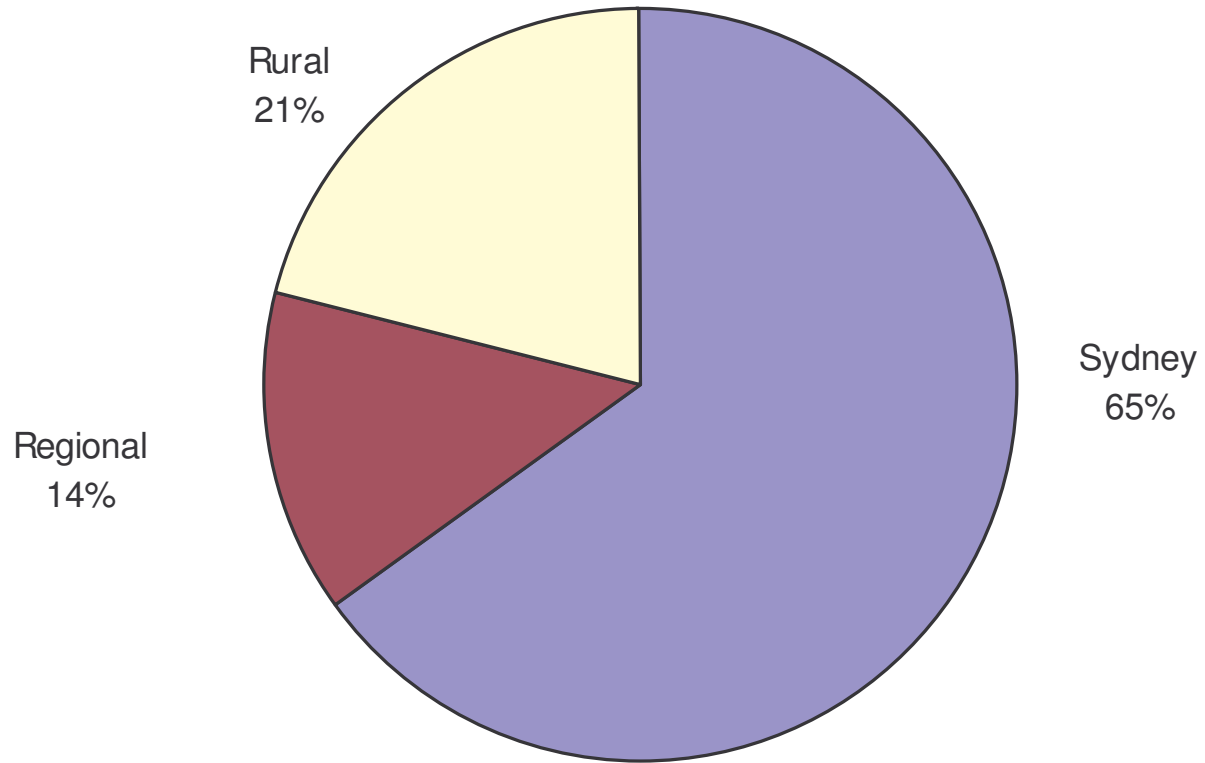


## Questionnaire (April 2005)

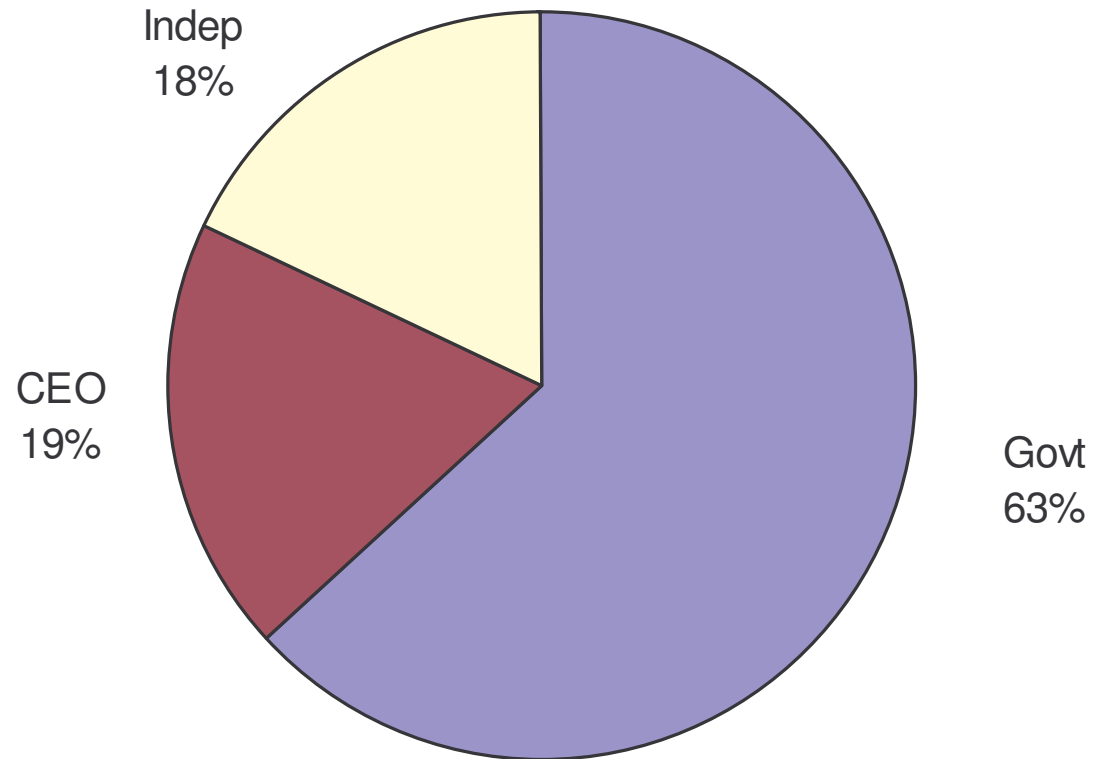
- Random sample of 480 secondary schools across NSW
- 2 page questionnaire
  - Part A: - information about the teacher and school
  - Part B: - changes at school level; programming
    - activities and resources used in lessons
  - Part C: - three open questions
- 263 questionnaires returned (72 HoDs & 191 teachers)



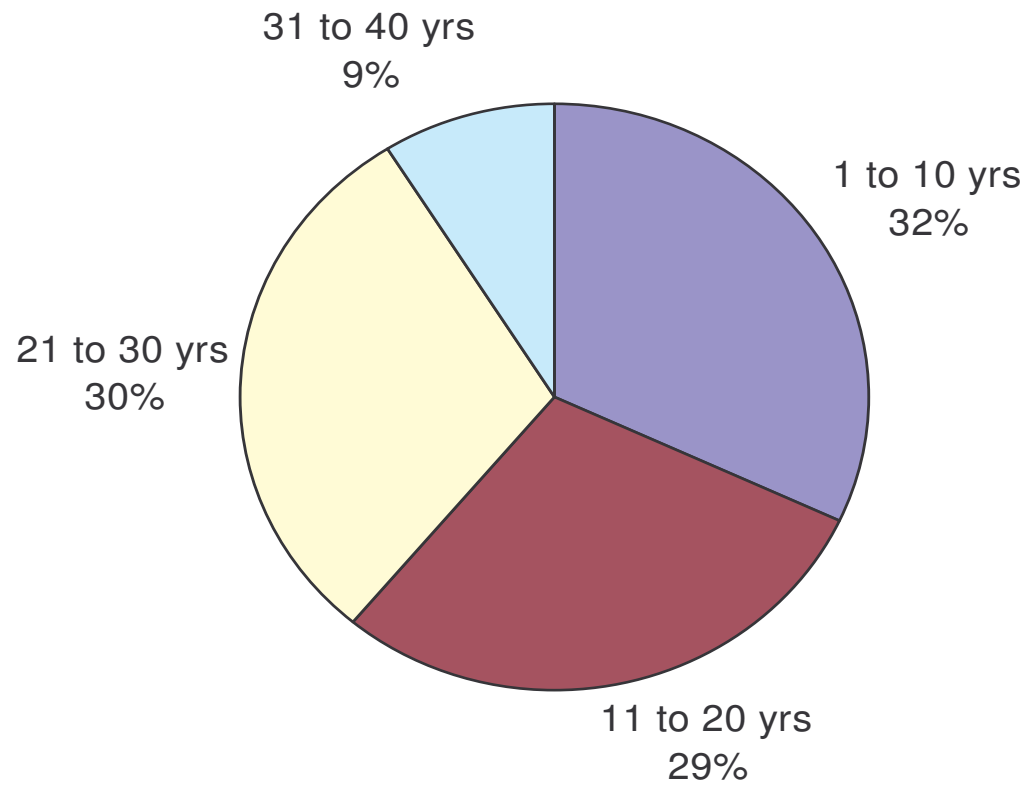
# Location of schools



# School systems



# Teaching experience

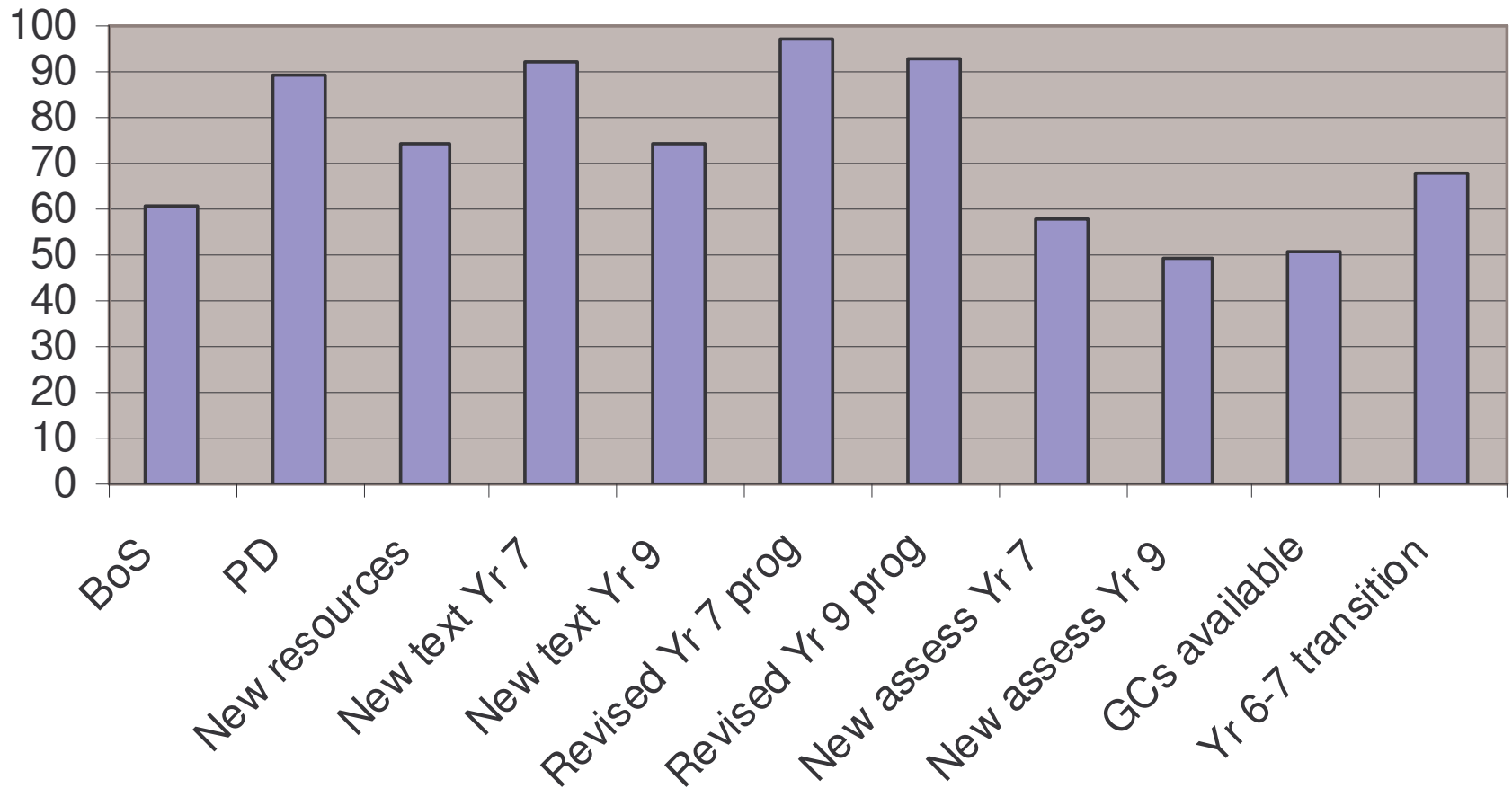


## Part B items (HoD)

<b>Participated in the Board's consultation process on the new syllabus (e.g. by completing a school survey)</b>	
<b>Organised professional development session(s) for staff about the new syllabus</b>	
<b>Made graphics calculators available to students</b>	
<b>Introduced a new textbook for Year 7</b>	
<b>Introduced a new textbook for Year 9</b>	
<b>Purchased new resources as a result of introduction of new syllabus</b>	
<b>Revised the Year 7 program as a result of introduction of new syllabus</b>	
<b>Revised the Year 9 program as a result of introduction of new syllabus</b>	
<b>Introduced new assessment practices in Year 7</b>	
<b>Introduced new assessment practices in Year 9</b>	
<b>Considered Year 6-7 transition issues</b>	



# HoD Survey

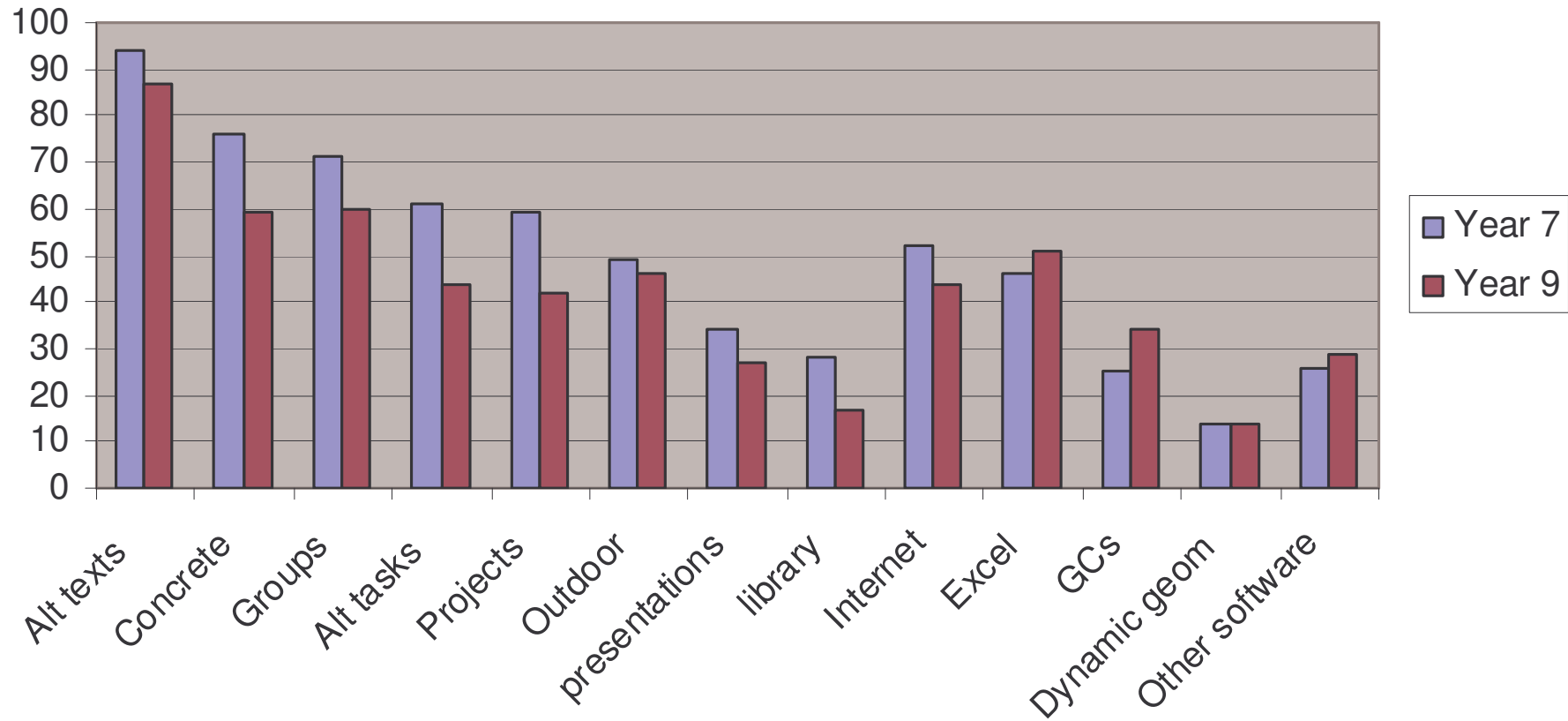


## Part B items (teacher)

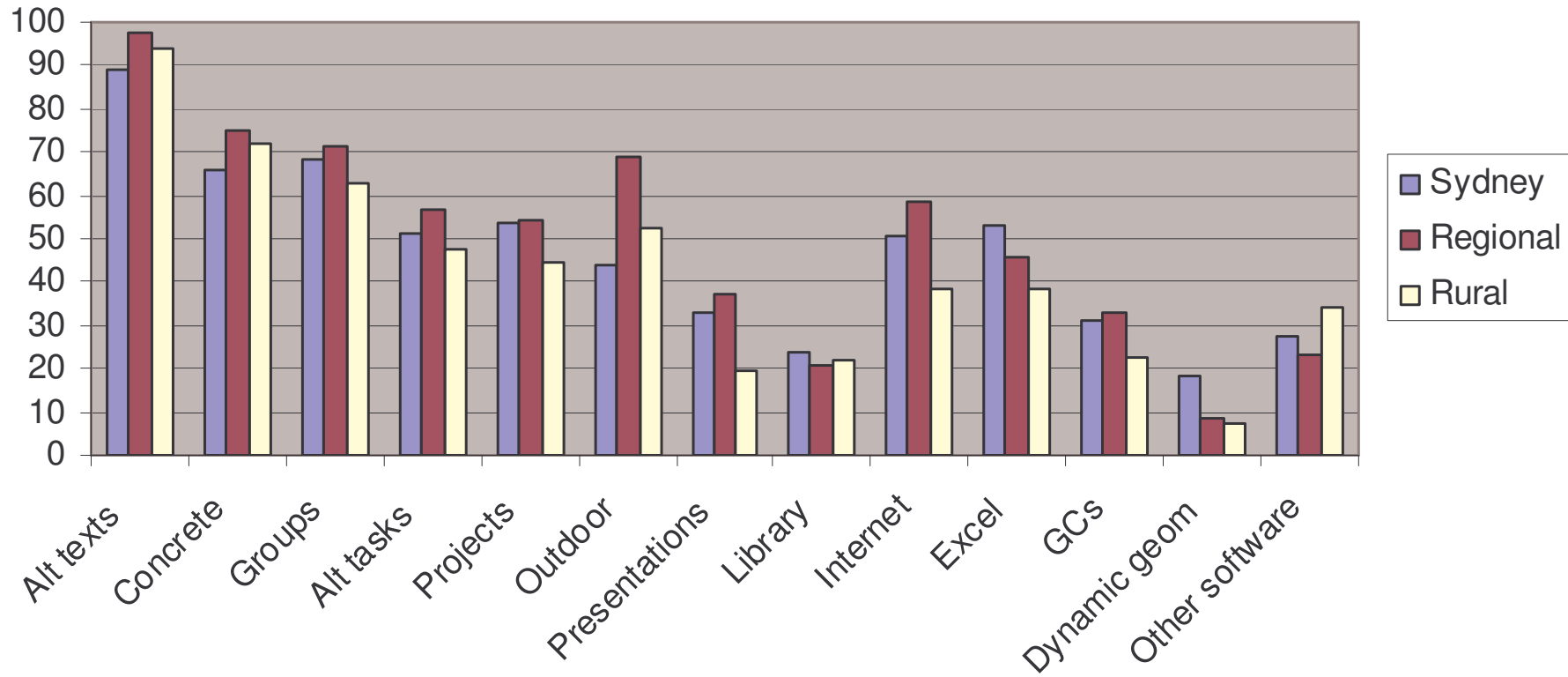
	<b>Year 7</b>	<b>Year 9</b>
<b>Alternate textbooks</b>		
<b>Concrete materials</b>		
<b>Group work</b>		
<b>Alternate assessment tasks</b>		
<b>Projects</b>		
<b>Outdoor lessons</b>		
<b>Student presentations</b>		
<b>Library lessons</b>		
<b>Internet</b>		
<b>Spreadsheets</b>		
<b>Graphics calculators</b>		
<b>Dynamic geometry software</b>		
<b>Other software</b>		



# Year 7 v Year 9



# City v country



## Part C questions (HoD)

- How has the new syllabus changed the way maths is taught in Years 7 to 9?
  - Negative impact (44%)
  - No impact (32%)
  - Positive impact (24%)
- How has the new syllabus affected the programming of these classes?
  - Incorporating the continuum (45%)
  - Writing new ones (25%)
  - Minimal or none (23%)
  - Identifying new resources for Working Mathematically (6%)



**We see the merit in the NS but the assistance to complete this massive change has been too little. We feel as though we are reinventing the wheel all the time.**

**Massive reprogramming to accommodate changes with NS. Teachers are out of their comfort zone but willing to try new things. Too much too soon and feeling overwhelmed at times trying to tie this to the QT principles. We need more opportunities to share things with other teachers.**

**There is more emphasis on finding out where kids are on the continuum and taking them from there.**

**We are trying to aim for maximum flexibility between the different pathways in year 9 but this makes programming very difficult.**

**The programs need to be reviewed each year to cater for the group coming in.**

**NS hasn't really changed the way maths is taught, but the structure has changed. For example, we now stream year 7 and have adopted a pathways approach. For example, the top year 7 class is attempting to get through the year 7 course in a little over half a year.**



## Part C questions (teacher)

- What do you consider to be one important difference in the new syllabus compared to the old?
  - Continuum of learning (41%)
  - Working Mathematically (19%)
  - More/harder content (14%)
  - No change (10%)
- Give one major impact of the new syllabus on the way you teach
  - No change (35%)
  - Working Mathematically (19%)
  - New assessment strategies (15%)
  - Using more ICT (11%)



The NS has forced me to seek out other resources and develop WM teaching strategies I've been hesitant to use in the past.

Overall the change to the NS has not dramatically impacted on the way I teach. The delivery in the classroom is not affected by what I consider relatively minor changes to the syllabus.

I'm looking for better ways to do things but at the moment I'm flat out just doing the basics. When the programs and plans and reports are in place there may be time to look at other things.

We are attempting to head towards practical assessment in maths but this would likely have occurred regardless of the NS.

Because of the huge amount of content that still needs to be taught to give kids a chance of doing their best in Years 11 and 12 and because it seems kids are getting harder to encourage to do lots of work it is difficult to adopt too many fancy approaches that take a lot of extra time in the classroom.



## Interviews (July – November 2005)

- 39 teachers (21 HoDs); Median 15 yrs teaching
- 30 minutes; Recorded and transcribed
- Structure:
  - What kind of mathematics teacher are you?
  - Has this changed as a result of the new syllabus?
  - What are the significant changes in the new syllabus?  
(What has it been like to program the new syllabus?)
  - What do you understand by *Working Mathematically*?
  - How have you implemented *Working Mathematically* in lessons?
  - Have your assessment practices changed?
  - What do you think of the new syllabus?
  - Are there any further changes you would like to have seen?



# Reactions to the new syllabus

- Positives
  - Single document
  - Improved layout
  - Lots of ideas
  - Structure more evident
  - Part of reform agenda
  - More sharing
- Negatives
  - Extra work
  - Fast implementation
  - Lack of support
  - Too much content
  - Technology not mandated
  - Little consultation



## Change at the school level

- New textbooks
- Graded classes in Year 7
- No longer commence Stage 4 with all Year 7 students
- Differentiated curriculum (within pathways)
- New programs
  - HoD alone
  - Adopt or adapt someone else's
  - Local groups share the task
  - Faculty work together
- Alternative assessment tasks



We used to have a problem with only one and a half classes capable of doing Advanced maths. Now we can cover only those 5.3 outcomes that the less able can cope with. This is a good aspect of the NS.

Even though the content hasn't changed greatly, the NS has revitalised members of the faculty and I'm seeing more teachers getting outside the traditional box and doing more things.

We need a lot more faculty support with a lot more examples of assessment and teaching practices rather than just saying "look it up on the net".

There's a lot more sharing of ideas. If we have an in-service everyone just sits there, but we have some quite robust discussions at recess.

We've gone about as far as we can go as a department. We really need some ideas from outside now.

NS is a catalyst for change as it encouraged them to try approaches they had been hesitant to use in the past. It gives me ammunition!



## Change at the classroom level

- Not much
- Technology not widely used
- Style of test questions
- Working Mathematically
  - Differing views
  - Content and time pressures
  - Students need to know the basics first
  - Classroom management
  - Lower-ability students need structure
  - Higher-ability students and exams



Pressure of work does not allow for classroom implementation in the spirit of the NS.

The syllabus seems more crowded and more work to cover means it's difficult to expose kids to as much as possible and yet have time to allow kids to explore and investigate as much as I would like.

[The new syllabus] has made me want to teach differently and assess in different ways. However, this is not always happening as I don't seem to have time to think through and research new ideas.

It's a step in the right direction and a significant improvement. It's what I've been doing for a while so it's nice to know. It validates me.

I am not driven by the textbook as much as in the past so my teaching has become more creative and includes more practical work. I use a more student-centered style with more open-ended investigations.



## Three responses to change

- Dissenters (resistance to change)
  - Disenfranchised
  - Beliefs about mathematics and how it should be taught
  - See no valid reason to change
- Aspirants (barriers to change)
  - Good intentions
  - Hesitation
  - Practical concerns
- Supporters (embracing change)
  - Critical reflection
  - Clear ideas about working mathematically
  - Perseverance



Maths is maths. We are teaching maths and changing the syllabus doesn't change that. Maths hasn't changed in the past 100 years – a new syllabus won't change that fact.

Curriculum changes should include more teachers in the development of new courses – too many theorists and non-teaching personnel make inappropriate or unrealistic changes.

I wish there was less content to cover. If there was, I could make up and do so many interesting activities and tasks with my students, to encourage them to discover and enjoy the beauty of maths. Unfortunately this is not possible because there's so much to cover by certain times.

Kids come to maths expecting a certain style of lesson; to do their work, chalk and talk, lots of practice. It's hard to get them to work in groups or think about a problem. If they can't get it in 30 seconds, forget it.

I used to be a very traditional teacher, but now I think we really don't teach kids anything and I see my role now as helping them learn for themselves by trying to work through problems for themselves and discussing it together.



# Implications

- Teachers need a good reason to change
- Change takes time
- Legitimate concerns of teachers must be addressed
- New roles and new skills
- Support materials are not sufficient
- Engage teachers in working mathematically tasks and allow time for reflection
- Pre-service and in-service

