

**Evaluation of the  
Years 1 to 10 Mathematics Key Learning Area  
Curriculum Development Project**

**Final Report December 2002**

*Prepared for the Queensland Studies Authority by*



*Independent Professional  
Evaluation & Research*

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Office of the Queensland Studies Authority  
295 Ann Street  
Brisbane Q 4000

PO Box 307  
SPRING HILL QLD 4004

Inquiries:  
Reception (07) 3864 0299  
Fax (07) 3221 2553  
Email [office@qsa.qld.edu.au](mailto:office@qsa.qld.edu.au)

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This evaluation was designed and supervised by Ted Hobbs, who prepared this report. Associate evaluators were Paul Hathaway, Robyn Zevenbergen and Lynne Hais. Lyn Calcutt did final editing of the report.

## Executive Summary

This interim report is concerned with the external evaluation of the Years 1 to 10 Mathematics Curriculum Development Project.

### **The project:**

The purpose of the curriculum project is to design, develop and disseminate a Years 1 to 10 syllabus, sourcebooks and initial inservice materials in Mathematics for Queensland schools.

Development commenced in January 1999 leading to a trial phase during 2000. The project team extensively revised the draft materials in a "trial and development" phase in 2001 and the project entered an "extended trial phase" in 2002.

The evaluation was concerned with the extended trial phase and had the purpose of providing advice on the February 2002 draft syllabus and support materials ("the materials") in terms of appropriateness, effectiveness and efficiency.

The materials used in the extended trial consisted of a CD-ROM containing:

- the February 2002 draft of the syllabus
- a limited number of sample modules
- printable documents including the syllabus, elaborations of the core learning outcomes, articles and papers
- software for preparing work programs and accessing the syllabus
- PowerPoint presentations for teachers and parents.

Evaluation approaches were the systematic collection, analysis, interpretation and reporting of information on:

- the experiences of teachers and administrators in the extended trial schools in working with the materials during the extended trial phase
- responses to the materials from school personnel, representatives of the three major school authorities and members of the Years 1 to 10 Mathematics Syllabus Advisory Committee.

### **Evaluation findings:**

The results generally indicate that the materials are appropriate, effective and efficient. Assessment and reporting are two areas where teachers needed more specific guidance and examples. The provision of teaching examples can be expected to supply such guidance and in general help teachers to understand and interpret the syllabus and elaborations.

As a general rule, teachers experienced high levels of satisfaction with teaching classroom units based on the materials. Students' responses in terms of interest and achievement were usually reported in enthusiastic terms. However, planning the units was reported as demanding and time-consuming. Most of the teachers saw little or no change from past programs in terms of demands for teaching resources or time.

The evaluation findings are summarised below for appropriateness, effectiveness and efficiency.

### Appropriateness

- The materials are highly compatible with the views of teachers and other groups with an interest and expertise in mathematics education.
- The core learning outcomes describe very well the learnings in Mathematics that are essential for all learners.
- The materials are highly consistent with the needs of students, adequately consistent with the needs of teachers and quite consistent with the needs of schools.
- The progression described by the core learning outcomes is highly appropriate.
- The elaborations are highly consistent with the core learning outcomes.

### Effectiveness

- The materials are very feasible for the range of diversity in students needs and assist teachers quite well in providing for that diversity.
- Teachers have been able to use the materials very effectively in the teaching and learning context.
- The materials are quite effective in matching teachers' needs for definition of scope and emphasis.
- The materials are quite effective in matching teachers' needs for clarity and amount of detail.
- The materials are quite effective for classroom planning and school level planning.
- The materials are quite effective for assessment and very workable for making judgements about students' learning but some teachers have encountered difficulties in practice or expressed concerns about consistency.
- The materials are less than adequate in terms of workability for communicating with students and parents about students' progress, mainly because teachers had difficulty applying the outcomes approach to reporting without guidance from the materials, school, or school authorities.

### Efficiency

- The materials are quite feasible in terms of teaching resources and the time available to mathematics in the school curriculum.
- Few of the teachers taking part in the trial had used the online tools for planning. Most said they preferred to work from hard copy when planning.

# 1. Introduction

## 1.1 Purpose of the Evaluation

The purpose of the external evaluation of the Years 1 to 10 Mathematics Key Learning Area Curriculum Development Project is to provide advice on the February 2002 draft Years 1 to 10 Mathematics syllabus and online support materials (“the materials”) in terms of:

- appropriateness in meeting the needs of students, teachers and school administrators
- effectiveness as resources in planning and implementing school and classroom Mathematics programs
- efficiency of use.

The primary audience for the evaluation consists of the Queensland Studies Authority and the Mathematics project team for the curriculum development project.

## 1.2 The Years 1 to 10 Mathematics Curriculum Development Project

### 1.2.1 Project Outline

The purpose of the Years 1 to 10 Mathematics Curriculum Development Project is to design, develop, publish and disseminate a Years 1 to 10 syllabus for Mathematics, online support materials/sourcebooks and initial inservice materials for use in Queensland schools.

The project commenced in January 1999 with the formation of a project team, and is expected to be finalised in 2003. The draft syllabus is expected to be submitted to the QSA for approval early in 2003. The design brief, timeline and other information on the project are available from the QSA Years 1 to 10 Mathematics web page:

[http://www.qsa.qld.edu.au/yrs1\\_10/kla/mathematics](http://www.qsa.qld.edu.au/yrs1_10/kla/mathematics)

A trial phase occurred during 2000, involving a group of 15 schools nominated by Education Queensland, the Queensland Catholic Education Commission (QCEC) and the Association of Independent Schools of Queensland Inc. (AISQ). The report of the external evaluation during this phase (Evaluation Report 1) can be accessed from the QSA Years 1 to 10 Evaluation web page:

[http://www.qsa.qld.edu.au/yrs1\\_10/evaluation\\_review/index.html](http://www.qsa.qld.edu.au/yrs1_10/evaluation_review/index.html)

The executive summary of Evaluation Report 1 is included in Appendix 1.

The project was originally planned to enter a pilot phase in 2001 with project completion by December 2002. Towards the end of 2000 however, the timeline for the project was extended with completion now expected in 2003. During 2001, the project team extensively revised the draft syllabus-in-development in a “trial and development” phase. The evaluation report on this phase (Evaluation Report 2) may be accessed from the above URL, and the executive summary is included in Appendix 1.

During the trial and development phase, 16 schools worked with the project team providing critical comment and suggestions on draft materials. The result was the February 2002 draft syllabus and a set of support materials, contained on a CD-ROM.



The draft syllabus provides a framework for planning learning experiences and assessment tasks through which students have opportunities to demonstrate what they know and can do in the Years 1 to 10 Mathematics key learning area. The main component of the syllabus consists of 66 core learning outcomes across six levels, organised around the strands and topics shown in Display 1. Associated with each core learning outcome is a set of core content and elaborations giving examples of what students know and can do.

**Display 1: Strands and topics:**

<b>Strand</b>	<b>Topics</b>
Number	Number concepts including money Addition and subtraction Multiplication and division
Patterns and Algebra	Patterns and functions Equivalence and equations
Measurement	Time Length, mass, area and volume
Chance and Data	Chance Data
Space	Shape Location, direction and movement

Other components of the CD include:

- sample sourcebook modules
- printable documents including
  - the syllabus
  - tabulations in various formats of the core learning outcomes with elaborations
  - articles and papers on a range of relevant issues
- an application called “Mathlink” that can be used to generate a work program for a school, a year level, a class or group of classes, a term or a unit of work
- a “Navtool” that facilitates navigation through the levels, strands and topics, core learning outcomes, content and elaborations, allowing them to be located, copied and pasted to other documents such as school programs or classroom plans
- PowerPoint presentations that can be used for induction of teachers into the extended trial or for introduction of the draft curriculum to parents.

In 2002, the project moved into an extended trial of the draft syllabus and support materials that were developed in 2001. The extended trial includes the 16 trial and development schools with an additional 11 schools. The 11 schools were added not only to broaden the range of schools for the trial but also to include schools and that were new to the draft curriculum. These schools and teachers were expected to bring a fresh perspective to the trial and provide insight into how the materials might be received by teachers being introduced to them for the first time.

The extended trial schools cover a range of school types across the State. The list of trial schools can be accessed from the QSA Years 1 to 10 Mathematics web page (URL shown in Section 1.2.1).

Project activity for 2002 consisted of:

- continued production of sourcebook materials
- continued production of sourcebook guidelines and units of work
- collection and analysis of feedback from schools and the consultative network
- finalisation of the syllabus.

This external evaluation report is concerned with project activity during 2002, the extended trial phase.

### 1.2.2 Project Team Activity in the Extended Trial Phase

During the extended trial phase, project team activity began with three-day conferences in February and March for teachers and administrators in the schools taking part in the extended trial. The first day focussed on teachers who were new to the project in 2002, to introduce the draft curriculum materials, assist them in preparing to work with the materials in their classrooms, and prepare them for the task of supporting other staff in their schools to become familiar with and use the materials. The second and third days involved teachers and administrators who were continuing with the project from the trial phase in 2001, to bring them up to date with the latest versions of the materials and prepare them for their participation in the extended trial.

Other project team activity during 2002 consisted of:

- visits to the participating teachers in the trial schools
- the collection of unit plans from teachers
- revision of the draft core learning outcomes and elaborations
- consultations with various Mathematics associations, experts in the field and representatives of the three schooling authorities
- meetings with the Years 1 to 10 Mathematics Syllabus Advisory Committee
- publication of project updates
- participation in a range of Mathematics-related projects.

The culminating event of the extended trial was a two-day conference in September to provide the teachers with opportunities to discuss their planning, assessment and reporting activities and to provide feedback about core learning outcomes, core content and elaborations of core learning outcomes to the project team.

An important component of the project was extensive ongoing consultation with a wide range of interested groups and individuals, including academics, teacher unions, professional associations, parent groups and non-trial schools.

### 1.2.3 Expectations of Teachers taking part in the trial

The expectations of the schools and teachers participating in the extended trial are shown in Appendix 2. In brief, the teachers taking part in the trial were asked to:

- write mathematics programs at school or classroom level or both
- implement these programs

- assess and monitor students' progress
- inform the school community about the extended trial and students' progress
- identify issues and problems with the materials and provide feedback to the project team.

### 1.3 Evaluation Methods

This report is concerned with the external evaluation during the extended trial phase of the curriculum development project in 2002. The purpose of the evaluation was to provide advice on the February 2002 draft Years 1 to 10 Mathematics syllabus and online support materials in terms of appropriateness, effectiveness and efficiency.

The focus questions for the extended trial phase are listed in Display 2.

The main evaluation approaches were the systematic collection, analysis, interpretation and reporting of information on:

- the experiences of teachers and administrators in extended trial schools in working with the materials during the extended trial phase
- responses to the materials from school personnel, representatives of the three major school authorities and representatives of other groups with an interest and expertise in Mathematics curriculum for schools as represented on the Years 1 to 10 Mathematics Syllabus Advisory Committee.

Evaluation activity included:

- interviews with teachers and school administrators in the 27 schools participating in the extended trial phase
- a process involving the members of the Years 1 to 10 Mathematics Syllabus Advisory Committee (the SAC) to evaluate the extent to which the materials were compatible with the views held by groups with an interest and expertise in Mathematics education
- a mail survey of all teachers participating in the extended trial phase
- a process involving the three major school authorities (Education Queensland, QCEC and AISQ) to identify their needs in relation to a Mathematics curriculum in Years 1 to 10 and the extent to which the materials were consistent with those needs.

The interviews with teachers taking part in the trial took place from the middle of Term 2 to the middle of Term 3 of the trial year. The questions followed a structured format, proceeding from the general to specific issues.

The main focus for the interviews was on the teachers' experiences in planning and implementing the materials. Assessment issues, as well as learning and teaching processes were covered. Interviews with administrators focussed on more general issues of appropriateness, effectiveness and efficiency.

Interviews were held during visits to the schools, with at least one teacher and an administrator taking part in each school. Copies of the interview questions are included in Appendix 3. Teachers were given the questions in advance of the visit so that they could prepare for the interview and discuss the questions with their colleagues.

The timing of the interviews was such that the teachers had been well exposed to the materials and had ample time to work on planning. All but one of the schools had completed the planning process by the time of the visit and most had begun or completed teaching their planned units.

## Display 2: Evaluation focus questions

<b>Appropriateness</b>
1. To what extent are the draft Years 1 to 10 Mathematics curriculum materials compatible with the views held by groups with an interest and expertise in Mathematics education?
2. To what extent are the draft Years 1 to 10 Mathematics curriculum materials consistent with the needs of the three major school authorities for a Mathematics curriculum in Years 1 to 10?
3. To what extent do the draft Years 1 to 10 Mathematics core learning outcomes describe the learnings in Mathematics that are essential for all learners?
4. To what extent are the draft Years 1 to 10 Mathematics curriculum materials consistent with the needs of a range of students, teachers and schools?
5. To what extent is the progression described by the draft Years 1 to 10 Mathematics core learning outcomes considered developmentally appropriate by various groups?
6. How consistent are the elaborations with the core learning outcomes?
<b>Effectiveness</b>
7. How well are the draft Years 1 to 10 Mathematics curriculum materials able to be used by teachers taking part in the trial for the purposes of planning for learning, teaching and assessment at school and classroom levels?
8. How well have the draft Years 1 to 10 Mathematics materials been able to be used by teachers taking part in the trial for designing assessment activities, making judgements about learning and communicating with students and parents about students' progress in Mathematics?
9. How effectively do the draft Years 1 to 10 Mathematics curriculum materials assist teachers and schools in providing for students' diverse needs?
10. How effectively have teachers in the extended trial been able to use the draft Years 1 to 10 Mathematics curriculum materials in a teaching and learning context?
11. To what extent do the draft Years 1 to 10 Mathematics curriculum materials match teachers' needs in relation to definition of scope and emphasis of the Mathematics key learning area?
12. To what extent do the draft Years 1 to 10 Mathematics curriculum materials match teachers' needs in relation to clarity and amount of detail?
<b>Efficiency</b>
13. How do the resourcing and time required for planning using the draft Years 1 to 10 Mathematics curriculum materials compare with that required previously?
14. How workable is the online format of the draft Years 1 to 10 Mathematics curriculum in navigating through the outcomes and elaborations?
15. How workable is the online format of the draft Years 1 to 10 Mathematics curriculum for planning and assessing Mathematics programs at school and classroom levels?

The evaluation processes involving the SAC began in May and finished in October 2002. The process had three steps, listed below.

- In step 1, a set of key aspects was identified with input from the project team and the SAC. These were aspects seen to be significant to the development of a mathematics curriculum for Years 1 to 10 in Queensland schools. A draft list developed by the evaluation team was presented to the project team and SAC via the Internet. Responses were discussed with the project team and a revised list presented to the SAC for their final comment.
- In step 2, the project team indicated their perspective on the intent of the curriculum materials in relation to each key aspect.
- In step 3, the members of the SAC were asked to indicate the extent to which the project team's perspectives were compatible with their views about Mathematics and Mathematics education in schools.

The survey was conducted by mail near the end of Term 3 when the extended trial was well under way. It was aimed at teachers who had been working with the February 2002 trial syllabus and support materials during the year. The survey consisted mostly of multiple choice items ("tick a box") with a space for general comments. Response rate was 60% – 77 of 128 surveys returned. A copy of the survey is provided as Appendix 4 and a summary of the results as Appendix 5.

## 2. Appropriateness

### 2.1 Teacher Survey (Term 3)

As indicated in Section 1.3, the survey was aimed at all teachers who had taken part in the extended trial. Returns were received from 77 of the 128 teachers to whom a survey form was sent. The survey took place near the end of Term 3, 2002 when the trial had been under way for over six months.

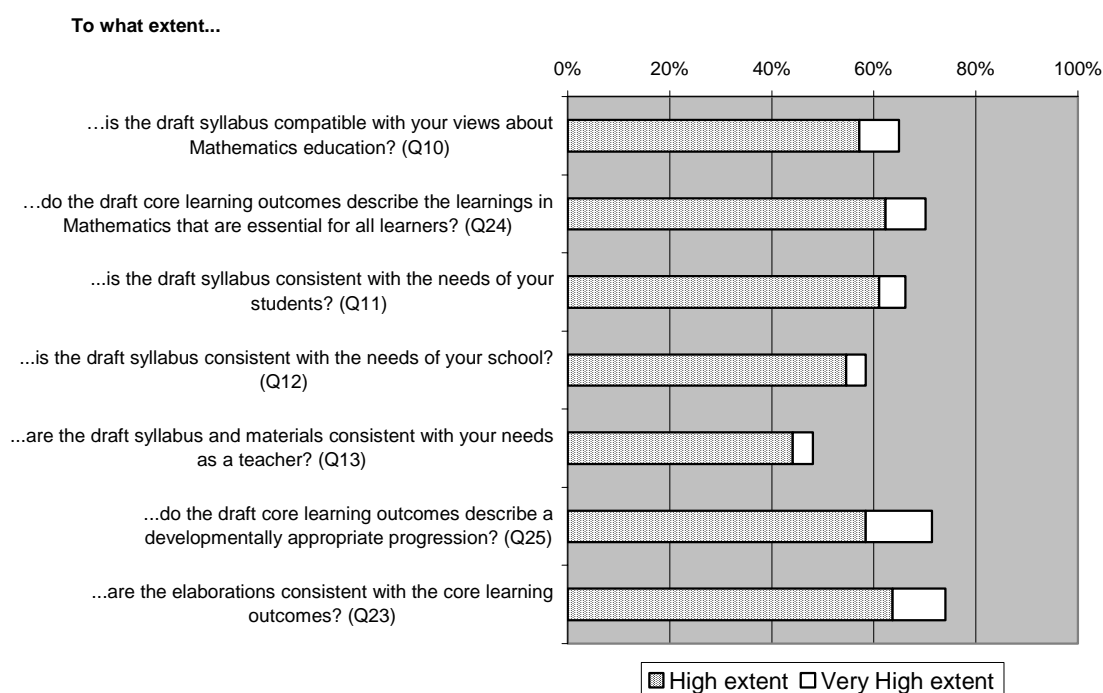
Survey items on appropriateness are shown with the results in Displays 3 and 4.

#### Display 3: Survey results – appropriateness (percent of actual responses, N=77)

To what extent...	Very high extent	High extent	Moderate extent	Low extent	Very low extent
...is the draft syllabus compatible with your views about Mathematics education? (Q10)	8%	57%	22%	8%	3%
...do the draft core learning outcomes describe the learnings in Mathematics that are essential for all learners? (Q24)	8%	62%	22%	6%	0%
...is the draft syllabus consistent with the needs of your students? (Q11)	5%	61%	25%	6%	3%
...is the draft syllabus consistent with the needs of your school? (Q12)	4%	55%	29%	6%	6%
...are the draft syllabus and materials consistent with your needs as a teacher? (Q13)	4%	44%	27%	16%	8%
...do the draft core learning outcomes describe a developmentally appropriate progression? (Q25)	13%	58%	21%	5%	1%
...are the elaborations consistent with the core learning outcomes? (Q23)	10%	64%	22%	1%	0%

0% to 19%	20% to 39%	40% to 59%	60% to 79%
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## Display 4: Survey results – appropriateness (percent high and very high)



Displays 3 and 4 indicate that according to the teachers taking part in the trial, the draft Years 1 to 10 Mathematics syllabus and materials are:

- highly appropriate (>60% high or very high) in terms of:
  - compatibility with teachers' views about mathematics education
  - description of learnings in mathematics that are essential for all learners
  - consistency with the needs of students
  - description of a developmentally appropriate progression of learning
  - consistency between the core learning outcomes and the elaborations.
- quite appropriate (50-59% high or very high) in terms of:
  - consistency with the needs of schools
- adequately appropriate (>50% moderate or higher) in terms of:
  - consistency with teachers' needs.

Interestingly, the secondary teachers' ratings of appropriateness were significantly lower on average than the primary teachers' ratings.

### 2.2 School Administrator Interview (Terms 2 and 3)

Three items on the school administrator interview related to appropriateness. Items asked for ratings and comments. The questions and ratings are shown in Display 5, followed by discussion of the comments.

**Display 5: School administrators' ratings – appropriateness (frequency table N=25)**

To what extent...	Very high	High	Moderate	Low	Very low	No answer
...are the draft materials compatible with this school's views about Mathematics education?	4	17	3	0	0	1
...do the draft core learning outcomes describe the learnings in Mathematics that are essential for all learners?	4	16	2	0	0	3
...are the draft curriculum materials consistent with the needs of your school?	2	13	6	2	0	2



The ratings were mostly high or very high for the first two items and mostly high or moderate for the third. These results are similar to those from the survey.

The administrators' comments help to illuminate the low and moderate ratings for consistency with schools' needs. Of the four comments, two referred to the need for material such as modules (not provided in the extended trial), one wanted the elaborations stated mathematically and one wanted guidance on an integrated curriculum.

The lack of modules to provide examples of classroom activities is probably the main factor explaining the lower ratings of consistency with schools' needs. Few were available in the extended trial but more may be included in the support materials that accompany the final version of the syllabus.

### 2.3 SAC Process

The SAC process is described in Section 2.3 above.

Appendix 6 shows:

- the set of key aspects of a Years 1 to 10 Mathematics curriculum that were identified in a consultation process involving the SAC and the Project Team
- the project team's perspective on the intent of the curriculum materials in relation to each key aspect
- the SAC members' indications of the extent to which the project team's perspectives were compatible with their views about Mathematics and Mathematics education in schools.

Of the 16 SAC members invited to participate, 11 responded.

Display 6 shows for each key aspect, the SAC members' ratings of the compatibility of the project team's perspectives with their views. Taken together, the results indicate that the February 2002 trial syllabus and support materials were highly compatible with the views held by the groups represented on the SAC. The only aspect on which moderate ratings were relatively numerous was the way Working Mathematically is addressed. Comments on this aspect suggest that Working Mathematically may be well represented in the syllabus but could be lost or diminished in the planning or teaching processes. If this is so, the modules currently being prepared would be crucial in representing Working Mathematically effectively.

### Display 6: Compatibility with views of SAC members (N=11)

Key Aspect	Compatibility Rating <sup>1</sup>					
	VH	H	M	L	VL	NA
The core curriculum The identification of the essential elements of mathematics that all students should study during the years of compulsory schooling.	5	6				
Description of a developmental sequence The description of a sequence for children's development in Mathematics representing a progression in sophistication and complexity in what students know and what they can do with what they know.	6	3	2			
The organisational framework for the syllabus A framework of strands and topics that forms a sound basis for the organisation of the syllabus.	3	7	1			
Degree of specification The degree to which the syllabus provides clear direction for schools and teachers while allowing scope to take account of and respond to the diversity of school contexts.	3	7	1			
Providing for diversity in the needs of students The degree to which the mathematics syllabus and support materials are adaptable to a wide range of diversity in students' needs.	2	8	1			
The place of numeracy in the mathematics key learning area How numeracy is emphasised and addressed in the mathematics syllabus and support materials, which plays a major role in the development of numeracy for all students.	5	4	1	1 <sup>2</sup>		
How working mathematically is addressed The emphasis on thinking and working mathematically and how this is embedded in the mathematics syllabus and support materials.	2	4	5			
The emphasis on mental computation The emphasis that the syllabus and support materials place on mental calculation from level 1 to level 6.	4	6				1
Integrated use of electronic technologies How the mathematics syllabus and support materials encompass the use of electronic technologies.	2	8	1			
The forms and roles of assessment Compatibility of the mathematics syllabus and support materials with good assessment practice in the context of an outcomes approach.	4	7				
Relationship with current programs in Years 1 to 10 The nature of the relationship between the syllabus and existing mathematics programs in Year 1 to 10.	4	5	1			1
Articulation with programs in Years 11-12 How the mathematics syllabus links with and allows pathways to current mathematics programs in Years 11 and 12.	5	3	2			1

0% to 19%	20% to 39%	40% to 59%	60% to 79%
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<sup>1</sup> VH=Very high; H=High; M=Moderate; L=Low; VL=Very low; NA=No answer given.

<sup>2</sup> Rating accompanied by comment that it depends on how teachers actually use syllabus.

The SAC members also responded to two other questions. The results are summarised in Display 7. These results support a finding of very high appropriateness in terms of:

- compatibility with views of groups with an interest and expertise in mathematics education
- how well the draft core learning outcomes describe the learnings in Mathematics that are essential for all learners.



**Display 7: SAC results – appropriateness questions (frequency table N=11)**

Question	Very high	High	Moderate	Low	Very low	No answer
To what extent do you believe that the draft Years 1 to 10 Mathematics syllabus and support materials are compatible with the views held by the group for which you are nominee on the Years 1 to 10 Mathematics Syllabus Advisory Committee?	1	8	1	0	0	1
To what extent do the draft core learning outcomes describe the learnings in Mathematics that are essential for all learners?	3	6	1	0	0	1



## 2.4 School Authorities Process

A representative from each of the school authorities – AISQ, Education Queensland and QCEC – was approached in an attempt to determine the extent to which the draft Years 1 to 10 Mathematics curriculum materials were consistent with the authority’s needs for a Mathematics curriculum in Years 1 to 10. The first step was to be the identification of the needs.

At the time of the preparation of this report, no list of needs had been obtained from any of the three representatives.

## 2.5 Evaluation Findings - Appropriateness

The findings from the various evaluation processes pertaining to appropriateness appear to justify the following findings.

- The materials are highly compatible with the views of teachers and other groups with an interest and expertise in mathematics education.
- The core learning outcomes describe very well the learnings in Mathematics that are essential for all learners.
- The materials are highly consistent with the needs of students, adequately consistent with the needs of teachers and quite consistent with the needs of schools.
- The progression described by the core learning outcomes is highly appropriate.
- The elaborations are highly consistent with the core learning outcomes.

## 3. Effectiveness

### 3.1 Survey

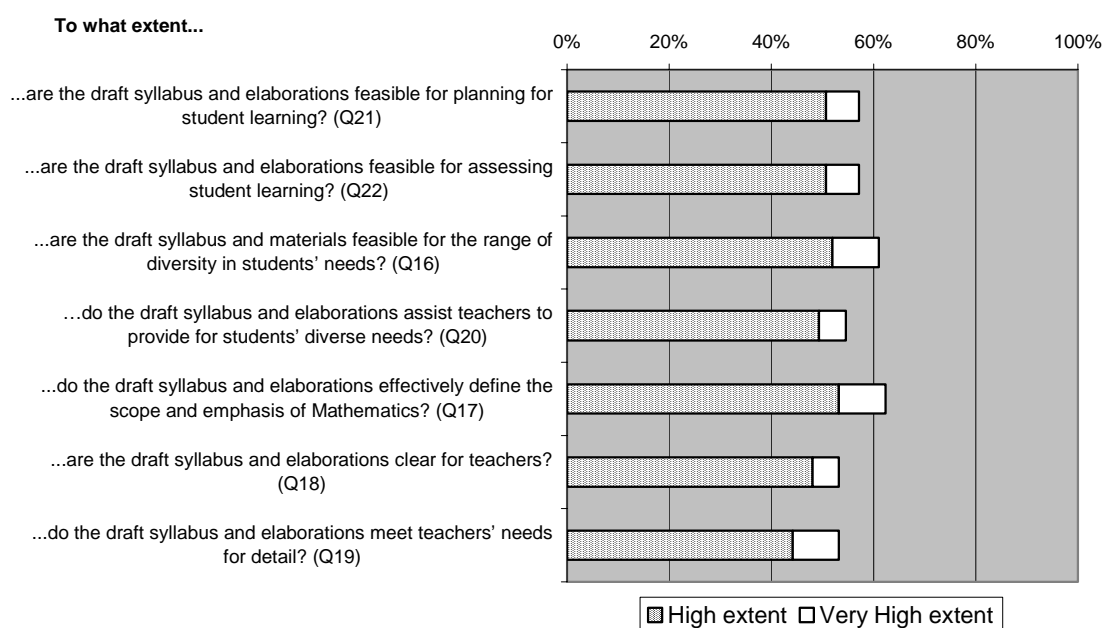
The survey included seven items related to effectiveness. Displays 8 and 9 show the items and results.

**Display 8: Survey results – effectiveness (percent of actual responses)**

To what extent...	Very high extent	High extent	Moderate extent	Low extent	Very low extent
...are the draft syllabus and elaborations feasible for planning for student learning? (Q21)	6%	<b>51%</b>	<b>27%</b>	8%	4%
...are the draft syllabus and elaborations feasible for assessing student learning? (Q22)	6%	<b>51%</b>	<b>25%</b>	13%	4%
...are the draft syllabus and materials feasible for the range of diversity in students' needs? (Q16)	9%	<b>52%</b>	<b>25%</b>	8%	5%
...do the draft syllabus and elaborations assist teachers to provide for students' diverse needs? (Q20)	5%	<b>49%</b>	<b>38%</b>	3%	3%
...do the draft syllabus and elaborations effectively define the scope and emphasis of Mathematics? (Q17)	9%	<b>53%</b>	<b>30%</b>	5%	0%
...are the draft syllabus and elaborations clear for teachers? (Q18)	5%	<b>48%</b>	<b>39%</b>	6%	0%
...do the draft syllabus and elaborations meet teachers' needs for detail? (Q19)	9%	<b>44%</b>	<b>29%</b>	12%	4%



**Display 9: Survey results – effectiveness (percent high and very high)**



The results in Displays 8 and 9 indicate that according to the teachers taking part in the trial, the draft Years 1 to 10 Mathematics syllabus and materials are quite effective (50-59% high or very high) in terms of:

- feasibility for the range of diversity in students needs and assisting teachers in providing for that diversity
- defining the scope and emphasis of the mathematics key learning area
- usability by teachers for classroom planning
- usability by teachers for assessing student learning
- matching teachers' needs for clarity and amount of detail.

As for the appropriateness items, the responses of the secondary teachers were significantly less favourable than those of the primary teachers.

### 3.2 Teacher Interview (Terms 2 and 3)

Most of the teacher interview was concerned with the issue of effectiveness. Extended lines of questioning explored teachers' experiences with:

- planning
- assessment
- providing for students' diverse needs
- the teaching-learning context.

Another issue covered in the interview was:

- how well the core learning outcomes defined scope and emphasis.

#### 3.2.1 Planning

Most of the teachers used the syllabus to plan. The online tools (Mathlink and Navtool) were rarely used. About two thirds of the teachers started with the outcomes, the elaborations or both. Others either used the syllabus at all planning stages or worked back to the outcomes after deciding on learning activities. For example:

- *I went to the syllabus and identified the outcomes and core content that were appropriate in the levels, then looked at the elaborations and used these to design the activities and assessment.*
- *I read the outcomes for levels 2 and 3, then established that my kids were working at level 2. I then focussed on the level 2 outcomes and looked at the 'know' and 'can' statements. I selected the outcomes mainly by looking at the 'can' statements.*
- *I consulted the syllabus to select the outcomes that were appropriate to my topic. When I found them, I looked at the 'know' and 'can' columns to see if what I wanted to do fitted into these. This helped to identify bits that I needed to cover that I may not have thought of.*

The teachers rated the workability of the February 2002 trial syllabus and elaborations for planning this way:

Very High	High	Moderate	Low	Very Low	No Answer
8	16	4	0	1	2

For most of the teachers, the syllabus and elaborations were highly or very highly workable for planning.

Of the 27 relevant comments, over 60% (16) were positive. Among the others, 4 said the syllabus and elaborations could still be improved in places, 5 said the elaborations were too many or too specific and 2 thought it would be difficult for inexperienced teachers.

The teachers were asked what changes would make the materials more workable for planning. Of 25 comments, more than one third (9) said no change was needed. Changes suggested were to add detail (3), reduce elaborations (2), change emphasis (2), give examples (4), explain how to relate levels to Years (1) or change the format (4). These suggestions have been passed on to the project team.

Another interview item asked the teachers for a word or phrase to describe their experiences with planning. The results, shown in Appendix 7, allow insight into the depth and nature of teachers' feelings about planning with the materials. Some found the process time-consuming or frustrating, but most had quite positive or rewarding experiences.

### 3.2.2 Assessment and Reporting

The interview items on assessment and reporting covered the workability of the materials for:

- designing assessment
- making judgements about students' learning
- communicating with students and parents about students' progress.

#### **Workability of the materials for designing assessment**

The teachers tended mainly to use the elaborations as the basis for assessment and reporting. Of the 27 who had worked with assessment, more than half referred to the elaborations either alone (13) or with the core learning outcomes (4). The remainder, about one third, referred to the outcomes alone or in conjunction with the level statements. Some typical interview responses were:

- *I looked at the 'students can' statements and made up the assessment activity from that.*
- *We used the 'can do' part of the elaborations, selecting those that seemed to be significant.*
- *I looked at the outcomes I needed to cover and the knowledge needed to get to that. Then I made up the assessment task to cover that.*
- *We had the outcomes and elaborations and used our experience to design assessment activities based on these.*

The teachers' ratings of the workability of the syllabus for the purpose of designing assessment activities were:

Very High	High	Moderate	Low	Very Low	No Answer
4	14	6	3	0	4

Excluding 4 who had not yet used the syllabus for assessment, 27 teachers gave a rating. Of these, over two thirds rated the workability for designing assessment as either high (15) or very high (4), but both moderate and low ratings appeared. These results indicate high workability but some teachers encountered problems.

In their comments, those who gave low or moderate ratings wanted guidance on assessment to be clearer or more specific. A couple complained of difficulty with tracking and recording.

### Workability of the materials for making judgements

The teachers' ratings of the workability of the syllabus for making judgements about students' learning were mostly high or very high:

Very High	High	Moderate	Low	Very Low	No Answer
5	15	6	2	1	2

The ratings indicate high workability, but problems were experienced by some of the teachers. The comments indicated the source of most difficulties were:

- concerns about consistency in teachers' judgements
- a need for more detailed or specific explanation of how to use the core learning outcomes and elaborations for making judgements.

Examples of comments were:

- *Making judgements is a personal thing. If I believe my child has demonstrated something, another person may not.*
- *It sometimes did not give me enough detail for me to be able to judge how much to expect.*
- *It is all there but you have to realise that you have to keep looking to confirm the judgement.*
- *This is part of your teaching job. I don't think the syllabus has much to do with it beyond the planning. Making judgements is a more complex thing.*

### Workability of the materials for reporting

The teachers were asked to rate and comment on the workability for communicating with students and parents about students' progress. The ratings were:

Very High	High	Moderate	Low	Very Low	No Answer
1	6	3	6	0	15

Close to half did not give a rating – for the most part because they had not worked with reporting at that stage. Most of the ratings were split between high and low, indicating less than adequate workability.

Of the 20 teachers who offered a comment, roughly equal numbers indicated:

- satisfaction with the syllabus and elaborations (7)
- concerns about meeting or changing parents' needs and expectations (8)
- various practical difficulties (5) such as mismatch with current school reporting systems, lack of guidance in the syllabus, difficulty of tracking, core learning outcomes too general and difficulties working up a suitable format.

Reporting students' progress was problematic for many teachers but most of their concerns seem to relate to the outcomes approach itself rather than something specific to mathematics. It seems that many teachers need more guidance in how to apply the outcomes approach to reporting.

### How teachers described their experiences with assessment and reporting

Another interview item asked the teachers for a word or phrase to describe their experiences with assessment and reporting. The results, shown in Appendix 7, allow insight into the depth and nature of teachers' feelings about assessment. The responses generally referred only to assessment and not reporting. Comments ranged from recognition and appreciation of the challenges and benefits to frustration or doubts.

### 3.2.3 Providing for Diverse Students' Needs

The interviews showed that teachers provided for diverse students' needs in six ways. The numbers in brackets show how the 27 responses were distributed:

- varying learning activities to suit the students' current levels (7)
- grouping, setting or streaming students (7)
- having different level expectations for the same learning activities (6)
- providing individualised teaching and support within a learning activity (5)
- bringing all students to the level before starting new learning activities (1)
- allowing student choice within learning assignments (1).

Teachers' ratings of the extent to which the materials help in providing for diversity in students' needs were mostly moderate or high:

Very High	High	Moderate	Low	Very Low	No Answer
3	<b>10</b>	5	3	1	<b>9</b>

Relatively high levels of non-response on this item are explained by the interviewers as being mostly due to teachers saying that they had not "used the materials for that purpose" and so could not give a rating.

Teachers' explanations of their ratings were similar across the range: that it is up to the teacher to provide for diversity. In the higher ratings, teachers said that the outcomes and levels format allowed teachers to provide for diversity by providing learning activities that could span several levels or having different students working on different core learning outcomes (rather than all class members studying the same topic or content at the same time).

When the teachers were asked for suggestions to improve the materials, 20 made relevant suggestions. Half were for more specific guidance and examples. Another suggestion (4 teachers) was to align the core learning outcomes across levels more.

Examples of suggestions for more specific guidance were:

- *Specific suggestions and alternative ideas as contained in the old sourcebooks.*
- *Provide support materials to identify student needs and ways of addressing these needs.*
- *Need to show people what to do. Need many more examples written.*

Examples of suggestions for more alignment of core learning outcomes across levels were:

- *We need a more graduated sequence within levels.*
- *Possibly if some of the outcomes in the different levels were more similar so that it is easier to integrate different levels into a unit.*

### 3.2.4 Teaching-Learning Context

The teachers were asked how their unit had "turned out in practice". It was too soon to know for a few (3), but of the other 26 responses, close to two thirds reported their unit had gone well. Mixed results were reported by 4 and no difference from the past by 3 teachers. Another 2 said they would do better with more experience.

In terms of students' response (interest and achievement) most reported high levels of success. Of the 27 responses, 21 reported good results, with some seeing improvement over the past (9) or significant or qualitative change in students' response (6). For example:

- *Good in terms of interest and in terms of what they have learned.*
- *It went well in terms of students' and teachers' enjoyment and there was a fair degree of success in terms of kids demonstrating the target outcome.*
- *Kids are interested; they show an increase in knowledge, enthusiastic and involved.*
- *The kids are enjoying their maths more. Maths has come out far ahead of the other subjects in enjoyment. The kids are learning more and the kids believe they are learning more, especially the ones who are struggling and the high fliers.*
- *They are overwhelming us with their involvement. They are really excited with the computer work and they are having fun. They are definitely learning the outcomes that we are exposing them to.*
- *The kid's responses were outstanding in terms of interest, effort, output and learning.*

Another interview item asked the teachers for a word or phrase to describe their experiences with teaching the unit they had planned. The results, shown in Appendix 7, allow insight into the depth and nature of teachers' feelings about teaching with the materials. Some of the results reflect little change from the past but many reveal positive or very positive experiences.

### 3.2.5 Scope and Emphasis

The teachers were asked to rate and comment on how well the February 2002 trial syllabus and elaborations defined the scope and emphasis for them.

The ratings were mostly moderate, high or very high, indicating that the syllabus and elaborations were very effective on this aspect:

Very High	High	Moderate	Low	Very Low	No Answer
8	14	7	2	0	0

Among the 28 relevant comments, a majority (16) indicated that the scope and emphasis were quite clear. For example:

- *It is well set out and user friendly for someone that knows about maths.*
- *I had no problems. The more you use the elaborations and outcomes the more comfortable you feel with them.*

Some (12) of the teachers found that the syllabus and elaborations were unclear in some respects. For example:

- *The scope isn't clearly defined in a lot of things.*
- *There are still chunks that we believe are in the wrong sections and the wrong levels. There are still ambiguous statements in the elaborations.*
- *We have found that the material defines the scope and sequence quite well in most areas, but we need more specification in the case of algebra.*
- *It is probably better at defining the scope rather than the emphasis. Some of the elaborations are much more important than others and this is not shown.*

### 3.3 Administrator Interview

The administrators were asked to rate and comment on workability of the materials for planning at school level, assessment and providing for students' diverse needs. The items and ratings are shown in Display 10.

**Display 10: Effectiveness – administrators' ratings (frequency table N=25)**

To what extent...	Very high	High	Moderate	Low	Very low	No answer
...have the materials been workable for planning a Mathematics program at school level?	6	13	4	0	1	1
...have the materials been workable for assessment purposes?	1	5	6	7	0	6
...have the materials been effective in providing for students' diverse needs?	3	16	2	0	1	3



The results in Display 10 indicate that, according to the administrators, the materials were:

- quite effective for planning at school level
- very effective in providing for students' diverse needs
- adequately effective for assessment purposes

The relatively high level of non-response for the item on assessment was due in most instances to the school not yet having worked with assessment to any great degree at the time of the visit, for various reasons.

Most of the comments on workability for school level planning were positive, for example:

- *We have been able to use the level statements and the elaborations to produce programs of work that teachers can build upon.*
- *From feedback I have, our maths team have had an uplifting and dynamic experience developing material.*
- *Teachers have experienced more success with Mathematics than with other KLAs. Taken together, the core outcomes, core content and elaborations are clear and specific.*

On workability for assessment, comments were mixed. For some it was not a problem but others found assessment difficult. For example:

- *Teachers have struggled to take outcome statements and generate assessment tasks that can identify those outcomes.*
- *Assessment is a problem to us. Levelling the students is very difficult.*

Comments on effectiveness in providing for students' diverse needs were similar to those in the teacher interviews. Some said it would be a matter of teachers' skill. For example:

- *It is just the sequential nature that allows you to go to and fro for each individual student.*
- *Yes, the outcomes provide for a range of needs to be addressed in the one program.*
- *Because of the way outcomes are set out, literally it is your remedial and extension program. The whole thing caters for diverse needs.*



### 3. 4 Evaluation Findings - Effectiveness

The findings from the various evaluation processes pertaining to effectiveness appear to justify the findings listed below.

- The materials are quite feasible for the range of diversity in students needs and assist teachers quite well in providing for that diversity.
- Teachers have been able to use the materials very effectively in the teaching and learning context.
- The materials are quite effective in matching teachers' needs for definition of scope and emphasis.
- The materials are quite effective in matching teachers' needs for clarity and amount of detail.
- The materials are quite effective for classroom planning and school level planning.
- The materials are quite effective for assessment and very workable for making judgements about students' learning but some teachers have encountered difficulties in practice or expressed concerns about consistency.
- The materials are less than adequate in terms of workability for communicating with students and parents about students' progress, mainly because teachers had difficulty applying the outcomes approach to reporting without guidance from the materials, schools or school authorities.

## 4. Efficiency

### 4.1 Survey

Survey items related to efficiency issues covered feasibility in terms resources and time available and the workability of Mathlink and Navtool. The items and the results are shown in Display 11.

**Display 11: Survey results – efficiency (percent of actual responses)**

To what extent...	Very high extent	High extent	Moderate extent	Low extent	Very low extent	N
...are the draft syllabus and materials feasible in terms of available teaching resources? (Q14)	1%	27%	52%	12%	8%	75
...are the draft syllabus and materials feasible for the time available to Maths in the curriculum? (Q15)	3%	27%	49%	12%	8%	73
...is Navtool workable for navigating through the outcomes and elaborations? (Q26)	0%	9%	45%	21%	24%	33 <sup>1</sup>
...is Navtool workable for planning Mathematics programs at the classroom level? (Q27)	0%	9%	36%	27%	27%	33
...is Mathlink workable for planning Mathematics programs at the classroom level? (Q28)	0%	6%	35%	29%	29%	34
...is Mathlink workable for planning Mathematics programs at the school level? (Q29)	3%	11%	33%	22%	31%	36



<sup>1</sup>High rates of non-response on items 26 to 29 are discussed below.

For the feasibility in terms of teaching resources and time available (items 14 and 15) most of the teachers chose moderate or high levels, but one in five chose low or very low. This seems to indicate that the materials are feasible in both aspects, but that some teachers have found problems in either or both. Further elucidation of these problems will be discussed in relation to the interviews.

For the questions on Mathlink and Navtool (items 26-29) more than half of the teachers did not respond. Of those who did respond, around half gave low or very low ratings, with ratings above moderate being rare.

The high non-response rate for the online tools suggests that many teachers had insufficient familiarity with them to comment. The results for survey items 7 and 8, summarised in Display 12, bear this out. Around two thirds of the teachers indicated very low familiarity with the two tools.

**Display 12: Survey results – familiarity with online tools (percent of responses)**

Background item	Very high extent	High extent	Moderate extent	Low extent	Very low extent	N
Your familiarity with the navtool? (Q7)	0%	1%	10%	21%	68%	77
Your familiarity with Mathlink? (Q8)	0%	4%	13%	18%	65%	77



Further light is shed on the results for the online tools by survey item 9, which asked the teachers to choose items from a list of possible reasons for not using the Navtool or Mathlink. More than one choice was possible. The results are shown in Display 13.

**Display 13: Reasons for using or not using the Navtool or Mathlink (N=77)**

Possible reasons	f
These are useful tools	5
I don't have ready access to a computer with CD drive	7
I have not seen the CD-ROM	37
My computer skills are limited	3
I see no need to use these tools	6
I would rather work from printed copy	31
These tools are useful for school-level planning but not for classroom planning	9
I don't want to spend the time learning to use these tools at this stage	8
Administration uses these tools, not teachers	2
The computer is not useful for group or team planning	1
The tools are not easy to use	4
Other	7

Display 13 indicates that close to half of the teachers claimed not to have seen the CD-ROM that contained the online tools. Almost as many indicated a preference for working from hard copy. Further analysis showed that 6 of the teachers chose both of these reasons, indicating that only 15 of the 40 who were familiar with the CD-ROM would choose to use the online tools over hard copy.

Thus the data indicates a preference among teachers for working with printed copy rather than the online tools when planning. This result may seem surprising considering that the conferences for teachers and administrators featured practical sessions on the CD-ROM including the use of the online tools. The evaluator notes however, that the tools were not strongly promoted as an essential part of the trial but provided as an option. Nonetheless for most of the teachers involved in the extended trial, the value or usefulness of such tools are in doubt as an application of information technology to assist in classroom planning.

## 4.2 Teacher Interview

### Time and resources

Two interview items relate to teaching resources and time available. Teachers were asked how the resources and the time needed for a unit compared with similar units in Mathematics they had planned or taught in the past.

For resources, the 30 responses were split between those indicating that resource needs would not change (16) and those who believed more resources would be required (14).

Examples of responses indicating that resource needs would not increase were:

- *Not a lot of difference and we were able to use the material we already have.*
- *We bought a lot of materials when P-10 came in and these still apply.*
- *You can get away with what you have got but we were at a stage where we wanted to upgrade our resources so we did.*

Those indicating that more resources would be needed referred to newer content, more authentic or real-life mathematics or the absence of a textbook. For example:

- *Need more because of more authentic or real-life maths.*
- *More needed because can't rely on textbook.*
- *You need more resources - a lot more because it can't be a textbook based program.*
- *Some changes have occurred in my inclusion of real life materials. Must have a lot more hands on material. Many schools may not have this. Have to get out of textbook teaching and into materials.*
- *More authentic. More resource hungry but worth every penny in terms of kids.*

For time needed, 16 of the 30 responses indicated that time needs would not change. For example:

- *I found some things take longer and some things take less time.*
- *In terms of teaching time it is fairly similar to the previous.*
- *I haven't changed anything with regards to time.*

About one third (11) indicated that more time would be required due to the teaching approaches. For example:

- *As to in-class time for teaching, it will not be less and could be more considering the time needed for hands-on exploration.*
- *More time because kids are doing more. More in depth learning than in the past where they did chalk and talk.*
- *You need more time to get the outcomes.*
- *Probably takes longer but kids actually get it - that's the difference.*

A few (3) indicated that less time was needed:

- *If anything it will take less time because it seems there is less content to teach.*

## Online tools

The teachers were asked to rate and comment on the workability of the online format (CD-ROM) in navigating through the core learning outcomes and elaborations.

The ratings were:

Very High	High	Moderate	Low	Very Low	No Answer
2	10	7	3	2	7

Of the 31 teachers, 7 did not rate the online format. Their comments were that they hadn't used it at the time of the interview. The ratings were mostly moderate or high among those who gave a rating.

Of the 33 relevant comments made, the two most frequent responses were that the teacher had not used the CD-ROM (6) or that problems had been experienced with it (7). For example:

- *It is too soon for us to rate this because we haven't used it yet.*
- *We looked at it but found it a bit confusing. Sometimes we could not find what we wanted.*
- *The syllabus is easy to navigate but the Mathlink is not easy. We don't see any advantage in the Navtool.*

Another response (5) was that teachers used the CD simply to copy and paste from the actual syllabus document. For example:

- *A good thing about the syllabus online is that you can cut and paste easily to another file, or straight into your planning.*
- *We use the syllabus as loaded on our school computers and I use this to copy and paste when putting together the school program. We don't use Mathlink or the Navtool.*

A few (4) had used the Navtool and found it to be satisfactory. For example:

- *It's fine. Tend to use paper copy, but online format OK.*
- *If I can work CD-ROM, then anyone can. It must be very good. We have good computer support.*

Among the other responses, some (4) preferred to work from hard copy, some (3) needed more time to be able to use it comfortably or effectively, some (3) had no access to suitable hardware and one worked with other planning software. For example:

- *Didn't use it. Will use the paper copy over the CD.*
- *I have more to learn in order to be able to use it effectively.*
- *We don't have access to CD drives on the computers in the classroom.*

In general, the teacher interview results reinforce the findings from the survey.

### 4.3 School Administrator Interview

The school administrators were asked to what extent the resource demands are comparable with those of current programs. The results are shown in Display 14.

**Display 14: Administrator interview – efficiency (frequency table N=25)**

To what extent...	Very high	High	Moderate	Low	Very low	No answer
are the resource demands comparable with those of current programs?	3	11	4	5	1	1

The results span the full range of options, with close to half showing a high extent. Apparently some, but by no means all, encountered additional resource demands.

Close to half of the 22 administrators' comments indicated that many schools had adequate resources for the draft curriculum, but some needed new resources for a different style of teaching and others thought the new curriculum required more resources. For example:

- *Haven't heard any major resourcing complaints.*
- *We haven't had to go out and buy anything new. We have been well resourced in the past.*
- *We know there are children here with diverse needs and the materials we have been able to get are very good but we are looking for more resource materials needed such as sourcebooks.*
- *Resources are different - not pencil and paper. A wider variety of resources is required.*
- *It's much more demanding in terms of both time and materials.*

The school administrator results confirm the findings from the survey and the teacher interviews.

#### **4.4 Evaluation Findings - Efficiency**

The results indicate that the materials are appropriate, effective and efficient. Assessment and reporting are two areas where teachers needed more specific guidance and examples. The provision of support materials which may include sample modules can be expected to supply such guidance and in general help teachers to understand and interpret the syllabus and elaborations.

As a general rule, teachers experienced high levels of satisfaction with teaching classroom units based on the materials. Students' responses in terms of interest and achievement were usually reported in enthusiastic terms. However, planning the units was reported as demanding and time-consuming.

Most of the teachers saw little or no change from past programs in terms of demands for resources or time required for teaching.

The findings from the various evaluation processes pertaining to efficiency appear to justify the findings listed below.

- The materials appear quite feasible in terms of teaching resources and the time available to mathematics in the school curriculum although about one third of the teachers and school administrators believed that more resources or time would be needed for the newer content, the teaching approaches suggested, the emphasis on real-life mathematics or the absence of a textbook.
- Few of the teachers taking part in the trial had used the online tools for planning. Most said they preferred to work from hard copy when planning.

## **5. Summary of Findings**

The results generally indicate that the materials are appropriate, effective and efficient. Assessment and reporting are two areas where teachers needed more specific guidance and examples. The provision of teaching examples can be expected to supply such guidance and in general help teachers to understand and interpret the syllabus and elaborations.

As a general rule, teachers found planning of classroom units to be demanding and time-consuming but experienced high levels of satisfaction with the teaching. Students' responses in terms of interest and achievement were usually reported in enthusiastic terms. Most of the teachers saw little or no change from past programs in terms of demands for teaching resources or time.

The evaluation findings are summarised below for appropriateness, effectiveness and efficiency.

#### Appropriateness

- The materials are highly compatible with the views of teachers and other groups with an interest and expertise in mathematics education.
- The core learning outcomes describe very well the learnings in Mathematics that are essential for all learners.
- The materials are highly consistent with the needs of students, adequately consistent with the needs of teachers and quite consistent with the needs of schools.
- The progression described by the core learning outcomes is highly appropriate.
- The elaborations are highly consistent with the core learning outcomes.

#### Effectiveness

- The materials are very feasible for the range of diversity in students needs and assist teachers quite well in providing for that diversity.
- Teachers have been able to use the materials very effectively in the teaching and learning context.
- The materials are quite effective in matching teachers' needs for definition of scope and emphasis.
- The materials are quite effective in matching teachers' needs for clarity and amount of detail.
- The materials are quite effective for classroom planning and school level planning.
- The materials are quite effective for assessment and very workable for making judgements about students' learning but some teachers have encountered difficulties in practice or expressed concerns about consistency.
- The materials are less than adequate in terms of workability for communicating with students and parents about students' progress, mainly because teachers had difficulty applying the outcomes approach to reporting without guidance from the materials, school or school authorities.

#### Efficiency

- The materials are quite feasible in terms of teaching resources and the time available to mathematics in the school curriculum.
- Few of the teachers taking part in the trial had used the online tools for planning. Most said they preferred to work from hard copy when planning.

## 6. Advice to QSA

The Years 1 to 10 Mathematics syllabus and elaborations should now be prepared for publication.

Work should continue on the development of teacher support material, especially sample teaching modules. In developing the support material, the project team should:

- ensure that Working Mathematically is a feature of all support material, including modules (some of the SAC members thought that this component of mathematics education might be lost in the translation from core learning outcomes into teaching)

- provide plenty of examples of planning, teaching and particularly assessment to accompany the syllabus (teachers need this kind of guidance and interpretation, especially when using the syllabus for the first time)
- provide support materials, for example modules, that include activities spanning several levels (some of the teachers wanted to be able to use a single learning activity for groups of students working at different levels).

The evaluator notes that in this and other evaluations of Years 1 to 10 projects, teachers have often called for more specific guidance on assessment and reporting within the outcomes approach.

The provision of computer software to assist navigation of the syllabus or planning for teaching seems to be of limited value or usefulness for teachers and schools in current circumstances. Few of the teachers who took part in the extended trial made use of the online tools on the CD-ROM and many expressed a preference for working from hard copy.

## Appendix 1: Executive Summaries – Evaluation Reports 1 and 2

### Evaluation Report 1 (December 2000)

This report is concerned with the trial phase of the Years 1 to 10 Mathematics Key Learning Area Curriculum Development Project. The purpose of the project is to design, develop and disseminate a Years 1 to 10 syllabus, sourcebooks and initial inservice materials in Mathematics for use in Queensland schools.

The project commenced in January 1999 and is expected to be completed by December 2002, when a complete set of curriculum materials will be available for implementation in schools. This report relates to the evaluation of the trial phase of the project, which took place during the second semester of 2000.

During the trial phase, 15 schools were involved in working with the project team in the development of draft curriculum materials for the pilot phase planned for year 2001.

The materials for the trial were presented to the trial teachers in the form of a CD-ROM. They included the February 2002 trial syllabus, a set of "source materials", a set of sample school programs and a "school program generator" designed to facilitate the planning task for teachers.

During the trial phase, project team activity consisted of:

- Two cluster meetings for trial teachers and school administrators
- Three visits to each trial school
- Establishment of an on-line mailing list with ongoing communication among trial teachers and project team members
- A series of revised drafts of the syllabus
- Further development of the CD-ROM in preparation for the pilot phase
- Ongoing consultation with people from a wide range of stakeholder groups

The purpose of the external evaluation is to provide advice on the appropriateness, effectiveness and efficiency of the draft syllabus and associated materials. This is the first of three evaluation reports and examines the progress of the trial phase and the trial teachers' preliminary views on the workability of the draft curriculum materials.

The conclusions of the first phase of the evaluation are:

1. The trial was effectively conducted, featuring good communication by the project team and sound progress in most of the schools. Visits to trial schools by the project team were effective and highly valued by the teachers.
2. Communication from the project team to the trial teachers was effective but in many cases, communication back from the teachers was hampered by either lack of direct access to email or not enough time.
3. Implications for the pilot phase are:
  - The support of the project team, especially through visits to the schools, should be maintained as a key strategy.
  - Networking among pilot schools should be fostered by the project team.
  - Guidance on assessment and reporting will be required, especially for secondary teachers working in the system of criteria-based assessment.
4. By the end of the trial, with input from the trial teachers, the project team had developed a workable draft syllabus that showed sequential development in the levels and core learning outcomes.
5. Some of the secondary trial teachers have expressed doubts about the workability of the draft syllabus for the purposes of assessment.



6. Any change to current planning processes that result from the draft syllabus will represent change for the better, because they will facilitate the planning process for teachers or improve teaching and assessment by placing more emphasis on the learning of individual students.
7. The current strategy of providing links from core learning outcomes to national numeracy benchmarks should be continued in future drafts of the syllabus, and the CD should provide teachers with easy access to the full set of benchmarks for reference purposes.

The Years 1 to 10 Mathematics KLA Curriculum Development Project has made a sound beginning. Extensive consultation with a range of stakeholder groups has occurred. Excellent relationships and mutual respect have been forged between the project team and the trial teachers. The trial teachers have had genuine opportunities to have input into the development process and have seen their contributions reflected in successive drafts.

An on-line mailing list has been set up allowing trial teachers and project team members to interact on emerging issues via email. The value of the on-line mailing list is probably limited however, because many of the trial teachers either do not have direct access to email or are not regular email users. This issue requires further investigation for the next evaluation report.

A workable draft syllabus has been prepared in time for the pilot phase in year 2001.

The trial teachers have been enthused by the potential of the CD, especially the school program generator, which they see as greatly facilitating the planning process for them.

As has been the case in other syllabus development projects, the secondary teachers have expressed concerns about their need for guidance in assessment and reporting using a syllabus based on an outcomes approach within the existing criteria-based processes in their schools. They need specific suggestions on how to cope with this problem.

At this stage we are confident of the continuing success of the project. Teachers have reacted positively to their first use of the developing materials, giving them support and encouragement for further development. Good relationships have been forged between the project team and the trial teachers. Strong and comprehensive consultation processes have been established. Future evaluation activity will focus strongly upon the pilot teachers' experiences as they implement the draft curriculum materials in school classrooms.

## **Evaluation Report 2 (October 2001)**

### **The Project**

The purpose of the Years 1 to 10 Mathematics Curriculum Development Project is to design, develop and disseminate a Years 1 to 10 syllabus, sourcebooks and initial inservice materials in Mathematics for use in Queensland schools. The Project commenced in January 1999 with the formation of a project team. A trial phase occurred during 2000, and during 2001, the project team extensively revised the draft syllabus-in-development in a "trial and development" phase, in which 16 schools worked with the project team providing critical comment and suggestions on draft materials. The main activities for the trial and development teachers were to:

- provide structured reaction, at school level, to drafts of the core learning outcomes and elaborations in each of the syllabus strands
- discuss and critique, at cluster level, the completed draft syllabus.

### **The Evaluation**

During 2001, external evaluation of the project focused on the trial and development phase, and had three main components:

- a set of visits to the trial and development schools to interview participating teachers
- a survey of all teachers participating in the trial and development phase
- a structured external review of the syllabus-in-development, intended to characterise the draft curriculum and obtain structured response from the major stakeholders in the project, namely Education Queensland, QCEC and AISQ.

## Conclusions

1. By the beginning of Semester Two 2001, the project was progressing well. Teachers generally appreciated the efforts of the project team and the account taken of teacher comments and suggestions. Response to the staged implementation of the materials was positive. Overall, the teachers indicated a feeling of control over the development of materials, appreciating the acknowledgement and inclusion of much of their feedback to the team. There was also evidence of frustration among some of the teachers with the extent of the changes, the pressure of deadlines for responses to drafts and the time needed outside of classroom hours for communication with the project team.
2. Taken together, the results can be interpreted as broad recognition that the draft curriculum is generally in line with current thinking about mathematics and mathematics education. Most of the teachers saw the current topics as appropriate and believed that the developing curriculum would be an improvement. A few had doubts however that this improvement would justify the effort, time and resources that were going into the development project. Review by the major stakeholders (Education Queensland, QCEC and AISQ) indicated that at the basic level, the curriculum addresses most of the issues that are currently significant to Years 1 to 10 mathematics. However, doubts emerged about the appropriateness of the draft curriculum's response to significant issues, including catering for diversity, the role of language and provision for the middle years of schooling. Some reservations also came to light in relation to assessment and reporting, the nature and place of numeracy, place value, practicality and transparency for teachers, catering for teachers' varied backgrounds and the role of learning technologies. This indicates the need for continued consultation between the project team and the major stakeholders in relation to these specific issues.
3. The draft materials were clearly effective in meeting the needs of teachers and had good potential to meet the needs of the students in the range of schools participating in the trial and development phase.
4. Further development of the draft materials should focus on:
  - a. modifying the elaborations to bring out Working Mathematically more clearly
  - b. re-examining the level placement of content
  - c. addressing the reservations of the major stakeholders about the response of the draft materials to the issues identified in the external review.
5. In their current form, the draft curriculum materials, particularly the elaborations, provide a sound, workable basis for planning, teaching and learning contexts.
6. It was too early in the project to examine the ability of schools to apply the draft materials to assessment and reporting in depth. Nevertheless, assessment was an area of concern for some of the trial and development teachers. Some of the concerns indicated misunderstandings about the place of core learning outcomes and elaborations in assessment and reporting. The nature and purpose of core learning outcomes and elaborations need to be addressed in association with the pilot phase of the project and in the initial inservice materials.
7. The trial and development process has been successful in providing teachers with avenues for meaningful participation in the continuous improvement of the draft curriculum materials.
8. Provided the CD can be made easier for teachers to use, it has high potential for making the curriculum accessible and providing assistance with planning processes. Its value however, is contingent upon the ability of teachers to use software of this kind, their access to suitable computers and their readiness to apply computer-based processes to school and classroom planning.
9. The provision of materials in an online format promises significant advantages in making the curriculum materials easier to work with, but cannot substitute totally for person-to-person interaction involving colleagues or support personnel.

## **Discussion**

The trial and development process has been successful in providing a sound basis for the expected pilot phase of the Years 1 to 10 Mathematics curriculum development project. Through a cyclic process of draft – structured feedback – redraft, a well-accepted syllabus has been developed.

Some refinements are still needed, and attention needs to be paid to:

- the way Working Mathematically is apparent in the elaborations
- the level placement of some topics.

The provision of syllabus and associated materials in online format promises significant benefits over print format, and this is recognised by many of the trial and development teachers, but not all teachers were able to take full advantage of online technology. Even some of those who had no difficulty accessing the CD-ROM appeared to be more appreciative of the interaction provided by school visits from the project team and by cluster conferences involving other teachers.

An issue for the mathematics syllabus is whether elaborations should be included. Syllabuses in other key learning areas have not included elaborations. Consistency of format among the Years 1 to 10 syllabuses is important and should be maintained as far as possible, but in the interviews, many of the teachers expressed support for the inclusion of elaborations in the syllabus. The unique nature of the mathematics key learning area may provide sufficient justification to allow a variation of format in this case.

The external review process brought out a range of aspects of the draft materials that were not fully accepted by the three major stakeholders (AISQ, Education Queensland and QCEC). Consultation between the project team and these three organisations will be necessary to resolve the underlying reservations and concerns.

Taking the evaluation results as a whole, and considering the purposes of the trial and development phase, we consider that the project will be in a sound position to proceed to the pilot phase in 2002.

## Appendix 2: Expectations of Schools and Teachers in the Extended Trial

<b>Extended Trial School Protocols</b>	
<b>What schools are ASKED TO DO</b>	<i>FEEDBACK</i>
<p><b>WRITING SCHOOL / CLASS PROGRAMS</b></p> <ul style="list-style-type: none"> <li>• write school and/or class program(s)</li> <li>• focus on outcomes and core content and refer if necessary to the elaborations</li> <li>• define pedagogical expectations</li> <li>• write school assessment policy</li> <li>• write school policy/position for reporting on outcomes</li> <li>• review available resources</li> </ul>	<p><b>Identify ISSUES &amp; PROBLEMS</b></p> <ul style="list-style-type: none"> <li>• with the draft syllabus that arise during program writing, specifically:</li> <li>• that arise with management of the writing process, specifically:</li> <li>• that arise when planning, specifically:</li> <li>• associated with providing adequate resources for implementation of the program</li> </ul>
<p><b>IMPLEMENTING PROGRAMS</b></p> <ul style="list-style-type: none"> <li>• implement their school/class program</li> <li>• manage the implementation process for remainder of year</li> <li>• incorporate draft sourcebook modules as available</li> <li>• incorporate information from draft sourcebook guidelines and initial in-service materials</li> <li>• incorporate own resources as appropriate</li> </ul>	<p><b>Identify ISSUES &amp; PROBLEMS</b></p> <ul style="list-style-type: none"> <li>• with the draft syllabus that arose during implementation, specifically:</li> <li>• with use of draft sourcebook modules</li> <li>• related to electronic presentation of support materials                             <ul style="list-style-type: none"> <li>- about management of the implementation</li> </ul> </li> </ul>
<p><b>ASSESSING &amp; MONITORING STUDENTS</b></p> <ul style="list-style-type: none"> <li>• assess and monitor students</li> <li>• manage assessment and monitoring including potential transition difficulties</li> <li>• maintain updated student folio of evidence as required by school program</li> <li>• maintain updated student profile as required by school program</li> <li>• provide a clear focus for learning</li> <li>• develop understanding of the core learning outcomes</li> <li>• provide multiple opportunities</li> <li>• establish consistency of teacher judgment</li> </ul>	<p><b>Identify ISSUES &amp; PROBLEMS</b></p> <ul style="list-style-type: none"> <li>• with the draft syllabus and support materials that arise during assessment and monitoring</li> <li>• associated with management of assessment information</li> <li>• processes used to effect consistency of teacher judgment</li> </ul>
<p><b>INFORMING THE SCHOOL COMMUNITY</b></p> <ul style="list-style-type: none"> <li>• inform parents/communities about the trial</li> <li>• manage flow of information to parents</li> <li>• providing ongoing updates about the trial</li> <li>• report to parents and students</li> </ul>	<p><b>Identify ISSUES &amp; PROBLEMS</b></p> <ul style="list-style-type: none"> <li>• that arise during parent/community consultations</li> <li>• that arose during reporting sessions</li> </ul>

## **Appendix 3: The Interview Questions**

Teacher Interview

Administrator Interview

**YEARS 1 TO 10 MATHEMATICS CURRICULUM PROJECT  
EXTENDED TRIAL PHASE 2002  
EXTERNAL EVALUATION**

This interview is for teachers taking part in the extended trial phase of the QSCC curriculum development project for Years 1 to 10 Mathematics.

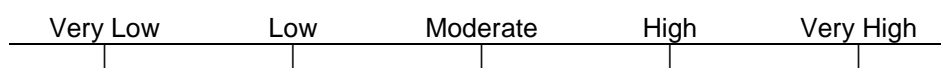
Our reports will not show the source of any interview responses. We will report your responses but we won't identify which school or person they came from.

The interview will relate to a unit you have worked on in conjunction with the trial. Please bring a copy of the unit plan to the interview. In answering the questions, we would like you to refer to the unit plan and your experiences with it.

Our questions refer mostly to the draft curriculum materials. By materials we mean:

- The draft syllabus and elaborations
- Mathlink
- Other support material on the CD-ROM

Some of the interview items call for a rating. The rating scale is:



<b>Part A: Messages</b>
1. What messages do you have for the Project Team, the Evaluator or the QSCC?
<b>Part B: The Unit</b>
2. What is the title of the unit?
3. Please specify the Year levels, strands, topics, levels and outcomes.
4. What is the timing for the unit and what stage have you reached?
5. What features of the school are relevant to discussion of the unit plan? (For example, student and community characteristics, special needs, school program features and emphases, location, staff, recent or current events etc.)
<b>Part C: Planning the Unit</b>
6. Briefly, how did you go about the planning process?
7. What use did you make of the draft materials in the planning? <ul style="list-style-type: none"> <li>a. The draft syllabus and elaborations</li> <li>b. Mathlink</li> <li>c. Other support material on the CD-ROM</li> </ul>
8. Rate and comment on how well the draft syllabus and elaborations defined the scope and emphasis for you. <b>[Rating]</b>
9. Rate and comment on the workability of the online format of the draft curriculum (CD-ROM) in navigating through the outcomes and elaborations. <b>[Rating]</b>
10. Rate and comment on the workability of the draft materials for planning. <b>[Rating]</b> <ul style="list-style-type: none"> <li>a. The draft syllabus and elaborations</li> <li>b. Mathlink</li> <li>c. Other support material on the CD-ROM</li> </ul>

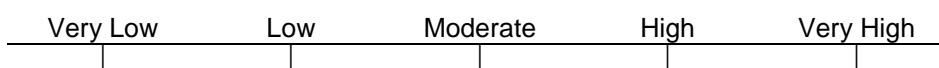
<b>Part C: Planning the Unit (Continued)</b>
11. What changes [if any] would make the draft materials more workable for planning? a. The draft syllabus and elaborations b. Mathlink c. Other support material on the CD-ROM
12. What provisions did you plan for diversity in students' needs?
13. To what extent did the draft materials help in providing for diversity in students' needs? How did they help? <b>[Rating]</b>
14. How could the draft materials be made more helpful in providing for diversity in students' needs?
15. How do the resources needed for the unit compare with similar units in Mathematics that you have planned or taught in the past?
16. How does the time needed for the unit compare with similar units in Mathematics that you have planned or taught in the past?
17. In a word or phrase, how would you describe the experience of planning the unit?
<b>Part D: Teaching the Unit</b>
18. How has the plan turned out in practice?
19. How have students responded in terms of achievement and interest?
20. In a word or phrase, how would you describe your experiences with teaching the unit?
<b>Part E: Assessment and Reporting</b>
21. What have you done in terms of assessment and reporting so far?
22. How did you use the materials in designing the assessment and reporting? a. The draft syllabus and elaborations b. Mathlink c. Other support material on the CD-ROM
23. Rate and comment on the workability of the materials for the purpose of designing assessment activities. <b>[Rating]</b> a. The draft syllabus and elaborations b. Mathlink c. Other support material on the CD-ROM
24. Rate and comment on the workability of the materials for the purpose of making judgements about students' learning. <b>[Rating]</b> a. The draft syllabus and elaborations b. Mathlink c. Other support material on the CD-ROM
25. Rate and comment on the workability of the materials for the purpose of communicating with students and parents about students' progress. <b>[Rating]</b> a. The draft syllabus and elaborations b. Mathlink c. Other support material on the CD-ROM
26. In a word or phrase, how would you describe your experiences with assessment and reporting?

## YEARS 1 TO 10 MATHEMATICS CURRICULUM DEVELOPMENT PROJECT: EXTENDED TRIAL PHASE 2002

### EXTERNAL EVALUATION: ADMINISTRATOR INTERVIEW

These questions relate to this year's trial of the draft Years 1 to 10 curriculum in Mathematics. Our reports will not show the source of any interview responses. We will report your responses but we won't identify which school or person they came from.

Please give a rating and comment for each question. The rating scale is:



#### To what extent:

27. Is the trial progressing well?

**VL—L—M—H—VH**

28. Are the draft materials compatible with this school's views about Mathematics education?

**VL—L—M—H—VH**

29. Do the draft core learning outcomes describe the learnings in Mathematics that are essential for all learners?

**VL—L—M—H—VH**

30. Are the draft curriculum materials consistent with the needs of your school?

**VL—L—M—H—VH**

31. Have the materials been workable for planning a Mathematics program at school level?

**VL—L—M—H—VH**

32. Have the materials been workable for assessment purposes?

**VL—L—M—H—VH**

33. Have the materials been effective in providing for students' diverse needs?

**VL—L—M—H—VH**

34. Are the resource demands comparable with those of current programs?

**VL—L—M—H—VH**



**Appendix 4: Survey Questionnaire**



## The Years 1 to 10 Mathematics Curriculum Project External Evaluation Survey of Trial Teachers

This survey is for teachers taking part in the extended trial of the QSA Years 1 to 10 Mathematics syllabus and materials. The results will form a significant part of the independent external evaluation of these materials. The findings will appear in a formal report to the QSA later this year. Please complete the survey quickly and return it to your school's trial coordinator, who will mail it back to us. Alternatively, you may send it to the address shown below.

- Every teacher's response is important.
- Please fill in both sides.
- Your responses are anonymous.
- A copy of the results will be sent to your school.
- Start with the background information below.
- Please accept our sincere thanks for participating in this survey.

### Background Information

<p>1. What Year levels do you teach this year?</p> <p><input type="checkbox"/> 1-3  <input type="checkbox"/> 4-7  <input type="checkbox"/> 8-10</p>	<p>2. Were you a participant in the trial and development phase in 2001?</p> <p><input type="checkbox"/> Yes  <input type="checkbox"/> No</p>
<p>3. School sector:</p> <p><input type="checkbox"/> Catholic  <input type="checkbox"/> Independent  <input type="checkbox"/> State</p>	<p>4. Years of teaching experience:</p> <p><input type="checkbox"/> Fewer than 2  <input type="checkbox"/> 2-5  <input type="checkbox"/> More than 5</p>
<p>5. Your highest Mathematics training:</p> <p><input type="checkbox"/> Post-graduate  <input type="checkbox"/> Degree major  <input type="checkbox"/> Some tertiary  <input type="checkbox"/> Secondary</p>	<p>6. Your familiarity with the draft Years 1 to 10 Mathematics materials?</p> <p><input type="checkbox"/> Very Low  <input type="checkbox"/> Low  <input type="checkbox"/> Moderate  <input type="checkbox"/> High  <input type="checkbox"/> Very High</p>
<p>7. Your familiarity with the Navtool?</p> <p><input type="checkbox"/> Very Low  <input type="checkbox"/> Low  <input type="checkbox"/> Moderate  <input type="checkbox"/> High  <input type="checkbox"/> Very High</p>	<p>8. Your familiarity with Mathlink?</p> <p><input type="checkbox"/> Very Low  <input type="checkbox"/> Low  <input type="checkbox"/> Moderate  <input type="checkbox"/> High  <input type="checkbox"/> Very High</p>
<p>9. Trial teachers have given various reasons for using or not using the Navtool or Mathlink on the CD-ROM. Which of these reasons apply to you? (Tick one or more)</p> <p><input type="checkbox"/> These are useful tools  <input type="checkbox"/> I don't have ready access to a computer with CD drive  <input type="checkbox"/> I have not seen the CD-ROM  <input type="checkbox"/> My computer skills are limited  <input type="checkbox"/> I see no need to use these tools  <input type="checkbox"/> I would rather work from printed copy  <input type="checkbox"/> These tools are useful for school-level planning but not for classroom planning  <input type="checkbox"/> I don't want to spend the time learning to use these tools at this stage  <input type="checkbox"/> Administration uses these tools, not teachers  <input type="checkbox"/> The computer is not useful for group or team planning  <input type="checkbox"/> The tools are not easy to use  <input type="checkbox"/> Other:</p>	

**Please continue on the other side →**

Please answer Questions 10 to 29 by ticking the appropriate box to the right.  
Each question begins with the phrase "To what extent:"

To what extent:	Very Low Extent	Low Extent	Moderate Extent	High Extent	Very High Extent
10. ...is the draft syllabus compatible with your views about Mathematics education?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. ...is the draft syllabus consistent with the needs of your students?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. ...is the draft syllabus consistent with the needs of your school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. ...are the draft syllabus and materials consistent with your needs as a teacher?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. ...are the draft syllabus and materials feasible in terms of available teaching resources?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. ...are the draft syllabus and materials feasible for the time available to Maths in the curriculum?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. ...are the draft syllabus and materials feasible for the range of diversity in students' needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. ...do the draft syllabus and elaborations effectively define the scope and emphasis of Mathematics?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. ...are the draft syllabus and elaborations clear for teachers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. ...do the draft syllabus and elaborations meet teachers' needs for detail?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. ...do the draft syllabus and elaborations assist teachers to provide for students' diverse needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. ...are the draft syllabus and elaborations feasible for planning for student learning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. ...are the draft syllabus and elaborations feasible for assessing student learning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. ...are the elaborations consistent with the core learning outcomes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. ...do the draft core learning outcomes describe the learnings in Mathematics that are essential for all learners?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. ...do the draft core learning outcomes describe a developmentally appropriate progression?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. ...is Navtool workable for navigating through the outcomes and elaborations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. ...is Navtool workable for planning Mathematics programs at the classroom level?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. ...is Mathlink workable for planning Mathematics programs at the classroom level?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. ...is Mathlink workable for planning Mathematics programs at the school level?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. Please write any comments here (or attach another sheet):

## Appendix 5: Summary of Survey Results

### Background Information

<p>Item 1: What year levels do you teach this year?</p> <table> <tr><td>4-7</td><td>24</td></tr> <tr><td>1-3</td><td>21</td></tr> <tr><td>4-10</td><td>2</td></tr> <tr><td>8-10</td><td>25</td></tr> <tr><td>1-7</td><td>4</td></tr> <tr><td>Missing</td><td>1</td></tr> </table>	4-7	24	1-3	21	4-10	2	8-10	25	1-7	4	Missing	1	<p>Item 2: Were you a participant in the trial and development phase in 2001?</p> <table> <tr><td>No</td><td>48</td></tr> <tr><td>Yes</td><td>29</td></tr> <tr><td>Missing</td><td>0</td></tr> </table>	No	48	Yes	29	Missing	0						
4-7	24																								
1-3	21																								
4-10	2																								
8-10	25																								
1-7	4																								
Missing	1																								
No	48																								
Yes	29																								
Missing	0																								
<p>Item 3: School sector:</p> <table> <tr><td>State</td><td>33</td></tr> <tr><td>Independent</td><td>15</td></tr> <tr><td>Catholic</td><td>29</td></tr> <tr><td>Missing</td><td>0</td></tr> </table>	State	33	Independent	15	Catholic	29	Missing	0	<p>Item 4: Years of teaching experience:</p> <table> <tr><td>Fewer than 2</td><td>9</td></tr> <tr><td>2-5</td><td>16</td></tr> <tr><td>More than 5</td><td>48</td></tr> <tr><td>Missing</td><td>4</td></tr> </table>	Fewer than 2	9	2-5	16	More than 5	48	Missing	4								
State	33																								
Independent	15																								
Catholic	29																								
Missing	0																								
Fewer than 2	9																								
2-5	16																								
More than 5	48																								
Missing	4																								
<p>Item 5: Your highest Mathematics training:</p> <table> <tr><td>Post-graduate</td><td>9</td></tr> <tr><td>Degree major</td><td>45</td></tr> <tr><td>Some tertiary</td><td>14</td></tr> <tr><td>Secondary</td><td>6</td></tr> <tr><td>Missing</td><td>3</td></tr> </table>	Post-graduate	9	Degree major	45	Some tertiary	14	Secondary	6	Missing	3	<p>Item 6: Your familiarity with the draft Years 1 to 10 Mathematics materials?</p> <table> <tr><td>Very low</td><td>3</td></tr> <tr><td>Low</td><td>6</td></tr> <tr><td>Moderate</td><td>34</td></tr> <tr><td>High</td><td>27</td></tr> <tr><td>Very high</td><td>6</td></tr> <tr><td>Missing</td><td>1</td></tr> </table>	Very low	3	Low	6	Moderate	34	High	27	Very high	6	Missing	1		
Post-graduate	9																								
Degree major	45																								
Some tertiary	14																								
Secondary	6																								
Missing	3																								
Very low	3																								
Low	6																								
Moderate	34																								
High	27																								
Very high	6																								
Missing	1																								
<p>Item 7: Your familiarity with the Navtool?</p> <table> <tr><td>Very low</td><td>52</td></tr> <tr><td>Low</td><td>16</td></tr> <tr><td>Moderate</td><td>8</td></tr> <tr><td>High</td><td>1</td></tr> <tr><td>Very High</td><td>0</td></tr> <tr><td>Missing</td><td>0</td></tr> </table>	Very low	52	Low	16	Moderate	8	High	1	Very High	0	Missing	0	<p>Item 8: Your familiarity with Mathlink?</p> <table> <tr><td>Very low</td><td>50</td></tr> <tr><td>Low</td><td>14</td></tr> <tr><td>Moderate</td><td>10</td></tr> <tr><td>High</td><td>3</td></tr> <tr><td>Very high</td><td>0</td></tr> <tr><td>Missing</td><td>0</td></tr> </table>	Very low	50	Low	14	Moderate	10	High	3	Very high	0	Missing	0
Very low	52																								
Low	16																								
Moderate	8																								
High	1																								
Very High	0																								
Missing	0																								
Very low	50																								
Low	14																								
Moderate	10																								
High	3																								
Very high	0																								
Missing	0																								

### Item 9:

Trial teachers have given various reasons for using or not using the Navtool or Mathlink on the CD-ROM. Which of these reasons apply to you? (Tick one or more)	f
These are useful tools	5
I don't have ready access to a computer with CD drive	7
I have not seen the CD-ROM	<b>37</b>
My computer skills are limited	3
I see no need to use these tools	6
I would rather work from printed copy	<b>31</b>
These tools are useful for school-level planning but not for classroom planning	9
I don't want to spend the time learning to use these tools at this stage	8
Administration uses these tools, not teachers	2
The computer is not useful for group or team planning	1
The tools are not easy to use	4
Other	7

**Items 10 to 29 (N=77)**

To what extent:	Very Low	Low	Moderate	High	Very High	Missing
30. ...is the draft syllabus compatible with your views about Mathematics education?	2	6	17	44	6	2
31. ...is the draft syllabus consistent with the needs of your students?	2	5	19	47	4	0
32. ...is the draft syllabus consistent with the needs of your school?	5	5	22	42	3	0
33. ...are the draft syllabus and materials consistent with your needs as a teacher?	6	12	21	34	3	1
34. ...are the draft syllabus and materials feasible in terms of available teaching resources?	6	9	39	21	1	1
35. ...are the draft syllabus and materials feasible for the time available to Maths in the curriculum?	6	9	36	21	2	3
36. ...are the draft syllabus and materials feasible for the range of diversity in students' needs?	4	6	19	40	7	1
37. ...do the draft syllabus and elaborations effectively define the scope and emphasis of Mathematics?	0	4	23	41	7	2
38. ...are the draft syllabus and elaborations clear for teachers?	0	5	30	37	4	1
39. ...do the draft syllabus and elaborations meet teachers' needs for detail?	3	9	22	34	7	2
40. ...do the draft syllabus and elaborations assist teachers to provide for students' diverse needs?	2	2	29	38	4	2
41. ...are the draft syllabus and elaborations feasible for planning for student learning?	3	6	21	39	5	3
42. ...are the draft syllabus and elaborations feasible for assessing student learning?	3	10	19	39	5	1
43. ...are the elaborations consistent with the core learning outcomes?	0	1	17	49	8	2
44. ...do the draft core learning outcomes describe the learnings in Mathematics that are essential for all learners?	0	5	17	48	6	1
45. ...do the draft core learning outcomes describe a developmentally appropriate progression?	1	4	16	45	10	1
46. ...is Navtool workable for navigating through the outcomes and elaborations?	8	7	15	3	0	44
47. ...is Navtool workable for planning Mathematics programs at the classroom level?	9	9	12	3	0	44
48. ...is Mathlink workable for planning Mathematics programs at the classroom level?	10	10	12	2	0	43
49. ...is Mathlink workable for planning Mathematics programs at the school level?	11	8	12	4	1	41

0-15 (0% to 19%)	16-30 (20% to 39%)	31-46 (40% to 59%)	47-61 (60% to 79%)
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## Appendix 6: Results from the Syllabus Advisory Committee Process

Key Aspects of Years 1 to 10 Mathematics	Project Team's Perspective on the intent of the Years 1 to 10 Mathematics Curriculum Materials	SAC members ratings of compatibility with their views, and comments
<p>1. The core curriculum The identification of the essential elements of mathematics that all students should study during the years of compulsory schooling</p>	<p>The core curriculum is described by the core learning outcomes across six levels. The core content is derived directly from core learning outcomes and written in terms of the key topics and concepts of the strands. Students engage with the core content when they are provided with opportunities to demonstrate the core learning outcomes in the syllabus.</p>	<p>VH: 5; H: 5, M: 0 (Mostly high or very high) <i>Students with intellectual impairment may not study all the core curriculum during the years of compulsory schooling.</i></p>
<p>2. Description of a developmental sequence The description of a sequence for children's development in Mathematics representing a progression in sophistication and complexity in what students know and what they can do with what they know.</p>	<p>The core learning outcomes represent a developmental sequence of learning, forming a continuum across six levels. The successive levels of learning outcomes indicate a progression of increasing sophistication and complexity.</p>	<p>VH: 5; H: 3, M: 2 (Mostly high or very high) <i>Theoretical support for a sequence of development is moderate. Calculators call into question developmental assumptions about number learning. At present the syllabus is moderately successful in laying out developmental sequences that focus on QUALITATIVE rather than QUANTITATIVE differences in what learners know and can do.</i> <i>The developmental sequence of learning is very important. It is not evident in some of the syllabuses of other KLAs. It is vital for mathematics.</i> <i>It is easy to see the sequential development by reading the level statements.</i></p>
<p>3. The organisational framework for the syllabus A framework of strands and topics that forms a sound basis for the organisation of the syllabus.</p>	<p>The five strands within the draft syllabus are consistent with those in the majority of comparable mathematics documents nationally and internationally. The eleven topics that unpack the strands are framed around the key concepts that permeate the syllabus and there is one core learning outcome for each topic at each level. The core learning outcomes provide a framework for teachers to plan appropriate learning and assessment for students throughout years 1 to 10.</p>	<p>VH: 3; H: 6, M: 1 (Mostly high) <i>I'm fairly sure that core learning outcomes alone are not sufficient to inform teachers' planning (especially inexperienced teachers). They will also need to consult elaborations.</i> <i>There will be some issues relating to the preparation of students for Senior studies, even with the beyond level 6 statements that are provided. There may still be some issues when comparing level 6 across the nation. This was discussed early in this process but the final position was never clarified.</i> <i>A sixth strand or a universal topic within each strand of working and thinking mathematically would have achieved the complete package.</i></p>

<b>Key Aspects of Years 1 to 10 Mathematics</b>	<b>Project Team's Perspective on the intent of the Years 1 to 10 Mathematics Curriculum Materials</b>	<b>SAC members ratings of compatibility with their views, and comments</b>
<p>4. Degree of specification The degree to which the syllabus provides clear direction for schools and teachers while allowing scope to take account of and respond to the diversity of school contexts.</p>	<p>The syllabus identifies several layers of specification (level statements, core learning outcomes and core content) to assist teachers by providing a framework for planning and assessment.</p> <p>The associated curriculum materials provide additional information about learning outcomes through the elaborations. The elaborations assist teachers to unpack the learning outcomes. Elaborations assist teachers to make judgments about demonstrations of core learning outcomes, may assist teachers to develop criteria to enhance consistency of judgment about demonstrations of learning outcomes and may provide information for diagnostic and intervention purposes.</p>	<p>VH: 2; H: 7, M: 1 (Mostly high)</p> <p><i>Level of detail in elaborations seems to be very helpful.</i></p> <p><i>Elaborations are very important for teachers who have trouble unpacking the outcomes. It is essential that these elaborations identify a variety of examples for teachers to use.</i></p> <p><i>The elaborations are useful in clarifying and unpacking the learning outcomes for staff. They will provide guidance for staff as they develop programs. The need for support materials, rich tasks etc. while outside this group's charter will be key to success of this syllabus.</i></p> <p><i>The fear that the elaborations would become the syllabus has been lessened by the structure of the syllabus.</i></p>
<p>5. Providing for diversity in the needs of students The degree to which the mathematics syllabus and support materials are adaptable to a wide range of diversity in students' needs.</p>	<p>Schools and teachers develop programs, units of work and learning experiences that cater for diversity of students' needs. The draft syllabus, with its core learning outcomes across six developmental levels and the foundation level examples, provides support for the development of differentiated learning programs, units and experiences designed to meet students' needs. Advice in associated curriculum materials supports equity principles for planning and assessment that ensures each student is provided with opportunities to demonstrate learning outcomes in ways that are sensitive to, and inclusive of, their circumstances and to ensure that students are provided with opportunities to negotiate assessment so that they can maximise their opportunities to demonstrate learning outcomes. For teachers planning individualised curriculum programs for students with disabilities more specific information is available in the Foundation Level statements and examples of learning outcomes.</p>	<p>VH: 2; H: 7, M: 1 (Mostly high)</p> <p><i>Design of sourcebook modules will be crucial here in providing explicit guidance. The syllabus itself does not really provide for a diversity of needs - how teachers interpret and implement the syllabus is what matters.</i></p>

Key Aspects of Years 1 to 10 Mathematics	Project Team's Perspective on the intent of the Years 1 to 10 Mathematics Curriculum Materials	SAC members ratings of compatibility with their views, and comments
<p>6. The place of numeracy in the mathematics key learning area How numeracy is emphasised and addressed in the mathematics syllabus and support materials, which plays a major role in the development of numeracy for all students.</p>	<p>Numerate students learn to reason and problem-solve, investigate, predict and explain, interpret, model and solve, as they interact with real-life situations that involve mathematics. The QSA draft mathematics syllabus and associated curriculum materials provide the framework for planning programs, units and activities incorporating relevant, interesting and challenging contexts through which students have opportunities to demonstrate what they know and what they can do with what they know in this key learning area. All key learning areas provide opportunities for students to develop and cope with the numeracy demands of schoolwork and everyday life that is the ability to choose from known mathematical concepts and skills and to apply them. This provides students with opportunities to make sense of and use mathematics in the real world.</p>	<p>VH: 5; H: 4, M: 0, L: 1 (Mostly high or very high. One low rating) <i>Difficult for a school syllabus to fully address numeracy (the contextual aspects). The "choosing and using" aspect is addressed through working mathematically ideas. The extent to which mathematical ideas and possibilities are recognised and applied in real world contexts will depend very much on how teachers (of mathematics and other KLAs) actually use the syllabus.</i> <i>For the majority of students, mathematics needs to be relevant. Focussing on numeracy as an important aspect of real life experiences means that students can engage with maths that makes sense.</i> <i>Numeracy is a term that is often misused and misrepresented. The development via interactions with real life situations is encouraged by the syllabus but will come down to the individual programs developed by the schools.</i> <i>The difference is with the definition of numeracy. Until a universal understanding of the term "numeracy" is achieved, its place in the syllabus and its development will be a matter of conjecture.</i></p>
<p>7. How working mathematically is addressed The emphasis on thinking and working mathematically and how this is embedded in the mathematics syllabus and support materials.</p>	<p>Thinking, reasoning and working mathematically is the essence of the Mathematics Key Learning Area and is embedded within the core learning outcomes. When planning using core learning outcomes, thinking, reasoning and working mathematically is developed through the use of investigations, significant tasks, problems, and open-ended situations. These provide learning opportunities through which students demonstrate their understanding and application of the key concepts. As students communicate with other students and teachers, reflecting on their thinking, clarifying ideas and procedures, reasoning about others' perspectives and generalising their knowledge to novel situations, evidence of demonstrations of learning outcomes can be gathered.</p>	<p>VH: 2; H: 4, M: 4 (Mostly moderate or high) <i>This aspect has improved throughout the development of the syllabus. Embedding WM within core learning outcomes is a better approach than having a separate strand.</i> <i>Working Mathematically is an integral part of any program. It is the essence of the KLA and should be embedded within everything that is done. The individual school programs will determine the success in addressing this issue. Elaborations assist in this.</i> <i>While I agree with the ideal, is this made clear? Do teachers know how to? Will students really communicate? - justify?</i> <i>Support materials have not yet been viewed in detail.</i></p>
<p>8. The emphasis on mental computation The emphasis that the syllabus and support materials place on mental calculation from level 1 to level 6.</p>	<p>The emphasis of mental computation within the draft syllabus has been informed by recent research, which indicates that the vast majority of everyday calculations are performed mentally. Mental computation, while emphasised, combines with written methods and the use of calculators, as the methods from which students can choose depending on the circumstances. The draft syllabus identifies a range of mental computation strategies at each level.</p>	<p>VH: 3; H: 6, M: 0, 1 no answer (Mostly high) <i>Mental computation is very important and needs emphasis in the syllabus.</i> <i>The syllabus does identify mental computation and it has been integral to the development, however in practice there is the need for programs developed to take this on board.</i> <i>"Identifies a range" - perhaps need more explicit information in modules.</i></p>



Key Aspects of Years 1 to 10 Mathematics	Project Team's Perspective on the intent of the Years 1 to 10 Mathematics Curriculum Materials	SAC members ratings of compatibility with their views, and comments
<p>9. Integrated use of electronic technologies How the mathematics syllabus and support materials encompass the use of electronic technologies.</p>	<p>The draft syllabus and the associated curriculum materials recommend that students be encouraged to use available electronic tools/technologies when provided with opportunities to demonstrate all levels of learning outcomes. The use of these electronic technologies promotes the exploration, experimentation and comparison of different aspects of mathematics, and may allow students to perform complex calculations and simulate experiments in relatively short periods of time thus enabling students to identify, analyse and describe important mathematical relationships in the real world.</p>	<p>VH: 2; H: 7, M: 1 Mostly high () <i>Will need some guidance and examples in sourcebook materials.</i> <i>It is important to remember that some students may not have access to electronic technology.</i> <i>The issue of access and equity will always drive technology issues and as such there is the need to offer alternative approaches, however to be a relevant syllabus the use of technology needs to be very strongly encouraged.</i> <i>Infrastructure in schools is not yet at a standard to be supportive.</i> <i>Have yet to see the associated materials.</i></p>
<p>10. The forms and roles of assessment Compatibility of the mathematics syllabus and support materials with good assessment practice in the context of an outcomes approach.</p>	<p>Principles of an outcome-approach to education (clear focus on learning outcomes, high expectations for all students, focus on development, planning curriculum with learners and learning in mind, expanded opportunities to learn) guide the development of syllabuses and therefore provide the foundation for assessment and reporting. Assessment plays a continuous and integral role within an outcomes approach to education. Assessment focuses on monitoring student progress in relation to core learning outcomes. A variety of assessment techniques may be used to gather and record evidence about student's demonstrations of learning outcomes. Self- and peer- assessment may be used to gather evidence of students' demonstrations of learning outcomes. Assessment is used to provide feedback on student progress and to inform decision making related to student learning. Assessment should focus on student's demonstrations of learning outcomes, be comprehensive, reflect equity principles, be valid and reliable, take account of individual learners, be an integral part of the learning and teaching process and develop students' capabilities to take responsibility for their own learning and monitor their own progress. Students should be encouraged to negotiate ways to demonstrate their learning. Criteria may be developed to assist students to understand how to demonstrate core learning outcomes. Teachers collect and use evidence of students' demonstrations of learning outcomes to make judgments about students' learning. Learning should be monitored over time and across a range of contexts. Students need to be provided with multiple opportunities to demonstrate learning outcomes and to develop as life-long learners.</p>	<p>VH: 3; H: 7, M: 0 (Mostly high) <i>Actually I would argue this is a weakness of outcomes focussed curriculum - weak link only between planning and assessment. While I generally agree with the team's perspective on assessment, I am still concerned that this could present a major challenge to teachers in implementing the syllabus. [referred to 'therefore' in line 5]</i> <i>While I have compatible views with the project team, I have some concerns on the practical application of these, particularly in a secondary school setting without a great deal of time and effort being spent on the PD of the staff involved. The practical realities and the syllabus ideals seem poles apart at this time. Reporting is also an issue that will require a significant amount of work to become "useful". The training of parents not the least of these. These are however issues that fall outside the scope of the team's brief. Sections on assessment and reporting are in agreement with QTU policy. Strongly support the advice that "record keeping should support planning, be manageable and be easily maintained".</i> <i>Ideally - need explicit examples through modules.</i> <i>Why specify self and peer assessment when a variety of assessment techniques is the subject of the previous sentence?</i></p>

<b>Key Aspects of Years 1 to 10 Mathematics</b>	<b>Project Team's Perspective on the intent of the Years 1 to 10 Mathematics Curriculum Materials</b>	<b>SAC members ratings of compatibility with their views, and comments</b>
<p>11. Relationship with current programs in Years 1 to 10 The nature of the relationship between the syllabus and existing mathematics programs in Year 1 to 10.</p>	<p>Within the syllabus and the associated curriculum materials the core learning outcomes incorporate and reflect the expectations of the Year 2 Diagnostic Net Number Developmental Continuum and the Years 3, 5 and 7 National Numeracy Benchmarks. Findings of a formal review of the 1987 Mathematics Syllabus, guidelines and sourcebooks informed the design and development of the draft syllabus.</p>	<p>VH: 3; H: 5, M: 1, 1 no answer (Mostly high or very high) <i>It is very important that teachers can focus on the reporting of demonstrations of outcomes and are not focussing on learning for a test etc.</i> <i>Do they answer the question? Very different to existing mathematics program.</i></p>
<p>12. Articulation with programs in Years 11-12 How the mathematics syllabus links with and allows pathways to current mathematics programs in Years 11 and 12.</p>	<p>An important element of the mathematics design brief was to ensure that the draft mathematics syllabus provided appropriate pathways for students wishing to study mathematics in Years 11 and 12. Articulation issues were discussed with project officers at BSSSS Mathematics Subject Advisory Committee and sub-committee meetings. The Mathematics project team has conducted numerous workshops involving representatives from school authorities, schools and the tertiary sector to ensure that the learning outcomes in the draft syllabus provided appropriate links to senior secondary mathematics syllabuses.</p>	<p>VH: 4; H: 3, M: 2, 1 no answer (Mostly high or very high) <i>Continuity of learning and having prerequisites for further studies is very important.</i> <i>As stated earlier, there are and will be some issues relating to preparation for senior studies although there is the potential at beyond 6 to prepare for the more mathematically demanding courses. I believe the team have attempted to link the syllabus to senior programs.</i> <i>At the Beyond Level 6 level, all learning outcomes are discretionary. However some of these outcomes are vital as preparation of the study of maths B and C and for applying mathematics in many future careers.</i> <i>Articulation to Years 11-12 still difficult.</i></p>

## Appendix 7: Teachers' Experiences with Planning, Teaching and Assessment

This appendix reports the results of three questions on the teacher interview. Teachers were asked to describe in a word or phrase, their experiences with planning, assessment/reporting and teaching a unit based on the materials.

The responses have been placed in order, based on the judgement of the evaluator, from positive to negative.

In a word or phrase, how would you describe the experience of ...		
...planning the unit?	...assessment and reporting?	...teaching the unit?
<p>Very challenging and satisfying            Interesting, rewarding            Interesting and informative and really enjoyable            Insightful – it made me research and refine teaching            Exciting            Quite easy, quite successful            Outcomes very positive            More organised, especially assessment            Maths has more purpose            Comfortable, easy, enjoyable            Interesting            Interesting because we had access to experts            Easier than normal planning            Daunting but enjoyable            Created an interest            Challenging            A different way of thinking about it            Simple and effective            Pretty good            Normal practice            No problems, no different from old planning            No different from what I do already            Natural for us, but more accountable            Just routine for me            Time consuming            Time consuming            Initially interesting, then get bogged down            Frustrating as some original tasks are low level            Time-consuming, challenging            Stressful - I felt overwhelmed We shared ignorance</p>	<p>Challenging, interesting            Challenging            Stress-free because cumulative            I like it because they can do it or they can't            Better big picture of the child            An improvement to the way I used to assess kids            Assessment more detailed and student-focussed            Positive            Good but hard work -will improve with practice            Different from what I have done before            Assessment improved, reporting not addressed            Assessing easier than reporting            No difference            We're finding our way            Still on a learning curve            Difficult at first but more useful            Not entirely convinced yet            Fits current situation            Observation and collection important            Wish it had more heart            Thought provoking with disappointing results            Not as successful as in the past            Difficult and time consuming at this stage            Exasperating            Frustrating</p>	<p>Enjoyable – planning is the essence – new concepts            Challenging, interesting, eye-opening to new ways            Very fulfilling            Great – satisfying – fun – fascinating            Purposeful            Enjoyable, interesting, more related to real life            More thought provoking for us            Very organised            A learning curve for us            A lot of work but rewarding            Fun            Enjoyable            Enjoyable and seemed effective            I have enjoyed teaching time this time            Good            Enjoyable            Exhausting but rewarding            No difference            As before            No problems            Little change from the past for me            Comfortable, same as usual            No difference            Wasn't hard for me            Different to what I had done before            Continual evaluation and reflection            Not entirely satisfied – can improve on what I did            Sigh, accurately recording and reporting elusive</p>