SURVEY OF MATHEMATICS PROGRAMS AND RESOURCES
REPORT -   1981 - 1982

The survey of mathematics programs and resources was sent to the
mathematics co-ordinators of all Secondary Division Schools during term 1,
1981.   By November, 92% of schools had returned the completed questionnaire.

The purpose of the survey was to gather and collate accurate information
on programs, resources, facilities and practices in State Secondary Schools,
in order that needs should be known, trends become apparent, good practices
recognized and so that future planning both within schools and across the
division could be made on the basis of sound information.   For this reason,
the questionnaire was comprehensive and time-consuming to complete - perhaps
an explanation for the many obvious errors in the completed forms, ranging
from the boys' schools that gave all student figures as girls, the many that
gave no student figures, making necessary reference to official figures, to
the almost 80% who misunderstood the Venn diagram and the matrix.   Such
omissions and misunderstandings added to the time taken in the collation and
analysis of the returns, and to some extent, may effect the accuracy of the
survey findings.

All percentages were calculated using the total returns and figures in
brackets indicate the percentage of girls or boys involved.

1.0 SCHOOL RECORD

The first part of the survey covered general aspects of the school's
mathematics programs and resources.   The school's name and that of the
co-ordinator was recorded for contact but not retained for any other purpose.

1.1 STAFF

1.11 Summary of Qualifications of Mathematics Staff.
. 6% have more than three years of tertiary mathematics study - a
very high proportion of these being in country or western suburbs
schools.
. 43% have three years of tertiary mathematics study.
. 26% have two years of tertiary mathematics study.
. 17% have one year of tertiary mathematics study.
. 9% of those teaching mathematics have studied no mathematics at
tertiary level.

Qualifications of Mathematics Teachers.

METHOD	Years of TERTIARY MATHS STUDY					
	>3	3	2	1	0	total
Double	4	20	2	0	0	26%
Single	2	22	20	7	1	52%
Nil	0	1	4	9	6	20%
Primary	0	0	0	1	2	3%
	6%	43%	26%	17%	9%	

Of those who have had only one year of tertiary mathematics study, the most
commonly held qualification was a statistics unit in Commerce or Psychology.

1.2 ANCILLARY STAFF:

15% of schools surveyed have some ancillary assistance. Many of these staff are Part-time, although two schools have more than one full-time aide.

1.2 FACILITIES:

1.21 Mathematics Rooms:

88% of schools have between one and five rooms dedicated to the teaching of mathematics.
4% have a mathematics laboratory.
52% have a separate resource centre.
25% have a remedial maths centre.

1.22 Computer Facilities:

54% of mathematics faculties reported that they have a microcomputer. This figure is increasing rapidly. A survey by the Secondary Computer Education Committee in November, 1981, indicated that 60.5% of secondary schools then owned a microcomputer facility.

1.23 Budget:

94% of mathematics faculties surveyed have an allocated budget. These allocated funds range from below $1000 (22%) to more than $4000 (9%). The size of the budget does not always relate to the size of the school.

1.24 Externally Funded Projects:

22% of schools have received extra funding for special projects from a variety of sources:

Source	Percentage of schools
Country Education Project	3%
Schools Commission	1%
Supplementary Grants	8%
DSE Discretionary Fund	4%
Local Community	1%
TEAC	0.4%
School Council	3%
Other	1%

2.0 REMEDIAL PROGRAMS

Responses indicated some confusion about the definition of a remedial program, as some schools included figures which apparently related to non-mainstream terminal courses.

2.1 Remedial Programs offered at each year level:

7	8	9	10
64%	57%	51%	52%

2.2 Course organization
(NB a number of schools employ more than one method)

Year	7	8	9	10
Separate remedial stream	29%	26%	34%	38%
Short term withdrawal from maths	26%	19%	9%	2%
Short term withdrawal from other	5%	4%	3%	1%
Support teacher in maths classes	19%	14%	7%	3%
Supplementary program outside class	2%	3%	3%	2%
Cross-age tutoring	3%	2%	3%	2%

A separate remedial stream continues to be the most common means of organizing the program, with 29% at year 7 and increasing at each year level to 34% at year 10, while short-term withdrawal from mathematics classes becomes a less frequently used method from 26% at year 7 to a low 2% by year 10. A similar pattern exists with the use of support teachers in the classroom.

Less frequently used methods include short-term withdrawal from classes other than mathematics, supplementary programs outside class time and cross-age tutoring.

2.3 Method of selecting students
(NB a number of schools employ more than one method)

Year	7	8	9	10
Student choice	7%	5%	11%	16%
Teacher recommendation	49%	45%	40%	37%
Standardized tests	27%	17%	12%	11%
Informal tests	24%	21%	16%	16%

While teacher recommendation is the most used procedure, some form of formal or informal testing is used in most programs as a supplement or basis for such recommendation. Student choice becomes more significant at year 10.

3.0. USE OF CALCULATORS

Year	7	8	9	10
Not permitted	59%	52%	27%	14%
Structured use only	38%	45%	61%	55%
Free use	3%	3%	12%	31%
	100%	100%	100%	100%

Despite research findings and societal acceptance of the calculator, the survey shows that a majority of schools do not allow the use of calculators in the junior school and introduce them in a stuctured way by year 10.

4.0. USE OF COMPUTERS

Although only 54% of mathematics faculties reported access to a computer, the survey shows that its use is not restricted to senior levels.

Year	7	8	9	10
Use by Teachers	11%	11%	21%	28%
Use by Students	10%	10%	22%	31%
Not used	79%	79%	57%	50%
	100%	100%	100%	100%

5.0 SPECIAL PROGRAMS

Primary-Secondary transition	18%
Pre-employment	16%
Gifted children	21%
Other	11%
Nil	34%
	100%

These are programs designed to assist or encourage students beyond the normal mathematics program. Such programs are often interdisciplinary or run by the wider school community.

6.0 STUDENT NUMBERS

The majority of students at year 7 are girls and 95% of them do the mainstream mathematics. However, even at this level, slightly more girls than boys either are in a lower stream of mathematics or do not take mathematics at all. At year 8, the proportion of girls taking non-mainstream courses is slightly less than at year 7.

There is a marginal increase in the proportion of girls at the year 9 level and again, more girls than boys are in alternate streams. This trend is apparent also at year 10.

6.1 Years 7-10

	Course 1 (Mainstream)	Course 2 (Alternate)	No maths	Total Students
Year 7 Girls	54%(95%)	3%(6%)		58%(100%)
Boys	41%(96%)	2%(5%)		42%(100%)
Year 8 Girls	55%(96%)	2%(4%)		57%(100%)
Boys	41%(95%)	2%(5%)		43%(100%)
Year 9 Girls	52%(89%)	6%(6%)	1%(1%)	58%(100%)
Boys	37%(90%)	5%(6%)		42%(100%)
Year 10 Girls	44%(77%)	13%(23%)		58%(100%)
Boys	34%(80%)	9%(19%)		42%(100%)

6.2 Year 11

Although 57% of year 11 students are girls, only 26% of these take both Mathematics I and II, while 39% of boys take both mathematics. 21% of girls study no mathematics at year 11, while only 12% of boys do no maths.

	Ma I&II	Ma I	Ma A	Other	Nil	Total
Girls	15%(26%)	9%(16%)	15%(26%)	7%(11%)	12%(21%)	57%(100%)
Boys	17%(39%)	8%(18%)	9%(21%)	4%(10%)	5%(12%)	43%(100%)
	32%	17%	24%	11%	17%	100%

6.3 Year 12

At year 12, girls are again in the majority and are under-represented in mathematics classes, with 59% of girls taking no mathematics subjects at year 12. While only 17% of year 12 students taking no mathematics are boys, this represents 40% of boys at this level.

The proportion of girls and boys who study General Mathematics is very similar, being 27% of girls and 25% of boys while 40% of girls and 59% of boys take HSC mathematics subjects.

Only 1% of schools indicated that they have students attempting all three Group I mathematics subjects while 28% of year 12 students take one Group I mathematics subject.

	Pure & Applied	Pure Ma only	General	Other	Nil	Total
Girls	5%(9%)	2%(3%)	15%(27%)	1%(2%)	35%(59%)	59%
Boys	13%(32%)	1%(2%)	10%(25%)	1%( )	17%(40%)	41%
	18%	3%	25%	2%	52%	100%

7.0.ORGANIZATION:

7.1 MAINSTREAM COURSES

At year 7 and 8, traditional classroom lessons continue to be the most common process, with 69% and 71% of schools, respectively, using this approach. With 73% of classes at year 7 and 71% at year 8 in heterogenous groupings, this indicates little attempt to use either organization or approach as a means of dealing with individual differences.

At year 9, 82% of of schools teach traditional classroom lesson, although there is more ability grouping used at this level. This trend continues at year 10 with 88% of schools using the traditional approach with 49% involving ability grouping. At year 10, student choice is used in 13% of schools compared with 1% at year 7.

	7	8	9	10
A - Fixed classes based on student ability	21%	23%	34%	49%
B - Fixed classes not based on ability	73%	71%	55%	29%
C - Classes based on student choice	1%	2%	7%	13%
D - Flexible grouping according to topic	5%	3%	3%	6%
T - Traditional class lessons	69%	71%	82%	88%
S - Some individualization	22%	21%	16%	9%
I - Mainly individualized	9%	7%	3%	1%

	7	8	9	10.
AT	19%	20%	28%	46%
BT	46%	48%	46%	25%
CT	1%	1%	6%	13%
DT	3%	2%	2%	4%
	69%	71%	82%	46%
AS	2%	3%	6%	4%
BS	19%	16%	7%	3%
CS	0%	1%	1%	0.
DS	1%	1%	2%	2%
	22%	21%	16%	9%
AI	0%	0%	0%	0%
BI	8%	7%	2%	1%
CI	0%	1%	0%	0%
DI	1%	0%	0%	0%
	9%	8%	3%	1%

7.2 ALTERNATE COURSES

Although most such courses are predominately run as traditional classroom lessons, especially at years 9 and 10, individualized and

semi-lockstep approaches are more evident than in the mainstream classes and, of course, ability grouping is the most frequent selection method used especially at years 7 and 8.

	7	8	9	10
A –	73%	80%	66%	61%
B –	9%	10%	15%	17%
C –	6%	3%	17%	20%
D –	12%	7%	2%	2%
	100%	100%	100%	100%
T –	38%	33%	62%	73%
S –	29%	25%	25%	24%
I –	33%	42%	13%	3%
	100%	100%	100%	100%
AT –	25%	26%	37%	40%
BT –	5%	2%	12%	18%
CT –	0.	2%	11%	11%
DT –	5%	4%	1%	2%
	35%	34%	61%	71%
AS –	24%	26%	19%	19%
BS –	2%	0.	3%	3%
CS –	3%	0.	3%	1%
DS –	3%	0.	0.	1%
	32%	26%	25%	24%
AI –	23%	26%	9%	3%
BI –	2%	8%	2%	2%
CI –	3%	2%	1%	0.
DI –	5%	4%	2%	0.
	33%	40%	14%	5%

8.0 .TIME ALLOCATION-

8.1 Years 7 to 10

While most schools allocate either 240 or 250 minutes per week to mathematics classes, some faculties indicated a pressure to reduce this to 200 minutes or less.

8.11 MAINSTREAM COURSES

>250	6%	6%	6%	14%
250	34%	29%	30%	26%
240	18%	19%	17%	14%
230	7%	2%	6%	2%
220	2%	6%	4%	7%
210	3%	3%	2%	3%
200	24%	29%	28%	23%
<200	6%	6%	7%	11%
	100%	100%	100%	100%

8.12 ALTERNATE COURSES

>250	8%	8%	6%	7%
250	25%	27%	28%	27%
240	15%	16%	11%	12%
230	7%	5%	6%	1%
220	2%	6%	4%	1%
210	-	2%	1%	0%
200	26%	26%	21%	21%
<200	17%	10%	23%	31%
	100%	100%	100%	100%

8.2 Year 11

Mins	Ma I&II	Ma I only	Ma A	Other Maths
>500	2%			
500	25%			
480				
460	12%			
440				
420	7%			
400	30%			
<400	5%			
>250		7%	3%	7%
250		28%	22%	28%
240		15%	16%	11%
230		15%	15%	10%
220				
210				
200		32%	39%	34%
<200		9%	2%	5%

8.3 Year 12

	Pure Maths	Applied Maths	General Maths
>250	12%	8%	8%
250	46%	39%	39%

240	23%	18%	22%
230	7%	8%	8%
220	1%	1%	1%
210	1%		
200	9%	8%	8%
<200	1%	1%	1%

9.0. TEXTBOOKS

9.1 MAINSTREAM COURSES

YEAR		7	8	9	10
New Mainstream	(Gatford)	52%	58%	41%	35%
Math Book	(Del Grande)	38%	34%		
Math Book	(Kennedy)			30%	20%
RAMP	(Henry)	23%	14%		
New Active	(Gatford)		19%		
Maths for Year -	(Lynch)			41%	53%
Modern Maths	(Daffey)	19%	14%		
Secondary Maths	(Bail)	14%			
Acheron	(Astro)		15%		

(NB Many schools use a variety of resources too numerous to list)

	7	8	9	10
Pupil purchased textbook only	10%	14%	17%	17%
Single Resource	16%	23%	27%	17%
Class Sets	56%	52%	39%	37%

9.2 ALTERNATE COURSES

Year	7	8	9	10
9.21 Type of Course				
Basic/Remedial/Modified	24%	20%	41%	68%
Advanced	3%	1%	5%	11%
Activities	1%			
Computers		3%	4%	

At Year 10, courses other than Mainstream include:
Basic/Modified/Arithmetic/Consumer/Citizen/Business/Applied/
Remedial/Practical/Alternate/Terminal/General/Maths A B/
Medium/Single/Bridging/Vocational/Ordinary/Trade/Composite/Zoo/
Environmental/Everyday/
Advanced/Elective/Algebra/Maths A B/Maths 1 2/Extended/Gifted.

9.22 Textbooks

		7	8	9	10
Mainstream	(Gatford)	31%	27%	22%	
Math Book 1	(Del Grande)	16%			
Review Arithmetic	(Keller)		29%		
Secondary Maths	(Bail)		16%		
Maths for Year 9	(Lynch)			14%	17%
Modern Maths	(Daffey)			12%	.
Applied Arithmetic	(Horne)				27%
Real Life Maths	(Barney)				21%
Maths for Year 10	(Lynch)				17%
Various Basic Texts			27%		2%

10.0 YEAR 11

10.1 YEAR ORGANIZATION

Mathematics offered as:

Year course	80%
Semester Units	9%
Trimester Units	7%
Don't know	4%

10.2 COMPUTER USE

Mathematics I and II	25%
Mathematics I only	13%
Mathematics A	26%
Other Mathematics	16%
Nil use	20%
	100%

11.0 Year 12

11.1 OPTIONS

11.11 Pure Mathematics

	Total	Term I	Term II	Term III	Two Terms	Whole Year
Numerical Maths	1%	0.4%			0.4%	0%
Probability	5%	1%	2%		1%	0%
Complex Nrs.	74%	16%	29%	2%	24%	3%
Computer App	4%				1%	1%

11.12 Applied Mathematics

	Total	Term I	Term II	Term III	Two Terms	Whole Year
Numerical ma	1%	1%				
Probability	74%	52%	5%	1%	14%	2%
Complex Nrs	4%	1%	1%		1%	
Computer App.	3%	1%	1%		1%	1%

11.13 General Mathematics

	Total	Term I	Term II	Term III	Two Terms	Whole Year
Computer App	12%	2%	2%		4%	4%
Earth & Space	2%	1%				1%
Growth & Decay	6%	1%	3%		1%	1%
Applicable Ma	72%	20%	20%	2%	22%	8%

11.2 Group II Mathematics

11.21 Course Names

- Business Maths   3%
- STC   2%
- Maths A   1%