# Appendix A (Patterns of Performance and Progress)

Percentages of students in each year group as a function of gender, ethnicity, school decile band, and framework stage for each domain on the Diagnostic Interview (NumPA) in 2004

Year	1	2	3	ENP	4	5	6	ANP	7	8	INP
(Number of students)	(7793)	(8197)	(8516)	(24507)	(10013)	(9868)	(9959)	(29840)	(8374)	(7306)	(15680)
Gender											
Girls	48.3	48.5	48.6	48.5	49.1	48.2	48.7	48.7	49.9	50.7	50.3
Boys	51.7	51.5	51.4	51.5	50.9	51.8	51.3	51.3	50.1	49.3	49.7
Ethnicity											
European	64.7	62.5	61.9	63.0	59.7	59.1	59.2	59.3	58.9	58.2	58.6
Māori	17.3	17.6	18.4	17.8	18.7	19.5	18.2	18.8	24.5	24.6	24.6
Pasifika	8.5	9.1	10.2	9.3	11.3	10.9	11.2	11.2	9.5	10.0	9.7
Asian	5.8	6.3	5.6	5.9	5.9	5.9	6.4	6.1	3.6	3.4	3.5
Other	3.8	4.5	4.0	4.1	4.4	4.7	4.9	4.7	3.6	3.8	3.7
School Decile Band											
Low (1–3)	20.1	22.1	25.8	22.8	26.6	29.4	29.7	28.5	28.4	31.5	29.8
Medium (4–7)	38.3	36.4	35.7	36.8	37.8	38.9	37.4	38.1	49.3	48.5	48.9
High (8–10)	41.6	41.5	38.4	40.5	35.6	31.8	32.8	33.4	22.2	20.0	21.2
Addition/Subtraction											
Initial Stage											
0: Emergent	15.7	3.2	1.7	6.6	1.7	0.9	0.9	1.2	0.9	0.7	0.8
1: One-to-One Counting	29.8	14.6	4.9	16.1	1.6	0.7	0.4	0.9	0.3	0.2	0.2
2 Count All with materials	43.7	39.5	17.8	33.3	5.3	2.2	1.1	2.9	1.0		
3 Count All with imaging	8.5	20.2	14.2	14.4	5.5	2.9	1.3	3.3	1.2		
4: Advanced Counting	2.2	19.4	46.3	23.3	48.9	40.7	34.2	41.3	27.4		-
5: Early Additive P–W	0.2	3.0		6.1	32.6				46.2		
6: Adv. Additive P–W	0.0	0.2	0.6	0.3	4.3	9.0		9.6	23.0	31.9	-
	0.0	0.2	0.0	010		2.0	10.0	210	20.0	51.9	
Final Stage											
0: Emergent	2.0	1.0	0.1	1.0	0.2	0.2	0.1	0.1	0.3	0.3	0.3
1: One-to-One Counting	9.6	2.7	0.9	4.3	0.3	0.1	0.1	0.2	0.1	0.0	
2 Count All with materials	42.6	16.8	4.9		1.6	0.8		0.9	0.4		0.3
3 Count All with imaging	25.9		7.2		2.3	1.1	0.5		0.6		
4: Advanced Counting	17.7	44.0	47.2	36.8	32.5	22.1	16.2	23.6	14.0		
5: Early Additive P–W	2.1	14.4	35.4	17.8		52.3	46.3		43.4		
6: Adv. Additive P–W	0.1										
	0.1	0.0		1.0	10.0		20.0			20.1	
Multiplication/Division					1						
Initial Stage											
Not given	98.6	84.0	46.7	75.7	17.8	7.9	4.7	10.2	3.9	1.9	3.0
2–3: Count All	1.1	9.2	21.9			11.7			4.9		
4: Advanced Counting	0.3	5.8		10.7					24.1		
5: Early Additive P–W	0.5	0.9		2.2	15.4				30.6		
6: Adv. Additive P–W		0.9	1.1	0.4					28.3		
7: Adv. Mult. P–W		0.0	0.0	0.0	0.8	2.2	5.2	2.8	8.3	14.5	11.2

Year	1	2	3	ENP	4	5	6	ANP	7	8	INP
Muliplication/Division cont.	(7793)	(8197)	(8516)	(24507)	(10013)	(9868)	(9959)	(29840)	(8374)	(7306)	(15680)
Final Stage											
Not given	87.5	53.6	19.8	52.7	6.8	3.7	2.3	4.2	1.5	0.8	1.2
2–3: Count All	5.8	12.1	12.0	10.1	6.1	3.2	2.0	3.8	1.9	1.1	1.5
4: Advanced Counting	6.0	27.4	43.1	26.1	37.3	24.8	15.3	25.8	12.1	7.3	9.9
5: Early Additive P–W	0.6	5.9	17.5	8.2	28.7	30.0	26.2	28.3	24.1	19.7	22.0
6: Adv. Additive P–W	0.1	1.0	6.8	2.7	17.4	29.6	36.1	27.7	38.0	37.3	37.7
7: Adv. Mult. P–W		0.1	0.6	0.3	3.7	8.7	18.2	10.2	22.4	33.8	27.7
Proportion/Ratio											
Initial Stage											
Not given	98.7	84.2	46.8	75.8	18.5	8.1	4.9	10.5	4.5	2.5	3.6
1: Unequal Sharing	0.8	6.7	17.0	8.4	15.1	11.1	8.1	11.4	5.4	3.5	4.5
2–4: Equal Sharing	0.5	8.6	32.9	14.5	50.5	49.8	41.1	47.1	32.7	26.3	29.7
5: Early Additive P–W	0.0	0.4	3.1	1.2	12.7	22.4	27.7	20.9	29.2	28.2	28.7
6 Adv. Additive P–W		0.0	0.2	0.1	2.5	6.8	13.1	7.5	19.1	24.0	21.4
7: Adv. Mult. P–W		0.0	0.0	0.0	0.6	1.8	4.6	2.4	8.0	12.6	10.2
8: Adv. Proportional P–W					0.1	0.1	0.5	0.2	1.0	2.8	1.8
Final Stage											
Not given	87.6	53.6	20.6	53.0	7.1	4.2	2.4	4.5	1.9	1.0	1.4
1: Unequal Sharing	2.9	6.3	6.6	5.3	3.8	1.7	1.2	2.2	1.1	0.6	0.9
2–4: Equal Sharing	9.1	35.7	52.4	33.0	46.1	32.5	22.0	33.6	19.1	13.1	16.3
5: Early Additive P–W	0.4	3.8	16.3	7.0	29.1	34.8	32.7	32.2	28.8	23.5	26.3
6 Adv. Additive P–W	0.1	0.5	3.5	1.4	10.4	18.9	25.2	18.2	26.8	29.0	27.9
7: Adv. Mult. P–W		0.1	0.5	0.2	3.2	7.4	14.4	8.3	17.9	23.4	20.5
8: Adv. Proportional P–W			0.0	0.0	0.3	0.5	2.2	1.0	4.3	9.3	6.7
FNWS											
Initial Stage											
0 Emergent FNWS	11.2	2.4	1.4	4.9	1.9	0.7	0.6	1.1	1.3	1.2	1.2
1 Initial FNWS to 10	27.8	7.7	2.1	12.2	0.6	0.2	0.1	0.3	0.1	0.0	0.1
2 up to 10	33.1	20.5	6.1	19.5	1.6	0.5	0.3	0.8	0.3	0.2	0.2
3 up to 20	19.5	27.7	14.1	20.4	4.5		1.2	2.7	1.1	0.5	
4 up to 100	7.6				1						
5 up to 1000	0.8	6.6	26.6	11.7	50.3	61.8	63.0	58.4	58.0	51.2	54.8
6 up to 1,000,000	0.0	0.2	1.2	0.5	4.5	11.0	20.7	12.1	29.1	40.4	34.3
Final Stage											
0 Emergent FNWS	1.9	1.9	0.9	1.5	1.4	0.6	0.7	0.9	0.8	0.7	0.7
1 Initial FNWS to 10	5.4	0.8	0.3	2.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0
2 up to 10	16.5	4.0	1.0	6.9	0.3	0.2	0.1	0.2	0.1	0.0	0.1
3 up to 20	33.9	15.7	4.5	17.6	1.3	0.7	0.4	0.8	0.4	0.2	0.3
4 up to 100	35.9	48.5	34.4	39.6	17.6	8.7	5.0	10.5	4.1	2.0	3.1
5 up to 1000	6.2	27.4	51.5	29.0	62.5	58.8	47.6	56.3	40.7	29.5	35.5
6 up to 1 000 000	0.2	1.7	7.4	3.2	16.8	30.9	46.4	31.4	53.8	67.6	60.2

Year	1	2	3	ENP	4	5	6	ANP	7	8	INP
	(7793)	(8197)	(8516)	(24507)	(10013)	(9868)	(9959)	(29840)	(8374)	(7306)	(15680)
Initial Stage											
0 Emergent BNWS	38.3	8.2	2.6	15.8	2.3	1.0	0.8	1.4	1.6	1.4	1.5
1 Initial BNWS from 10	21.3	13.1	4.7	12.8	1.2	0.4	0.1	0.6	0.2	0.1	0.1
2 back from 10	29.7	33.6	15.2	26.0	4.6	1.7	1.0	2.4	0.4	0.4	0.4
3 back from 20	6.7	15.7	12.1	11.6	5.5	2.7	1.2	3.1	1.4	0.5	1.0
4 back from 100	3.5	22.9	38.4	22.1	32.3	24.2	16.4	24.3	13.0	8.8	11.0
5 back from 1000	0.5	6.3	25.9	11.3	49.7	59.6	61.1	56.8	54.9	49.5	52.4
6 back from 1 000 000	0.0	0.2	1.2	0.5	4.3	10.4	19.5	11.4	28.4	39.3	33.5
Final Stage											
0 Emergent BNWS	6.1	2.5	1.2	3.2	1.5	0.8	0.8	1.1	1.3	1.4	1.4
1 Initial BNWS from 10	10.1	2.7	0.9	4.4	0.3	0.2	0.1	0.2	0.1	0.0	0.1
2 back from 10	31.7	12.3	3.5	15.4	0.9	0.4	0.2	0.5	0.1	0.1	0.1
3 back from 20	22.4	14.8	6.0	14.1	2.1	0.8	0.5	1.1	0.5	0.2	0.4
4 back from 100	23.6	39.7	32.3	32.0	18.5	10.7	6.0	11.8	5.2	3.0	4.2
5 back from 1000	5.9	26.2	49.0	27.7	60.2	57.7	47.6	55.2	39.8	29.2	34.8
6 back from 1 000 000	0.2	1.7	7.2	3.1	16.5	29.4	44.8	30.2	52.9	66.1	59.1
Numeral ID											
Initial Stage											
N/A	2.0	15.0	54.1	24.5	81.6	91.8	94.8	89.3	94.1	94.5	94.3
0 Emergent	27.5	3.5	0.4	10.1	0.5	0.4	0.4	0.4	0.2	0.3	0.2
1 Numerals to 10	36.0	14.8	2.9	17.4	0.5	0.2	0.1	0.3	0.1	0.0	0.1
2 Numerals to 20	17.0	15.0	3.9	11.8	1.2	0.4	0.2	0.6	0.2	0.2	0.2
3 Numerals to 100	15.1	37.8	21.3	24.8	5.6	1.9	0.8	2.8	0.9	0.6	0.8
4 Numerals to 1000	2.3	13.8	17.4	11.4	10.7	5.3	3.8	6.6	4.5	4.4	4.5
Final Stage											
N/A	8.7	35.7	73.6	40.3	89.5	94.8	96.3	93.5	95.2	95.3	95.2
0 Emergent	4.0	0.4	0.1	1.4	0.4	0.3	0.2	0.3	0.3	0.2	0.2
1 Numerals to 10	13.7	2.7	0.5	5.4	0.2	0.1	0.0	0.1	0.0		0.0
2 Numerals to 20	17.0	4.9	1.0	7.4	0.3	0.2	0.1	0.2	0.1	0.0	0.0
3 Numerals to 100	41.2	25.8	7.4	24.3	1.7	0.7	0.3	0.9	0.4	0.2	0.3
4 Numerals to 1000	15.3	30.6	17.4	21.1	7.9	4.0	3.1	5.0	4.0	4.3	4.2
Fractions											
Initial Stage											
Not given	98.7	84.3	45.6	75.4	17.3		3.6	9.4	4.0	2.2	3.2
2-3 Unit fracts not recog	1.2	14.9	46.5	21.5	47.4	37.9	28.0	37.8	16.9		14.5
4 Unit fractions recog.	0.1	0.7	5.9	2.3	21.1	27.9	30.2	26.4	27.4	25.1	26.3
5 Order unit fractions	0.0	0.1	1.9	0.7	12.8	23.4	29.6	21.9	34.5	33.8	34.2
6 Coord. num'r/denom'r		0.0	0.1	0.0	0.9	2.5	5.4	2.9	10.9	15.4	13.0
7 Equivalent fractions			0.0	0.0	0.4	0.9	2.3	1.2	4.4		5.9
8 Order fractions					0.1	0.3	0.8	0.4	1.9	4.0	2.9

Year	1	2	3	ENP	4	5	6	ANP	7	8	INP
Fractions cont.	(7793)	(8197)	(8516)	(24507)	(10013)	(9868)	(9959)	(29840)	(8374)	(7306)	(15680)
Final Stage											
Not given	87.1	54.2	21.0	53.3	7.9	3.9	1.9	4.6	2.1	1.3	1.7
2–3 Unit fracts not recog.	8.8	23.0	25.6	19.4	15.4	9.0	6.2	10.2	4.7	2.7	3.8
4 Unit fractions recog.	2.8	15.4	27.8	15.7	27.6	22.6	17.1	22.5	17.0	12.0	14.7
5 Order unit fractions	0.6	7.1	23.6	10.8	40.5	45.8	42.9	43.0	36.9	31.2	34.3
6 Coord. num'r/denom'r	0.1	0.3	1.8	0.7	6.5	13.0	19.1	12.9	20.0	22.5	21.2
7 Equivalent fractions			0.2	0.1	1.6	4.1	8.3	4.7	12.0	17.5	14.6
8 Order fractions		0.0	0.1	0.0	0.5	1.6	4.5	2.2	7.2	12.7	9.8
Place Value											
Initial Stage											
0–1 Emergent	50.8	22.0	8.5	26.5	4.6	1.8	1.2	2.5	5.0	6.3	5.6
2–3 One as a unit	47.3	61.0	45.0	51.1	21.9	11.1	6.0	13.0	5.5	2.8	4.2
4 Ten as counting unit	1.9	15.7	38.5	19.3	47.4	42.5	32.7	40.9	23.7	17.4	20.8
5 Tens in nos. to 1000	0.0	1.1	7.2	2.9	21.7	34.2	39.1	31.6	34.7	32.9	33.9
6 Ts, Hs, Th whole nos.	0.0	0.1	0.8	0.3	4.1	9.7	17.9	10.5	24.2	29.6	26.7
7 10ths in decimals/order			0.0	0.0	0.3	0.7	2.8	1.3	5.7	8.0	6.8
8 Decimal conversion		0.0		0.0	0.1	0.1	0.3	0.2	1.2	2.9	2.0
Final Stage											
0–1 Emergent	16.1	6.7	2.0	8.1	2.1	0.8	0.6	1.2	2.0	2.6	2.3
2–3 One as a unit	62.2	40.5	21.1	40.7	8.6	3.8	2.2	4.9	2.0	0.9	1.5
4 Ten as counting unit	20.7	44.0	47.1	37.7	34.3	22.9	14.4	23.9	11.2	6.7	9.1
5 Tens in nos. to 1000	0.8	7.5	24.4	11.3	40.1	43.9	38.2	40.7	31.0	24.5	28.0
6 Ts, Hs, Th whole nos.	0.1	1.2	5.2	2.2	13.3	23.8	32.1	23.1	34.5	36.4	35.4
7 10ths in decimals/order	0.0	0.0	0.2	0.1	1.2	4.1	10.2	5.2	14.0	18.8	16.2
8 Decimal conversion			0.0	0.0	0.3	0.6	2.3	1.1	5.3	10.0	7.5
Basic Facts											
Initial Stage											
0–1 Non-grouping w 5	94.8	79.5	46.9	73.0	22.3	10.3	6.5	13.1	12.2	11.5	11.8
2-3 Within/w. 5, w'in 10	4.5	14.8	25.6	15.3	23.1	14.7	9.3	15.7	6.6	4.3	5.5
4 Add'n w. 10s/doubles	0.7	5.4	23.5	10.2	35.3	30.7	23.2	29.7	16.0	11.9	14.1
5 Addition facts	0.0	0.2	3.3	1.2	15.6	29.2	30.4	25.1	25.3	24.2	24.8
6 Subtr'n & mult'n facts		0.0	0.6	0.2	3.0	12.8	24.1	13.3	29.0	31.8	30.3
7 Division facts		0.0	0.0	0.0	0.6	2.1	5.6	2.8	9.9	12.7	11.2
8 Common factors/multiple					0.0	0.2	0.9	0.4	1.0	3.7	2.2
Final Stage											
0–1 Non-grouping w 5	61.7	33.5	13.6	35.5	6.9	2.6	1.9	3.8	5.8	5.5	5.7
2-3 Within/w. 5, w'in 10	28.1	29.5	18.4	25.2	9.3	5.5	3.1	5.9	2.3	1.3	1.9
4 Add'n w. 10s/doubles	9.7	31.3	43.0	28.5	32.4	18.9	10.9	20.8	8.2	5.2	6.8
5 Addition facts	0.4	5.0	20.0	8.8	34.0	35.5	27.9	32.5	22.0	15.9	19.2
6 Subtr'n & mult'n facts	0.1	0.6	4.6	1.8	14.0	27.3	34.2	25.1	32.3	32.0	32.1
7 Division facts	0.0	0.0	0.4	0.2	2.9	8.9	17.7	9.8	23.3	26.6	24.9
8 Common factors/multiple			0.0	0.0	0.5	1.3	4.4	2.1	6.1	13.4	9.5

# Appendix B (Patterns of Performance and Progress)

# Table B1

Percentages of Year 0–8 Students as a Function of Gender, Ethnicity, and School Decile Band in 2004 and 2003

	Ge		]	Ethnicity			Decile Band			
Year	Boys	Girls	European	Māori	Pasifika	Asian	Other	Low	Mid	High
2004	51.0	49.0	60.4	19.7	10.2	5.4	4.3	26.8	40.0	33.2
2003	51.0	49.0	57.8	23.6	9.7	4.7	4.1	35.6	37.9	26.4

Total number of students in  $2004 = 70\ 027$ Total number of students in  $2003 = 138\ 829$ 

#### Table B2

Percentages of Year 0–8 Students at Each Framework Stage for <u>Addition/Subtraction</u> as a Function of Gender, Ethnicity, and School Decile Band in 2004 and 2003

	Ge	nder		Ethn	icity			Decile B	and
Year	Boys	Girls	Europea	n Māori	Pasifika	Asian	Low	Mid	<u>High</u>
				20	)04				
	(35740)	(34286)	(42331)	(13801)	(7120)	(3794)	(18132)	(27064)	(22488)
Initial St	0								
0–3	29.1	28.4	28.0	29.7	32.3	26.6	30.2	27.0	30.0
4 AC	28.4	34.3	29.3	34.9	39.4	25.5	35.9	30.6	29.0
5 EA	30.1	29.4	31.2	27.6	23.6	33.0	26.5	31.3	30.4
6 AA	12.5	7.9	11.5	7.8	4.7	14.9	7.5	11.1	10.6
Final Sta	ge								
0–3	16.8	16.5	16.0	18.0	19.7	13.2	17.3	16.5	16.7
4 AC	23.3	27.7	23.5	28.5	33.9	21.3	30.3	23.9	24.2
5 EA	35.1	37.3	36.6	36.1	34.3	34.7	35.3	36.9	36.1
6 AA	24.8	18.5	23.8	17.4	12.1	30.7	17.0	22.7	23.0
				20	003				
	(70823)	(68004)	(80249)	(32784)	(13523)	(6566)	(48063)	(51187)	((35648)
Initial St	age								
0–3	32.8	32.9	30.6	35.0	42.8	28.5	36.3	30.9	31.7
4 AC	29.5	35.1	30.8	35.6	36.1	26.5	35.0	32.0	29.0
5 EA	26.7	25.0	28.1	23.6	17.3	28.0	22.3	27.4	28.1
6 AA	11.0	7.0	10.6	5.8	3.8	16.9	6.4	9.7	11.2
Final Sta	ge								
0–3	20.6	20.9	18.3	23.5	31.0	16.3	24.8	19.3	17.7
4 AC	23.9	28.3	24.3	28.3	32.3	22.0	29.0	24.9	23.9
5 EA	34.3	35.1	36.2	34.4	27.7	33.1	32.2	36.0	36.3
6 AA	21.2	15.7	21.2	13.8	8.9	28.6	14.0	19.8	22.1

Percentages of Year 0-8 Students at Each Framework Stage for <u>Multiplication/Division</u> as	а
Function of Gender, Ethnicity, and School Decile Band in 2004	

Ger	nder		Ethn	icity			Ľ	Decile Ba	nd
Boys	Girls	European	Māori	Pasifika	Asian		Low	Mid	<u>High</u>
31.8	31.2	31.1	31.6	34.9	29.1		32.5	30.0	33.0
9.5	10.6	9.0	11.4	14.3	9.2		12.0	9.4	9.6
23.2	26.2	23.5	27.6	27.8	20.8		27.2	24.4	23.1
17.0	17.9	18.1	16.9	14.6	18.3		16.2	18.5	17.2
13.8	11.5	14.0	10.2	7.4	15.8		9.7	13.7	13.2
4.7	2.6	4.3	2.3	1.1	6.7		2.4	4.1	3.9
20.5	20.5	20.2	21.0	23.4	16.7		20.4	20.7	20.8
5.2	5.8	4.7	6.5	8.0	5.4		6.8	4.7	5.3
21.1	23.6	20.8	25.1	28.0	18.5		25.7	21.0	21.8
18.9	20.9	19.5	20.9	21.1	18.6		21.1	19.7	19.2
21.7	20.6	22.6	19.2	15.5	23.8		18.9	22.5	21.0
12.6	8.6	12.2	7.5	4.0	17.0		7.0	11.4	11.9
	Boys 31.8 9.5 23.2 17.0 13.8 4.7 20.5 5.2 21.1 18.9 21.7	31.8 31.2   9.5 10.6   23.2 26.2   17.0 17.9   13.8 11.5   4.7 2.6   20.5 5.2   5.2 5.8   21.1 23.6   18.9 20.9   21.7 20.6	Boys   Girls   European     31.8   31.2   31.1     9.5   10.6   9.0     23.2   26.2   23.5     17.0   17.9   18.1     13.8   11.5   14.0     4.7   2.6   4.3     20.5   20.5   20.2     5.2   5.8   4.7     21.1   23.6   20.8     18.9   20.9   19.5     21.7   20.6   22.6	BoysGirlsEuropeanMāori $31.8$ $31.2$ $31.1$ $31.6$ $9.5$ $10.6$ $9.0$ $11.4$ $23.2$ $26.2$ $23.5$ $27.6$ $17.0$ $17.9$ $18.1$ $16.9$ $13.8$ $11.5$ $14.0$ $10.2$ $4.7$ $2.6$ $4.3$ $2.3$ $20.5$ $20.5$ $20.2$ $21.0$ $5.2$ $5.8$ $4.7$ $6.5$ $21.1$ $23.6$ $20.8$ $25.1$ $18.9$ $20.9$ $19.5$ $20.9$ $21.7$ $20.6$ $22.6$ $19.2$	BoysGirlsEuropeanMāoriPasifika $31.8$ $31.2$ $31.1$ $31.6$ $34.9$ $9.5$ $10.6$ $9.0$ $11.4$ $14.3$ $23.2$ $26.2$ $23.5$ $27.6$ $27.8$ $17.0$ $17.9$ $18.1$ $16.9$ $14.6$ $13.8$ $11.5$ $14.0$ $10.2$ $7.4$ $4.7$ $2.6$ $4.3$ $2.3$ $1.1$ 20.5 $20.5$ $20.2$ $21.0$ $23.4$ $5.2$ $5.8$ $4.7$ $6.5$ $8.0$ $21.1$ $23.6$ $20.8$ $25.1$ $28.0$ $18.9$ $20.9$ $19.5$ $20.9$ $21.1$ $21.7$ $20.6$ $22.6$ $19.2$ $15.5$	BoysGirlsEuropeanMāoriPasifikaAsian $31.8$ $31.2$ $31.1$ $31.6$ $34.9$ $29.1$ $9.5$ $10.6$ $9.0$ $11.4$ $14.3$ $9.2$ $23.2$ $26.2$ $23.5$ $27.6$ $27.8$ $20.8$ $17.0$ $17.9$ $18.1$ $16.9$ $14.6$ $18.3$ $13.8$ $11.5$ $14.0$ $10.2$ $7.4$ $15.8$ $4.7$ $2.6$ $4.3$ $2.3$ $1.1$ $6.7$ $20.5$ $20.5$ $20.2$ $21.0$ $23.4$ $16.7$ $5.2$ $5.8$ $4.7$ $6.5$ $8.0$ $5.4$ $21.1$ $23.6$ $20.8$ $25.1$ $28.0$ $18.5$ $18.9$ $20.9$ $19.5$ $20.9$ $21.1$ $18.6$ $21.7$ $20.6$ $22.6$ $19.2$ $15.5$ $23.8$	BoysGirlsEuropeanMāoriPasifikaAsian $31.8$ $31.2$ $31.1$ $31.6$ $34.9$ $29.1$ $9.5$ $10.6$ $9.0$ $11.4$ $14.3$ $9.2$ $23.2$ $26.2$ $23.5$ $27.6$ $27.8$ $20.8$ $17.0$ $17.9$ $18.1$ $16.9$ $14.6$ $18.3$ $13.8$ $11.5$ $14.0$ $10.2$ $7.4$ $15.8$ $4.7$ $2.6$ $4.3$ $2.3$ $1.1$ $6.7$ $20.5$ $20.5$ $20.2$ $21.0$ $23.4$ $16.7$ $5.2$ $5.8$ $4.7$ $6.5$ $8.0$ $5.4$ $21.1$ $23.6$ $20.8$ $25.1$ $28.0$ $18.5$ $18.9$ $20.9$ $19.5$ $20.9$ $21.1$ $18.6$ $21.7$ $20.6$ $22.6$ $19.2$ $15.5$ $23.8$	BoysGirlsEuropeanMāoriPasifikaAsianLow $31.8$ $31.2$ $31.1$ $31.6$ $34.9$ $29.1$ $32.5$ $9.5$ $10.6$ $9.0$ $11.4$ $14.3$ $9.2$ $12.0$ $23.2$ $26.2$ $23.5$ $27.6$ $27.8$ $20.8$ $27.2$ $17.0$ $17.9$ $18.1$ $16.9$ $14.6$ $18.3$ $16.2$ $13.8$ $11.5$ $14.0$ $10.2$ $7.4$ $15.8$ $9.7$ $4.7$ $2.6$ $4.3$ $2.3$ $1.1$ $6.7$ $2.4$ $20.5$ $20.5$ $20.2$ $21.0$ $23.4$ $16.7$ $20.4$ $5.2$ $5.8$ $4.7$ $6.5$ $8.0$ $5.4$ $6.8$ $21.1$ $23.6$ $20.8$ $25.1$ $28.0$ $18.5$ $25.7$ $18.9$ $20.9$ $19.5$ $20.9$ $21.1$ $18.6$ $21.1$ $21.7$ $20.6$ $22.6$ $19.2$ $15.5$ $23.8$ $18.9$	BoysGirlsEuropeanMāoriPasifikaAsianLowMid $31.8$ $31.2$ $31.1$ $31.6$ $34.9$ $29.1$ $32.5$ $30.0$ $9.5$ $10.6$ $9.0$ $11.4$ $14.3$ $9.2$ $12.0$ $9.4$ $23.2$ $26.2$ $23.5$ $27.6$ $27.8$ $20.8$ $27.2$ $24.4$ $17.0$ $17.9$ $18.1$ $16.9$ $14.6$ $18.3$ $16.2$ $18.5$ $13.8$ $11.5$ $14.0$ $10.2$ $7.4$ $15.8$ $9.7$ $13.7$ $4.7$ $2.6$ $4.3$ $2.3$ $1.1$ $6.7$ $2.4$ $4.1$ Constant of the state of the s

*Percentages of Year 0–8 Students at Each Framework Stage for <u>Proportion/Ratio</u> as a Function of Gender, Ethnicity, and School Decile Band in 2004* 

	Ger	nder			Decile Band				
Year	Boys	Girls	European	Māori	Pasifika	Asian	Low	Mid	High
Initial Stage	•								
Not Given	32.1	31.5	31.4	32.2	35.3	29.3	33.1	30.2	33.2
1 Unequal	9.3	8.4	7.9	9.9	11.2	10.0	10.1	8.7	8.4
2–4 Equal	30.0	33.7	30.6	34.2	36.8	28.4	34.8	31.2	30.3
5 EA	15.7	15.9	16.4	15.8	12.1	15.0	14.6	16.7	15.3
6 AA	8.3	7.7	9.0	6.0	3.8	11.1	5.6	9.0	8.3
7 AM	3.9	2.6	4.1	1.7	0.7	4.8	1.5	3.7	3.9
8 AP	0.7	0.3	0.6	0.2	0.1	1.4	0.3	0.5	0.6
<b>Final Stage</b>									
Not Given	20.8	20.8	20.5	21.2	23.9	17.1	20.6	20.8	21.1
1 Unequal	3.3	2.7	2.5	4.0	3.6	3.7	3.7	2.7	2.9
2–4 Equal	28.3	30.8	27.6	32.4	37.0	26.6	33.9	28.2	28.4
5 EA	21.4	22.8	21.8	23.6	22.3	19.8	23.3	22.2	20.9
6 AA	14.6	14.4	15.5	12.7	10.1	17.3	12.8	15.2	14.7
7 AM	9.2	7.1	9.8	5.1	2.8	11.6	4.7	8.7	10.0
8 AP	2.5	1.4	2.3	0.9	0.3	3.9	1.0	2.1	2.1

Percentages of Students at Framework Stages for <u>Addition/Subtraction</u> at the End of the Project
as a Function of Ethnicity and Gender in 2004 and 2003

	Euro	opean	М	āori	Pas	sifika	As	ian
Final Stage	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
				2004				
No. of students	(21391)	(20940)	(7212)	(6589)	(3605)	(3515)	(1969)	(1825)
0–3	16.1	16.0	18.5	17.5	20.7	18.6	13.0	13.4
4 AC	21.1	26.0	26.9	30.1	32.6	35.2	18.1	24.8
5 EA	35.3	38.0	35.4	36.8	34.1	34.5	33.0	36.6
6 AA	27.6	20.0	19.1	15.6	12.6	11.6	35.9	25.2
				2003				
No. of students	(42518)	(39556)	(170.42)		(6782)	(6741)	(3382)	(2104)
No. of students	(42318)	(39330)	(17043)	(15741)	(0/82)	(0/41)	(5582)	(3184)
0–3	17.8	18.7	23.7	23.2	31.7	30.3	15.9	16.6
4 AC	21.6	27.1	26.8	29.9	31.3	33.4	20.0	24.1
5 EA	35.6	36.8	34.4	34.5	27.8	27.6	32.4	33.8
6 AA	24.9	17.4	15.1	12.4	9.1	8.7	31.6	25.4

# Table B6

Percentages of Students at Framework Stages for <u>Multiplication/Division</u> at the End of the Project as a Function of Ethnicity and Gender in 2004

	Euro	pean	Mā	iori	Pa	sifika	Asian		
Final Stage	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	
Not Given	20.2	20.3	21.2	20.7	24.4	22.5	16.3	17.2	
2-3	4.3	5.1	6.5	6.5	7.4	8.6	5.1	5.8	
4 AC	19.1	22.6	24.7	25.4	28.4	27.7	16.5	20.7	
5 EA	18.5	20.5	19.7	22.1	20.6	21.5	16.7	20.6	
6 AA	23.5	21.7	19.2	19.1	15.0	16.0	23.9	23.7	
7 AM	14.4	9.9	8.6	6.2	4.3	3.8	21.6	12.1	

*Percentages of Students at Framework Stages for <u>Proportion/Ratio</u> at the End of the Project as a Function of Ethnicity and Gender in 2004* 

	Euro	pean	Ma	āori	Pas	sifika	As	ian
Final Stage	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Not Given	20.4	20.6	21.4	21.0	25.1	22.8	16.5	17.7
1 Unequal	2.7	2.2	4.3	3.8	3.8	3.4	3.8	3.6
2–4 Equal	26.0	29.3	32.5	32.3	36.1	38.0	24.8	28.5
5 EA	21.1	22.5	22.4	25.0	22.2	22.4	18.7	20.9
6 AA	15.8	15.1	12.5	12.9	9.3	10.8	17.5	17.1
7 AM	11.0	8.5	5.8	4.3	3.2	2.4	13.3	9.8
8 AP	3.0	1.7	1.2	0.7	0.4	0.2	5.4	2.3

Percentages of Students Who Progressed to a Higher Stage for <u>Addition/Subtraction</u> as a Function of Initial Stage, Gender, Ethnicity, and School Decile Band (2004 and 2003)

	Ge	nder		Etl	nnicity			Decile Ba	and
Initial Stage	Boys	Girls	European	Māori I	Pasifika	Asian	Low	Medium	High
				200	-				
Stages 0–3	(10397)	(9742)	(11869)	(4094)	(2300)	(1008)	(5476)	(7313)	(6741)
To stage 4	34.3	36.2	35.3	34.6	34.4	37.0	35.9	33.1	37.2
To stage 5	8.2	6.2	7.6	5.5	5.5	12.5	6.9	6.6	7.2
To stage 6	0.8	0.5	0.7	0.6	0.1	1.4	1.4	0.2	0.3
Total	43.3	42.9	43.6	40.7	40.0	50.9	44.2	39.9	44.7
Stage 4	(10143)	(11760)	(12397)	(4813)	(2806)	(966)	(6505)	(8286)	(6520)
To stage 5	48.0	46.1	49.3	44.3	40.5	48.0	42.6	47.7	50.0
To stage 6	5.6	4.2	5.0	4.6	3.3	7.5	4.4	4.5	5.6
Total	53.6	50.3	54.3	48.9	43.8	53.5	47.0	52.2	55.6
Stage 5	(10747)	(10066)	(13198)	(3815)	(1682)	(1253)	(4796)	(8460)	(6839)
To stage 6	35.7	31.3	34.8	29.4	27.3	41.6	30.4	33.1	35.5
				200	3				
Stages 0-3	(23215)	(22364)	(24572)	(11471)	(5785)	(1870)	(17424)	(15801)	(11283)
To stage 4	32.0	33.8	34.5	30.4	28.9	35.9	30.8	32.5	37.1
To stage 5	6.9	4.8	6.5	4.9	4.2	7.7	4.8	6.2	7.1
To stage 6	0.6	0.5	0.7	0.3	0.2	1.9	0.2	0.2	0.9
Total	39.5	39.1	41.7	35.6	33.3	45.5	35.8	39.1	45.1
10101	57.5	57.1	71.7	55.0	55.5	45.5	55.0	57.1	75.1
Stage 4	(20907)	(23902)	(24685)	(11679)	(4876)	(1743)	(16830)	(16404)	(10340)
To stage 5	50.3	47.2	51.5	46.5	39.1	50.3	44.4	50.1	54.1
To stage 6	4.8	4.0	4.6	4.2	3.2	6.0	4.2	4.4	4.7
Total	55.1	51.2	56.1	50.7	42.3	56.3	48.6	54.5	58.8
Stage 5	(18895)	(16995)	(22516)	(7734)	(2346)	(1841)	(10732)	(14020)	(10032)
To stage 6	33.9	29.9	33.7	28.7	24.1	35.7	29.3	32.8	34.0

Percentages	of Students	Who Prog	gressed to a	ı Higher	Stage for	<u>Addition/Subtraction</u>	as	a
Function of I	nitial Stage,	Ethnicity, c	and Gender i	in 2004 a	nd 2003			

	Euro	opean	Mā	iori	Pas	sifika	As	ian
Initial Stage	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
				2004				
Stages 0–3	(6081)	(5788)	(2178)	(1916)	(1205)	(1095)	(509)	(499)
To stage 4	34.4	36.2	34.1	35.2	33.4	35.6	34.6	39.5
To stage 5	9.0	6.2	5.9	5.0	5.4	5.7	14.3	10.6
To stage 6	1.0	0.4	0.6	0.6	0.1	0.2	1.4	1.4
Total	44.4	42.8	40.6	40.8	38.9	41.5	50.3	51.5
Stages 4	(5563)	(6834)	(2352)	(2461)	(1340)	(1466)	(433)	(533)
To stage 5	51.0	47.9	44.6	44.1	41.2	39.9	49.0	47.3
To stage 6	6.1	4.1	5.1	4.1	2.8	3.9	9.5	5.8
Total	57.1	52.0	49.7	48.2	44.0	43.8	58.5	53.1
Stages 5	(6712)	(6486)	(2018)	(1797)	(882)	(800)	(668)	(585)
To stage 6	37.4	32.1	30.1	28.7	28.1	26.4	45.4	37.3
				2003				
Stages 0-3	(12274)	(12298)	(5997)	(5474)	(3003)	(2782)	(981)	(889)
To stage 4	33.7	35.4	29.4	31.5	28.5	29.3	34.7	37.2
To stage 5	7.7	5.3	5.5	4.3	5.1	3.2	10.1	5.1
To stage 6	0.7	0.6	0.3	0.2	0.2	0.3	2.4	1.3
Total	42.1	41.3	35.2	36.0	33.8	32.8	47.2	43.6
Stage 4	(11189)	(13496)	(5765)	(5914)	(2306)	(2570)	(785)	(958)
To stage 5	54.0	49.4	47.3	45.8	39.8	38.4	50.8	49.8
To stage 6	5.3	4.1	4.4	4.1	2.9	3.4	6.6	5.5
Total	59.3	53.5	51.7	49.9	42.7	41.8	57.4	55.3
Stage 5	(11815)	(10701)	(4157)	(3577)	(1196)	(1150)	(957)	(884)
To stage 6	35.9	31.2	30.1	27.1	24.0	24.2	36.8	34.5

# Appendix C (Patterns of Performance and Progress)

Table C1

Comparison of Average Framework Stages on <u>Addition/Subtraction</u> (Standard Deviations shown in brackets) for Younger Children <u>Before</u> the Project with Older Children <u>Before</u> the Project for Adjacent Year Groups in 2004

Year	Younger	Older	Younger	Older students	Diff	t value	df	Prob.	Effect
groups	students	students	students	before project					size
			before project						
1 & 2	7793	8197	1.52 (0.94)	2.48 (1.15)	-0.96	-57.72	15653	0.000	-0.83
2 & 3	8197	8516	2.48 (1.15)	3.44 (1.20)	-0.96	-53.14	16711	0.000	-0.76
3 & 4	8516	10013	3.44 (1.20)	4.13 (1.08)	-0.69	-40.99	17344	0.000	-0.58
4 & 5	10013	9868	4.13 (1.08)	4.48 (0.94)	-0.35	-24.40	19599	0.000	-0.34
5&6	9868	9959	4.48 (0.94)	4.69 (0.92)	-0.21	-15.76	19799	0.000	-0.22
6&7	9959	8374	4.69 (0.92)	4.85 (0.94)	-0.15	-11.08	17625	0.000	-0.16
7&8	8374	7306	4.85 (0.94)	5.03 (0.90)	-0.19	-12.72	15564	0.000	-0.20

### Table C2

Comparison of Average Framework Stages (SDs in brackets) for Younger Students <u>After</u> the Project with Older Students <u>Before</u> the Project for Adjacent Year Groups

### Addition/Subtraction

Year groups	Younger students	Older students	Younger students <b>after</b>	Older students before project	Diff	t value	df	Prob	Effect size
8 P -			project	<u></u> pj					
1 & 2	7794	8197	2.54 (1.02)	2.48 (1.15)	0.07	3.81	15924	0.000	0.06
2 & 3	8197	8516	3.50 (1.10)	3.44 (1.19)	0.06	3.21	16678	0.001	0.05
3 & 4	8516	10013	4.24 (0.91)	4.13 (1.08)	0.10	7.11	18527	0.000	0.10
4 & 5	10013	9868	4.69 (0.84)	4.48 (0.94)	0.21	16.40	19523	0.000	0.23
5&6	9868	9959	4.95 (0.80)	4.69 (0.92)	0.26	21.36	19476	0.000	0.30
6&7	9959	8374	5.17 (0.76)	4.85 (0.94)	0.33	25.63	16041	0.000	0.38
7&8	8374	7306	5.23 (0.81)	5.03 (0.90)	0.20	14.22	14844	0.000	0.23

# Multiplication/Division

Year groups	Younger students	Older students	Younger students <b>after</b>	Older students before project	Diff	t value	df	Prob	Effect size
Broups	statemes	statents	project	<u>belore</u> project					512.0
2 & 3	1287	4524	4.18 (0.77)	3.73 (0.73)	0.45	18.59	1975	0.000	0.59
3 & 4	4524	8217	4.45 (0.85)	4.14 (0.86)	0.31	19.67	9332	0.000	0.36
4 & 5	8217	9068	4.83 (0.96)	4.51 (0.97)	0.32	21.97	17158	0.000	0.33
5&6	9068	9485	5.21 (1.00)	4.84 (1.04)	0.37	24.39	18550	0.000	0.35
6&7	9485	8027	5.57 (1.01)	5.12 (1.04)	0.45	29.07	16871	0.000	0.43
7&8	8027	7145	5.71 (1.00)	5.39 (1.05)	0.32	19.34	14787	0.000	0.31

#### Proportion/Ratio

Year	Younger	Older	Younger	Older students	Diff	t value	df	Prob	Effect
groups	students	students	students <u>after</u>	before project					size
			project						
2 & 3	1274	4517	4.17 (0.59)	3.75 (0.58)	0.42	22.89	2026	0.000	0.70
3 & 4	4517	8130	4.37 (0.72)	4.06 (0.74)	0.31	23.20	9590	0.000	0.42
4 & 5	8130	9016	4.69 (0.89)	4.34 (0.86)	0.36	26.50	16820	0.000	0.40
5&6	9016	9454	5.03 (0.98)	4.65 (1.01)	0.38	25.98	18466	0.000	0.38

6&7	9454	7950	5.40	(1.08)	4.95	(1.10)	0.45	27.11	16827	0.000	0.40
7&8	7950	7094	5.58	(1.15)	5.25	(1.17)	0.33	17.43	14781	0.000	0.28

Table C3

Comparison of Final Framework Stages on <u>Addition/Subtraction</u> (SDs in brackets) for Particular Sub-groups at Each Initial Framework Stage in 2004

European vs Māori

Initial	No. of	No. of	Final stage	Final stage	Diff	t value	df	Prob	Effect
stage	European	Māori	European	Māori					size
0	1119	495	2.68 (1.74)	2.16 (1.51)	0.53	6.17	1075	0.000	0.31
1	2544	885	2.46 (0.99)	2.36 (0.99)	0.10	2.58	1532	0.010	0.10
2	5478	1794	3.14 (0.94)	3.11 (0.95)	0.03	1.22	3040	0.223	0.03
3	2728	920	3.91 (0.71)	3.85 (0.67)	0.07	2.59	1677	0.010	0.10
4	12397	4813	4.58 (0.64)	4.52 (0.65)	0.06	5.82	8586	0.000	0.09
5	13198	3815	5.33 (0.54)	5.25 (0.60)	0.08	7.31	5737	0.000	0.14
Average									0.13

# European vs Pasifika

Initial	No. of	No. of	Final stage	Final stage	Diff	t	df	Prob	Effect
stage	European	Pasifika	European	Pasifika		value			size
0	1119	292	2.68 (1.74)	1.98 (1.29)	0.71	7.72	596	0.000	0.42
1	2544	478	2.46 (0.99)	2.47 (1.02)	-0.01	-0.22	656	0.829	-0.01
2	5478	963	3.14 (0.94)	3.07 (0.95)	0.07	2.23	1314	0.026	0.07
3	2728	567	3.91 (0.71)	3.82 (0.73)	0.09	2.67	809	0.008	0.13
4	12397	2806	4.58 (0.64)	4.46 (0.62)	0.12	9.59	4251	0.000	0.19
5	13198	1682	5.33 (0.54)	5.23 (0.54)	0.10	7.10	2136	0.000	0.19
Average									0.17

# Asian vs Pasifika

Initial	No. of	No. of	Final stage	Final stage	Diff	t	df	Prob	Effect
stage	Asian	Pasifika	Asian	Pasifika		value			size
0	106	292	3.29 (1.76)	1.98 (1.29)	1.32	7.06	148	0.000	0.86
1	175	478	2.69 (1.04)	2.47 (1.02)	0.22	2.39	303	0.017	0.21
2	475	963	3.37 (0.94)	3.07 (0.95)	0.30	5.66	953	0.000	0.31
3	252	567	3.96 (0.68)	3.82 (0.73)	0.14	2.67	510	0.008	0.20
4	966	2806	4.62 (0.66)	4.46 (0.62)	0.16	6.60	1579	0.000	0.25
5	1253	1682	5.41 (0.51)	5.23 (0.54)	0.18	9.10	2767	0.000	0.34
Average									0.36

# High Decile vs Low Decile

Initial	No. of	No. of	Final stage high	Final stage low	Diff	t value	df	Prob	Effect
stage	high	low	decile	decile					size
	decile	decile							
0	453	791	2.03 (1.27)	2.77 (1.81)	-0.74	-8.44	1191		-00.44
1	1532	1137	20.55 (00.97)	20.45 (10.01)	00.11	20.76	2387	0.006	00.11
2	3182	2249	30.23 (00.93)	30.13 (00.93)	00.11	40.24	4828	0.000	00.12
3	1574	1299	30.94 (00.67)	30.85 (00.68)	00.09	30.63	2757	0.000	00.13
4	6520	6505	40.61 (00.61)	40.49 (00.65)	00.11	100.04	12974	0.000	00.17
5	6839	4796	50.34 (00.51)	50.26 (00.58)	00.08	70.93	9395	0.000	00.15
Average									00.10

## Table C4

Comparison of Final Framework Stages on <u>Addition/Subtraction</u> (SDs in brackets) for Particular Sub-groups at Each Initial Framework Stage in 2003

# European vs Māori

Initial	No. of	No. of	Final stage	Final stage	Diff	t value	df	Prob	Effect
stage	European	Māori	European	Māori					size
0	2416	1629	2.03 (1.56)	1.81 (1.33)	0.22	4.81	3835	0.000	0.15
1	4933	2278	2.40 (0.97)	2.31 (0.97)	0.08	3.43	4431	0.001	0.08
2	12749	5618	3.16 (0.97)	3.03 (0.97)	0.13	8.14	10787	0.000	0.13
3	4474	1946	3.90 (0.73)	3.80 (0.79)	0.10	5.00	3452	0.000	0.13
4	24685	11679	4.59 (0.63)	4.51 (0.72)	0.08	10.67	20445	0.000	0.12
5	22516	7734	5.30 (0.58)	5.21 (0.72)	0.09	10.51	11481	0.000	0.14
Average									0.13

# European vs Pasifika

Initial	No. of	No. of	Final stage	Final stage	Diff	t value	df	Prob	Effect
stage	European	Pasifika	European	Pasifika					size
0	2416	874	2.03 (1.56)	1.90 (1.21)	0.13	2.57	1980	0.010	0.09
1	4933	1153	2.40 (0.97)	2.29 (0.95)	0.10	3.32	1756	0.001	0.10
2	12749	2728	3.16 (0.97)	2.99 (0.98)	0.17	8.06	3955	0.000	0.17
3	4474	1030	3.90 (0.73)	3.71 (0.81)	0.19	6.97	1433	0.000	0.25
4	24685	4876	4.59 (0.63)	4.32 (0.96)	0.27	19.01	5732	0.000	0.38
5	22516	2346	5.30 (0.58)	4.97 (1.20)	0.33	13.33	2463	0.000	0.49
Average									0.25

# Asian vs Pasifika

Initial	No. of	No. of	Final stage	Final stage	Diff	t value	df	Prob	Effect
stage	Asian	Pasifika	Asian	Pasifika					size
0	250	874	2.64 (1.80)	1.90 (1.21)	0.74	6.11	316	0.000	0.53
1	301	1153	2.55 (1.05)	2.29 (0.95)	0.25	3.81	439	0.000	0.26
2	928	2728	3.20 (0.97)	2.99 (0.98)	0.21	5.56	1616	0.000	0.21
3	391	1030	3.91 (0.75)	3.71 (0.81)	0.20	4.30	762	0.000	0.25
4	1743	4876	4.60 (0.68)	4.32 (0.96)	0.28	13.23	4371	0.000	0.31
5	1841	2346	5.29 (0.71)	4.97 (1.20)	0.32	10.89	3925	0.000	0.31
Average									0.31

# High Decile vs Low Decile

Initial	No. of	No. of	Final stage	Final stage	Diff	t value	df	Prob	Effect
stage	high	low decile	high Decile	Low Decile					size
	decile								
0	1068	2466	2.29 (1.70)	1.90 (1.33)	0.40	6.79	1663	0.000	0.27
1	2182	3466	2.51 (0.99)	2.35 (0.99)	0.17	6.12	4621	0.000	0.17
2	5960	8458	3.21 (0.97)	3.03 (0.97)	0.18	11.11	12846	0.000	0.18
3	2073	3034	3.96 (0.71)	3.76 (0.81)	0.20	9.51	4801	0.000	0.26
4	10340	16830	4.62 (0.62)	4.45 (0.81)	0.17	19.16	25992	0.000	0.23
5	10032	10732	5.31 (0.55)	5.16 (0.90)	0.16	15.29	18016	0.000	0.21
Average									0.22

Table C5

Comparison of Final Framework Stages on <u>Addition/Subtraction</u> (SDs in brackets) for Students in Low-decile Schools Involved in the Manurewa Enhancement Initiative Versus Students at all Other Low-decile Schools at Each Initial Framework Stage (2004)

Initial	No. of	No. of	Final stage	Final stage	Diff	t	df	Prob	Effect
stage	MEI	non-MEI	MEI	non-MEI		value			size
0	20	771	1.85 (0.93)	2.79 (1.82)	-0.94	-4.30	23	0.000	-0.52
1	55	1082	3.00 (1.17)	2.42 (1.00)	0.58	3.62	58	0.001	0.57
2	123	2126	3.07 (0.89)	3.13 (0.93)	-0.06	-0.68	138	0.498	-0.06
3	59	1240	4.00 (0.56)	3.84 (0.69)	0.16	2.08	67	0.041	0.24
4	385	6120	4.61 (0.63)	4.49 (0.65)	0.12	3.64	437	0.000	0.18
5	251	4545	5.19 (0.46)	5.26 (0.59)	-0.08	-2.56	298	0.011	-0.14
Average									0.05

Low-decile Manurewa Enhancement Initiative vs Low-decile non-MEI

#### Table C6

Comparison of Final Framework Stages on Each Operational Domain (SDs in brackets) for Each Initial Framework Stage as a Function of Gender in 2004

#### Addition/Subtraction

Initial	No. of	No. of	Final stage boys	Final stage	Diff	t	df	Prob	Effect
stage	boys	girls		girls		value			size
0	1153	959	2.43 (1.66)	2.57 (1.65)	-0.14	-2.00	2046	0.046	-0.08
1	2191	2056	2.44 (1.02)	2.45 (0.98)	0.00	0.06	4243	0.949	0.00
2	4613	4501	3.15 (0.97)	3.13 (0.92)	0.02	1.07	9108	0.285	0.02
3	2440	2226	3.93 (0.73)	3.86 (0.67)	0.07	3.28	4664	0.001	0.10
4	10143	11760	4.57 (0.66)	4.53 (0.62)	0.04	4.52	20887	0.000	0.06
5	10747	10066	5.33 (0.55)	5.28 (0.55)	0.05	6.35	20754	0.000	0.09
Average									0.05

### Multiplication/Division

Initial	No. of	No. of	Final stage boys	Final stage	Diff	t	df	Prob	Effect
stage	boys	girls		girls		value			size
2-3	3370	3634	4.13 (0.81)	4.06 (0.78)	0.08	3.98	6906	0.000	0.10
4	8245	8950	4.81 (0.80)	4.74 (0.77)	0.07	5.98	16917	0.000	0.09
5	6085	6132	5.70 (0.69)	5.63 (0.68)	0.06	5.21	12209	0.000	0.09
6	4924	3935	6.38 (0.56)	6.33 (0.55)	0.05	4.57	8501	0.000	0.09
Average									0.09

#### Proportion/Ratio

Initial	No. of	No. of	Final stage boys	Final stage	Diff	t	df	Prob	Effect
stage	boys	girls		girls		value			size
1	3293	2846	4.22 (0.75)	4.17 (0.70)	0.04	2.33	6111	0.020	0.06
2-4	10639	11506	4.71 (0.81)	4.65 (0.77)	0.06	5.62	21799	0.000	0.08
5	5584	5426	5.64 (0.78)	5.55 (0.75)	0.09	6.10	11005	0.000	0.12
6	2964	2621	6.49 (0.69)	6.42 (0.66)	0.07	4.03	5546	0.000	0.10
7	1398	901	7.24 (0.51)	7.21 (0.51)	0.03	1.15	1916	0.249	0.06
Average									0.08

#### Appendix D: Stages of the Number Framework

#### Stage Zero: Emergent

Students at this stage are unable to consistently count a given number of objects because they lack knowledge of counting sequences and/or the ability to match things in one-to-one correspondence.

#### Stage One: One-to-one Counting

This stage is characterised by students who can count and form a set of objects up to ten but cannot solve simple problems that involve joining and separating sets, such as 4 + 3.

#### Stage Two: Counting from One on Materials

Given a joining or separating of sets problem, students at this stage rely on counting physical materials, such as their fingers. They count all the objects in both sets to find an answer, as in "Five lollies and three more lollies. How many lollies is that altogether?"

#### Stage Three: Counting from One by Imaging

This stage is also characterised by students counting all of the objects in simple joining and separating problems. Students at this stage are able to image visual patterns of the objects in their mind and count them.

#### Stage Four: Advanced Counting (Counting On)

Students at this stage understand that the end number in a counting sequence measures the whole set and can relate the addition or subtraction of objects to the forward and backward number sequences by ones, tens, and so on. For example, instead of counting all objects to solve 6 + 5, the student recognises that "6" represents all six objects and counts on from there: "7, 8, 9, 10, 11."

Students at this stage also have the ability to co-ordinate equivalent counts, such as "10, 20, 30, 40, 50," to get \$50 in \$10 notes. This is the beginning of grouping to solve multiplication and division problems.

#### Stage Five: Early Additive Part–Whole

At this stage, students have begun to recognise that numbers are abstract units that can be treated simultaneously as wholes or can be partitioned and combined. This is called *part–whole thinking*. A characteristic of this stage is the derivation of results from related known facts, such as finding addition answers by using doubles or teen numbers.

#### Stage Six: Advanced Additive Part–Whole

Students at the advanced additive stage are learning to choose appropriately from a repertoire of part–whole strategies to estimate answers and solve addition and subtraction problems. They see numbers as whole units in themselves but also understand that "nested" within these units is a range of possibilities for subdivision and recombining. Simultaneously, the efficiency of these students in addition and subtraction is reflected in their ability to derive multiplication answers from known facts. These students can also solve fraction problems using a combination of multiplication and addition-based reasoning. For example,  $6 \ge 6 \le (5 \ge 6) + 6$ .

#### Stage Seven: Advanced Multiplicative Part–Whole

Students at the advanced multiplicative stage are learning to choose appropriately from a range of part–whole strategies to estimate answers and solve problems involving multiplication and division. Some writers describe this stage as "operating on the operator". This means than one or more of the numbers involved in a multiplication or division is partitioned and then recombined.

For example, to solve 27 x 6, 27 might be split into 20 + 7 and these parts multiplied then recombined, as in 20 x 6 = 120, 7 x 6 = 42, 120 + 42 = 162. This strategy uses the distributive property.

A critical development at this stage is the use of reversibility, in particular, solving division problems using multiplication. Advanced multiplicative part–whole students are also able to estimate answers and solve problems with fractions using multiplication and division.

#### Stage Eight: Advanced Proportional Part–Whole

Students at the advanced proportional stage are learning to select from a repertoire of part– whole strategies to estimate answers and solve problems involving fractions, proportions, and ratios. This includes strategies for the multiplication of decimals and the calculation of percentages.

These students are able to find the multiplicative relationship between quantities of two different measures. This can be thought of as a mapping. For example, consider this problem: "You can make 21 glasses of lemonade from 28 lemons. How many glasses can you make using 8 lemons?"

To solve the problem, students need to find a relationship between the number of lemons and the number of glasses. This involves the creation of a new measure, glasses per lemon. The relationship is that the number of glasses is three-quarters the number of lemons. This could be recorded as: 21:28,  $\Box:8$ , 21 is  $\frac{3}{4}$  of 28, or  $\frac{3}{4}$  of 8 is 6.

# Appendix E (Te Poutama Tau: A Case Study of Two Schools)



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#### Te Rārangi Patapatai mō te Hunga Tumuaki

#### Te Tumuaki

- 1. E hia tau e mahi ana koe hei kaiako?
- 2. E hia tau e mahi ana koe hei tumuaki?
- 3. He aha ngā tohu whakaako kei a koe?
- 4. Kua uru atu koe i tētahi/ētahi wānanga pāngarau? Whakamāramatia mai.
- 5. Kei te kaingākaunui koe ki te pāngarau?

#### Ngā āhuatatega —ā-iwi, ā-whānau

- 6. He pēhea āhua o te whanaungatanga i waenganui i te kura me te iwi kāinga, ngā iwi/hapū?
- 7. He aha ngā kapapori pāpori, kapapori ohaoha (socio-economic background) o ngā tamariki?

He teitei	te katoa/te nuinga/ētahi/ruarua noa iho/ kare kau
Kei waenganui	te katoa/te nuinga/ētahi/ruarua noa iho/ kare kau
He hakahaka	te katoa/te nuinga/ētahi/ruarua noa iho/ kare kau

8. Te āhua o te whānau. He pēhea te āhua o ngā whānau?

Kotahi anake te matua	te katoa/te nuinga/ētahi/ruarua noa iho/ kare kau
Tokorua ngā mātua	te katoa/te nuinga/ētahi/ruarua noa iho/ kare kau
He whānau whānui	te katoa/te nuinga/ētahi/ruarua noa iho/ kare kau

- 9. Kōrero ai te whānau i te reo Māori i te kāinga?
- I ngā wā katoate katoa o ngā whānau/ ētahi/ruarua noa iho/ kare kauI te nuinga o te wāte katoa o ngā whānau/ ētahi/ruarua noa iho/ kare kauI ētahi wāte katoa o ngā whānau/ ētahi/ruarua noa iho/ kare kau
- 10. Te takiwā o te kura. He aha te āhua o te takiwā o te kura? He Rural Minor urban (small town) Major urban (big town/city)

# Te tataunga o te kura

11. What is the school decile?

He teitei (8–10) Kei waenganui (4–7)

- E hia ngā tamariki kei roto i te kura?
- 13. Ngā Whakaritenga o te pāngarau?
- 13. I pēhea koe i whakarite a te kura mō te marau pāngarau? Whakamāramatia mai.

# Te Poutama Tau

12.

- 14. I pēhea koe i tautoko ai ngā pouako hei mahi i Te Poutama Tau?
- 15. Ki ōu whakaaro, pēhea te neketanga whakamua o tō kura kei roto i Te Poutama Tau? He tino neke He āhua neke He iti noa Kāore i neke

He hakahaka (1-3)

- 16. Ki ōu whakaaro e tautoko ana Te Poutama Tau i te piki whakarunga o ngā tamariki kei roto i te pāngarau?
  - He tino tautoko He āhua tautoko He iti noa Kāore i tautoko
- 17. Ki ōu whakaaro he aha ngā āhuatanga me ngā whakaritenga o te kura i tino tautoko mai i te piki whakarunga o tōu kura i roto i Te Poutama Tau?

Hei tauira: te tautoko mai o ngā pouako?

te tautoko mai o te whānau?

te matatau o ngā pouako ki te pāngarau?

Te kaingakaunui o ngā tamariki ki te pāngarau?

18. He korero anō āu mo Te Poutama Tau, mo te whakaako rānei i te pāngarau?

# Te Rārangi Patapatai mō te Hunga Tumuaki (Principals' Questionnaire)

(These are indicative questions only)

## Principal

- 1. How many years have you been teaching?
- 2. How many years have you been principal?
- 3. What academic qualifications do you have?
- 4. Have you done any courses or professional development?
- 5. What are your own interests in pāngarau?

#### **Demographic characteristics**

6.	Iwi identification. Is t	he school closely connected to	iwi/hapū?
	One iwi/hapū	mixture of iwi/hapū	
7.	What is the socio-ecor	omic background of the tamar	iki?
	High	All/Most/Some/Few/None	
	Middle	All/Most/Some/Few/None	
	Low	All/Most/Some/Few/None	
8.	Family Type. What an	e the characteristics of the what	ānau?
	Single Parent	All/Most/Some/Few/None	
	Nuclear family	All/Most/Some/Few/None	
	Extended family	All/Most/Some/Few/None	
9.	Do the whanau speak	te reo Māori?	
	All the time	All/Most/Some/Few/None	
	Most of the time	All/Most/Some/Few/None	
	Sometimes	All/Most/Some/Few/None	
10.	School locality		
	What are the character	istics of the local area?	
	Rural Minor	urban (small town)	Major urban (big town/city)

#### **School Characteristics**

- 11. What is the school decile? High (8–10) Medium (4–7) Low (1–3)
- 12. What is the school roll?
- 13. How do you organize the school for pāngarau?

#### Te Poutama Tau

- 14. What kinds of support do you provide to teachers for the implementation of Te Poutama Tau?
- 15. How well do you rate your school's progress in Te Poutama Tau?
- 16. Do you think Te Poutama Tau has raised general pāngarau achievement?
- 17. What do you think are the factors that have lead to your school's success in Te Poutama Tau?

For example, teacher support/attitudes, whānau involvement/support, peer (teachers' and students') support, resource quality, facilitator support, and so on.

18. Do you have anything else to add about Te Poutama Tau or mathematics?

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# Te Rārangi Patapatai mō te Hunga Pouako

### Ngā mahi whakaako

- 1. E hia tau koe e mahi ana hei kaiako?
- 2. E hia tō roa i tēnei kura?
- 3. He aha te/nga tohu whakaako kei a koe?
- 4. Kua uru atu koe ki tētahi atu wānanga pāngarau i kō atu i Te Poutama Tau?
- 5. He aha te/nga marautanga e tino kaingākautia ana e koe?

#### Te āhua o tō akomanga

- 6. He aha te āhua o tō kura/akomanga i te tau 2003:
  - He kura kaupapa Māori?
  - He kura rumaki?
  - He kura-ā-iwi?
  - He akomanga rumaki i te kura auraki?
  - He akomanga reo rua?
  - He momo kura kē atu?
- 7. Tokohia nga tamariki i tō akomanga?

5-10 11-15 15-20 20-30 30+

- 8. He aha te/nga tau kura o nga tamariki i tōu akomanga? Tau 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
- 9. E hia tau koe i whakaako i tēnei reanga/karaehe?
- 10. He pēhea te matatau o tou karaehe ki te reo Māori?
  - He tino matatau te katoa
  - He matatau te nuinga
  - He āhua matatau te nuinga
  - Kāore i te matatau te nuinga
- 11. He pēhea tō rātau ngakaunui ki te pāngarau i mua mai i Te Poutama Tau?
  - a. He tino ngakaunui te katoa
  - b. He ngakaunui te nuinga
  - c. He āhua ngakaunui te nuinga
  - d. He iti nei ō rātau ngakaunui
- 12. He pēhea te whakaaro o nga tamariki ki te pāngarau i naianei?
  - He ōrite tonu He āhua rerekē He tino rerekē

### Te Whakaako Poutama Tau

- 13. E hia tau koe e whai atu ana i Te Poutama Tau?
- 14. I whakahaeretia Te Poutama Tau i te whānuitanga o te kura? Ae Kao
- 15. Mehemea ko koe te kaiwhakahaere o Te Poutama Tau ki tō kura, he aha ētahi o nga wharitenga matua mō tēnei kaupapa?
- 16. He pēhea tō whakaako i te pāngarau i naianei? He rite tonu, he rerekē? Whakamāramatia mai.
- 17. He aha nga rautaki whakaako o Te Poutama Tau e tino pai ki a koe? Whakamāramatia mai.
- 18. He aha nga wāhanga tino pai o Te Poutama Tau ki a koe? Whakamāramatia mai.
- 19. He aha nga wāhanga tino pai o Te Poutama Tau ki ō tamariki?
- 20. I pēhea koe i whakamahi ai nga rauemi o Te Poutama Tau? Whakamāramatia mai.
- 21. He aha nga rauemi matua ki a koe? Whakamāramatia mai.

# Te Tautoko o te Kura

- 22. He pēhea nei te tautoko mai o tōu kura i a koe e whai atu ana i Te Poutama Tau;
  - ka tino tautoko
  - ka āhua tautoko mai
  - kāore e tino tautoko mai i ētahi wā
  - kāore i te tino tautoko.
- 23. He korero anō āu mo Te Poutama Tau, mo te whakaako rānei i te pāngarau?

## Te Rārangi Patapatai mō te Hunga Pouako

(Teacher's Questionnaire)

(These are indicative questions only)

#### **Teaching Experience**

- 1. How many years have you been teaching?
- 2. How many years have you been teaching in this school?
- 3. What academic qualifications do you have?
- 4. Have you done any courses or professional development in pāngarau outside of Te Poutama Tau?
- 5. What are your main curriculum areas?

#### **Characteristics of class**

- 6. Is/was your class:
  - kura kaupapa Māori?
  - total immersion school?
  - total immersion class in an English-medium school?
  - bilingual class?
  - another type of class?
- 7. How many children did you have in your class?
  - 5-10 11-15 15-20 20-30 30+
- 8. What year group were they?
  - Y1, 2, 3, 4, 5, 6, 7, 8, 9, 10
- 9. How many years have you been teaching this age group?
- 10. How would you rate te reo Māori fluency of your class?
- 11. What is/was the attitude of the children to pangarau?
- 12. Has their attitude to pangarau changed?

#### **Teaching Te Poutama Tau**

- 13. How many years have you been involved in the Te Poutama Tau project?
- 14. Do you have school-wide responsibilities for Te Poutama Tau?
- 15. If you are the lead teacher, what are some of the main factors to consider?
- 16. Has your own teaching style been affected by Te Poutama Tau?
- 17. What are some of the effective strategies of Te Poutama Tau?
- 18. What do you find most effective about Te Poutama Tau? Explain.
- 19. What aspects of Te Poutama Tau do your children enjoy most?
- 20. How have you used the equipment?
- 21. What has been the key equipment?

#### **School support**

- 22. How has the school supported you in the Te Poutama Tau project?
- 23. Do you have anything else to add about Te Poutama Tau or mathematics?