

Effect of QuickSmart on Student Growth as Measured by NAPLaN - Summary Report

ANCOVA analysis

An initial ANCOVA analysis of the Numeracy data revealed that the respective linear regressions (NAPLaN logit growth for QuickSmart participants compared with that of rest of the Northern Territory for the same logit range) were not sufficiently parallel to show significance as QuickSmart students with low initial logit scores appeared to receive a disproportionately large gain from the program.

Effect size analysis

Effect sizes based on paired NAPLaN logit scores for consecutive (biannual) assessments were calculated for both QuickSmart participants and for the rest of the Territory for the corresponding initial logit range. A z-test was performed to determine the significance of the difference between these Effect Sizes. Effect Size calculations were based on Cohen's *d*, although as only paired data is used, the calculation is also identical to Hedge's *g*. The Standard Deviation value used in the Effect Size calculations was based on the raw data rather than on the paired t-test value (as suggested by Dunlop et al). Attendant Effect Size confidence intervals were calculated using a dependant sample formula suggested by Becker (1988), while the formula for the corresponding z-test was taken from Lambert and Flowers (1998).

Result Summary

The QuickSmart program appears to have had a significant impact on student logit growth as measured by NAPLaN for a number of the cohorts investigated. The apparent trend of an enhanced effect for students starting with lower logit scores, initially identified by the ANCOVA analysis, was also partially supported by the Effect Size analysis.

For the students participating in QuickSmart at year 4 (assessed at year 3 and 5 through NAPLaN) significant gains were evident in numeracy for both the 2009 and 2010 participants. Those who participated in QuickSmart at year 6 (assessed at year 5 and 7 through NAPLaN) did not initially show significant growth, however the removal of a large negative outlier within the 2009 participant group did result in a significant result.

Similarly, the year 4 participant groups all showed significant gains over the control in the Literacy areas of Grammar, Reading and Spelling, while none of the 2009 year 6 participant Literacy groups achieved significance. The 2010 year 6 participants demonstrated strongly significant gains over the control group in the areas of Grammar and Reading however. None of the groups demonstrated significant growth over the control for writing.

Numeracy – QuickSmart 2009

QS Cohort	NAPLaN Assessed	QS Cohort Effect Size (95%CI)	Control Group Effect Size (95%CI)	z-test	Significance
Year 4	2008, 2010 (Years 3, 5)	1.64±0.20 (n=53)	1.24±0.04 (n=867)	1.96	P=0.025 Significant at 95%
Year 6	2008, 2010 (Years 5, 7)	1.22±0.25 (n=39)	1.15±0.05 (n=614)	0.26	P=0.397 Not Significant
*Year 6	2008, 2010 (Years 5, 7)	1.61±0.26 (n=38)	1.15±0.05 (n=614)	1.70	P=0.0384 Significant at 95%
Year 8	2008, 2010 (Years 7, 9)	Insufficient data			

* Outlier removed

Numeracy – QuickSmart 2010

QS Cohort	NAPLaN Assessed	QS Cohort Effect Size (95%CI)	Control Group Effect Size (95%CI)	z-test	Significance
Year 4	2009, 2011	1.82±0.17 (n=101)	1.39±0.03 (n=1583)	2.46	P=0.0069 Significant at 99%
Year 6	2009, 2011	0.84±0.13 (n=96)	0.69±0.02 (n=1135)	1.11	P=0.1335 Not Significant

Literacy – QuickSmart 2009

Cohort	NAPLaN Years	QS Cohort Effect Size (95%CI)	Control Group Effect Size (95%CI)	z-test	Significance
Grammar QS Year 4	2008, 2010 (Years 3, 5)	2.16±0.44 (n=20)	1.37±0.06 (n=599)	1.77	P=0.038 Significant at 95%
Reading QS Year 4	2008, 2010 (Years 3, 5)	3.17±0.56 (n=19)	1.52±0.06 (n=545)	2.95	P=0.0016 Significant at 99%
Spelling QS Year 4	2008, 2010 (Years 3, 5)	2.31±0.42 (n=20)	1.38±0.04 (n=946)	2.23	P=0.013 Significant at 95%
Writing QS Year 4	2008, 2010 (Years 3, 5)	1.30 ±0.35 (n=20)	1.20±0.05 (n=750)	0.29	P=0.3859 Not Significant
Grammar QS Year 6	2008, 2010 (Years 5, 7)	0.97±0.40 (n=16)	0.76±0.05 (n=414)	0.53	P=0.298 Not Significant
Reading QS Year 6	2008, 2010 (Years 5, 7)	1.73±0.42 (n=16)	1.45±0.07 (n=431)	0.66	P=0.2546 Not Significant
Spelling QS Year 6	2008, 2010 (Years 5, 7)	1.59±0.33 (n=16)	1.36±0.06 (n=433)	0.71	P=0.2389 Not Significant
Writing QS Year 6	2008, 2010 (Years 5, 7)	0.70±0.37 (n=15)	0.53±0.04 (n=670)	0.48	P=0.3156 Not Significant

Literacy – QuickSmart 2010

Cohort	NAPLAN Years	QS Cohort Effect Size (95%CI)	Control Group Effect Size (95%CI)	z-test	Significance
Grammar QS Year 4	2009, 2011 (Years 3, 5)	1.52±0.25 (n=39)	1.04±0.03 (n=1281)	1.91	P=0.0281 Significant at 95%
Reading QS Year 4	2009, 2011 (Years 3, 5)	1.88±0.28 (n=39)	1.30±0.04 (n=989)	2.01	P=0.0222 Significant at 95%
Spelling QS Year 4	2009, 2011 (Years 3, 5)	1.44±0.22 (n=39)	1.14±0.02 (n=1830)	1.32	P=0.0934 Significant at 95%
Writing QS Year 4	2009, 2011 (Years 3, 5)	0.74±0.21 (n=39)	0.60±0.02 (n=1402)	0.68	P=0.2483 Not Significant
Grammar QS Year 6	2009, 2011 (Years 5, 7)	1.22±0.27 (n=30)	0.55±0.03 (n=1002)	2.51	P=0.0060 Significant at 99%
Reading QS Year 6	2009, 2011 (Years 5, 7)	1.62±0.27 (n=30)	0.77±0.03 (n=945)	3.12	P=0.0009 Significant at 99%
Spelling QS Year 6	2009, 2011 (Years 5, 7)	0.96±0.17 (n=30)	0.83±0.03 (n=1012)	0.74	P=0.2296 Not Significant
Writing QS Year 6	2009, 2011 (Years 5, 7)	0.49±0.21 (n=30)	0.35±0.03 (n=813)	0.61	P=0.2709 Not Significant

Note: Calculated Effect Sizes are for a two-year period of growth.

References

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Becker, B.J. (1988). Synthesising standardised mean change measures. *British Journal of Mathematical and Statistical Psychology*, 41, 257-278

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