SiMERR National Research Centre

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University of New England

Annual Literacy Program Report 2013

The SiMERR National Research Centre
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quicksmart

Table Of Contents

LIST of Tables

Acknowledgements

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1 *QuickSmart* in 2013

In 2013, the *QuickSmart* team at the University of New England received data from 1282 students who participated in *QuickSmart* Literacy lessons and 341 average-achieving comparison peers. These students were drawn from schools from 15 regions around Australia. Further data were also submitted for independent analysis to the Northern Territory (NT) Department of Education and Training by NT schools.

The analyses presented in this report provide information about students' performance on the Cognitive Aptitude Assessment System (OZCAAS) and on standardised test measures, specifically the Progressive Achievement Tests in Vocabulary and Comprehension (ACER, 2008). Further investigation of the data provided in this report examines the results in terms of gender and for participating Indigenous students.

2 Background

2.1 Purpose of *QuickSmart*

The prime purpose of the *QuickSmart* program is to reverse the trend of ongoing poor academic performance for students who have been struggling at school and who are caught in a cycle of continued failure. These targeted students experience significant and sustained difficulties in basic mathematics and/or literacy, and have a profile of low progress despite attempts to overcome their learning problems. Many such students have not drawn lasting benefits from other in-class and withdrawal instructional activities.

The *QuickSmart* professional learning program is designed for classroom teachers, special needs support teachers, and paraprofessionals to learn how to work with, and significantly improve, the learning outcomes in basic mathematics and literacy of under-achieving middle school students. The literacy workshop program features professional learning and support for working in a small class instructional setting with two students, using a specially constructed teaching program supported by extensive material and computer-based resources.

2.2 *QuickSmart* program description

The *QuickSmart* Numeracy and Literacy interventions were developed through the National Centre of Science, Information and Communication Technology and Mathematics Education for Rural and Regional Australia (SiMERR) at the University of New England, Armidale. The *QuickSmart* programs have been under development and continuous improvement since 2001.

The intervention is called *QuickSmart* to encourage students to become *quick* in their response speed and *smart* in their understanding and strategy use. In *QuickSmart*, the aim is to improve students' information retrieval times to levels that free working-memory capacity from an excessive focus on mundane or routine tasks. In this way, students are able to engage meaningfully with more demanding cognitive activities. In these interventions, automaticity is fostered; time, accuracy and understanding are incorporated as key dimensions of learning; and an emphasis is placed on ensuring maximum student on-task time. *QuickSmart* lessons develop learners' abilities to monitor their academic learning and set realistic goals for themselves.

Comprehension skills are emphasised in the *QuickSmart* Literacy program. The three-lesson cycle shown in Figure 1 indicates how this program focuses on each individual piece of text.

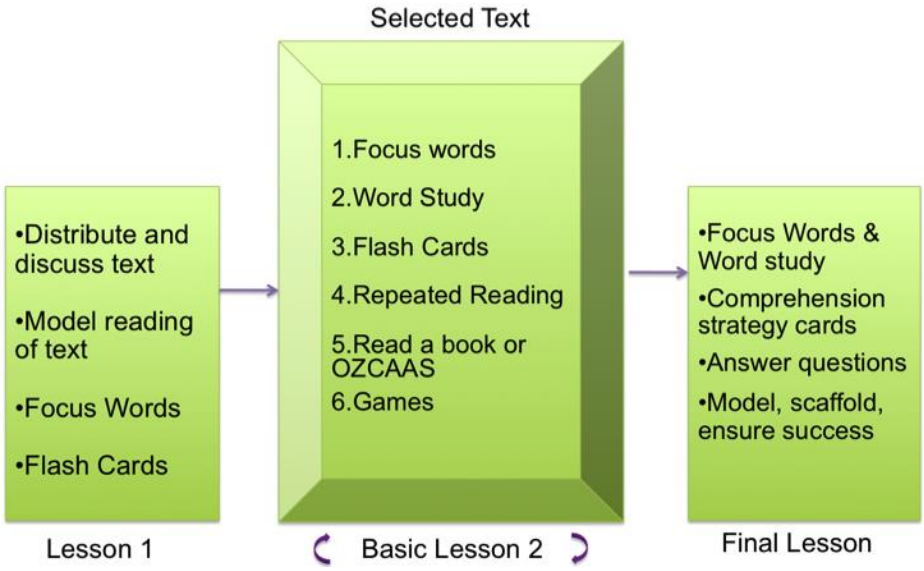


Figure 1: Literacy lesson structures

During the first lesson, the meaning of the text is emphasised and discussed. The structure of the second *QuickSmart* lesson type is repeated between three and six times to provide support and practice in basic literacy skills. Finally, the third type of lesson is used to ensure students can convey their comprehension of the passage.

3 Overall *QuickSmart* results

Two major sets of analyses quantify the benefits of the *QuickSmart* program. The first analysis examines data from speed and accuracy OZCAAS measures related to reading skills collected at the beginning and end of the *QuickSmart* program. These results are a direct measure of the work of *QuickSmart* instructors and reflect the primary focus of *QuickSmart* lessons.

The second set of analyses concern the results of independent tests. Most schools have utilised the PAT (Progressive Achievement Test) assessments in Vocabulary and Reading Comprehension. These are standardised tests developed by the Australian Council for Education Research (ACER). PAT tests are independent tests taken prior to commencement of *QuickSmart* and at the completion of the program. Students' PAT results provide information about how the knowledge, skills and attitudes developed in *QuickSmart* are used and how they transfer to other broad areas of reading skill.

The results from these two analyses are reported below in separate sections and include further analyses of the data by gender and for participating Indigenous students.

3.1 Results on the OZCAAS assessments

Six tests measured students' speed and accuracy both before *QuickSmart* began and at the end of the program. The tests were: (1) Essential Words; (2) Level 1 Words; (3) Comprehension Level 1; (4) Level 2 Words; (5) Comprehension Level 2; (6) Level 3 Words. To assist with interpretation of these results, Level 3 Words and Comprehension Level 2 are shown first, as these tests show the effect of the program most clearly. It is important to note that interpretation of results in some tests (e.g., Essential Words) can be impacted by a 'ceiling effect' as many students record strong results at pre-test which do not leave much room for improvement. The OZCAAS results recorded for average-achieving comparison students should also be interpreted with the knowledge that many of these students' results are constrained by a ceiling effect.

For all tests in this study (OZCAAS, and PATM) the comparison group represents average-achieving students selected from the same class as *QuickSmart* students. The comparison students did the pre-intervention and post-intervention tests but did not receive any *QuickSmart* instruction. It is important to note that the comparison students do not represent a 'true' control group because they do not share the same starting points with the *QuickSmart* students. The former were average-achieving students, the latter were low-achieving students. This point is demonstrated by all tables of results in this report, with comparison students achieving better average pre-intervention scores than students in the *QuickSmart* group.

As is often the case in educational studies of this nature, to obtain a 'true' control group would be ethically problematic since this would deprive a selected group of low-achieving students of the educational benefits that other low-achieving students in the same class would receive. Thus, even though the results in this report consistently show that the *QuickSmart* students improve more than the comparison students, it has to be borne in mind that if the comparison group consisted of low-achieving students, it is highly likely that the *QuickSmart* students would show an even greater margin of improvement relative to that group of comparison students.

Additionally, as *QuickSmart* programs become established in schools, sometimes even within the first year of operation, it becomes increasingly difficult to establish a true 'comparison' group. This occurs as more *QuickSmart* practitioners share *QuickSmart* resources and activities

throughout their schools. Our information from school reports is that the majority of Principals begin this school-wide implementation of *QuickSmart* in their schools within the first two years. While this attests to the impact that *QuickSmart* is having in schools, it does not allow a straightforward interpretation of results. Specifically, in many schools average-achieving comparison students are receiving some experience with *QuickSmart* activities, resources and approaches in their classrooms, and consequently their scores are higher at post-test because of this exposure.

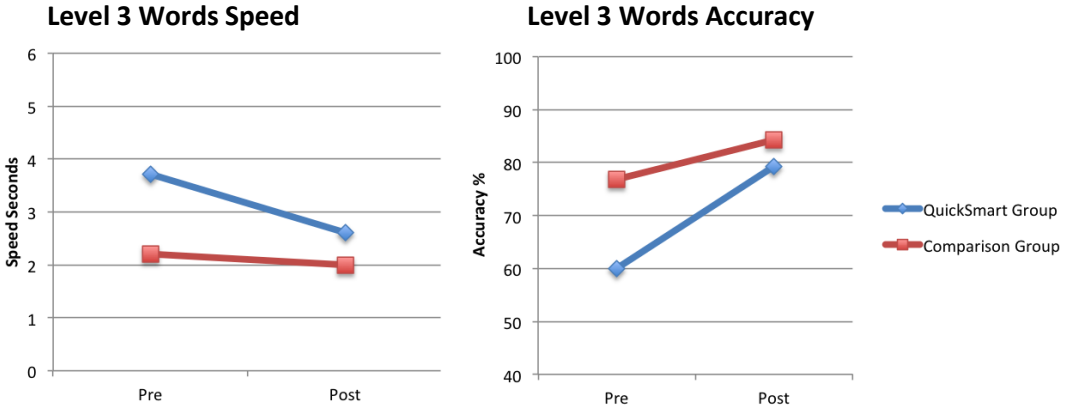
It should also be noted that in order to obtain the difference between the improvement of *QuickSmart* students and comparison students, we analysed the data using paired-samples *t*-tests. To protect against cascading Type I error associated with multiple *t*-tests we lowered the significance level from the customary 0.05 to 0.01. (The reason for this is to adjust for the situation where *t*-test analyses are repeated many times. This repetition means that, on average, the decision that the means of two groups are significantly different would be incorrect one time in every one hundred replications.) This means that in our analysis for any two means to be judged significantly different from each other, there has to be a less than 1% chance that the result was obtained by chance. This is the case for the results of our analyses presented in Tables 1 to 6 below. Detailed discussions of Tables 1 and 2 are provided for clarification purposes and as a model for understanding the results provided in Tables 3 to 6.

3.1.1 Combined OZCAAS Analysis

3.1.1.1 Level 3 Words

Table 1: OZCAAS Level 3 Words results - all students 2013

CAAS Operation	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Level 3 Words *QS* (speed secs)	869	3.71	2.455	2.61	2.061	-1.1	<0.001*	-0.485
Level 3 Words COMP (speed secs)	277	2.21	1.307	2.0	1.347	-0.21	0.003*	-0.158
Level 3 Words *QS* (accuracy %)	869	60.01	26.524	79.32	23.378	19.31	<0.001*	0.772
Level 3 Words COMP (accuracy %)	277	76.81	20.443	84.22	16.208	7.41	<0.001*	0.402



On the Level 3 Words test, there were paired data for 869 *QuickSmart* students and 277 comparison students. The desired criterion for response speed on the OZCAAS assessments for words is between 1 and 2 seconds as an indication of automaticity. The decrease in time on these difficult words for *QuickSmart* students is 1.1 seconds. The effect size for this result is -0.485, which indicates strong improvement. (Note the negative number means that the post-test time is lower than the pre-test time which is the desired pattern of improvement).

Effect size statistics can be understood based on the work of Hattie (Hattie, J. (2009). *Visible Learning: A synthesis of over 800 meta-analyses relating to achievement.* London: Routledge) such that:

- Effect sizes below 0.2 are considered poor, with an appropriate range of growth over an academic year for a student cohort established as within the range of 0.2 to 0.4;
- Effect size scores of 0.4 to 0.6 are considered strong;
- Effect sizes between 0.6 and 0.8 are considered very strong; and
- Effect size scores above 0.8 represent substantial improvement of the order of approximately three years' growth.

In terms of accuracy, the *QuickSmart* students' average scores have improved by over 19.3 percentage points, which is a very strong result. The effect size of 0.772, indicates a very strong improvement for the *QuickSmart* group.

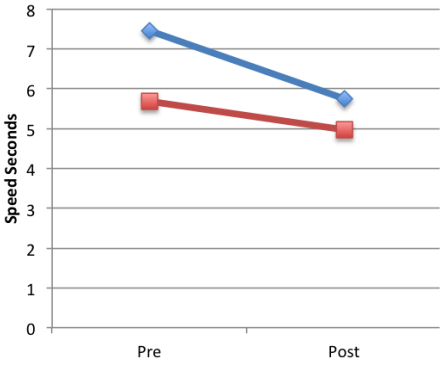
Table 1 shows that when compared to the scores of the comparison students, *QuickSmart* students' scores indicate greater improvement in terms of speed and accuracy with Level 3 words. The diagrams illustrate the narrowing of the gap between the *QuickSmart* students and comparison students as a result of the *QuickSmart* intervention.

3.1.1.2 Comprehension Level 2

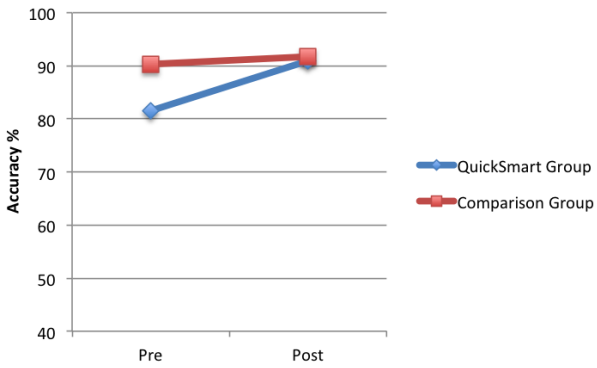
Table 2: OZCAAS Comprehension Level 2 - all students 2013

CAAS Operation	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Comprehension Level 2 *QS* (speed secs)	938	7.453	3.087	5.753	2.713	-1.7	<0.001*	-0.585
Comprehension Level 2 COMP (speed secs)	294	5.678	2.103	4.972	1.751	-0.706	<0.001*	-0.365
Comprehension Level 2 *QS* (accuracy %)	938	81.54	16.85	90.89	12.104	9.35	<0.001*	0.637
Comprehension Level 2 COMP (accuracy %)	294	90.32	9.427	91.71	8.257	1.39	0.015	0.157

Comprehension Level 2 Speed



Comprehension Level 2 Accuracy



On the Comprehension Level 2 test, there were paired data for 938 *QuickSmart* students and 294 comparison students. This test required students to choose the best alternative for two words to complete a sentence. It is a test of sentence-level cloze reading skills. The desired criterion for response speed on the OZCAAS assessments for comprehension is between 3 and 4 seconds as an indication of automaticity. The decrease in time for *QuickSmart* students is 1.7 seconds, which is a strong result. The effect size for this result is -0.585, which indicates strong improvement.

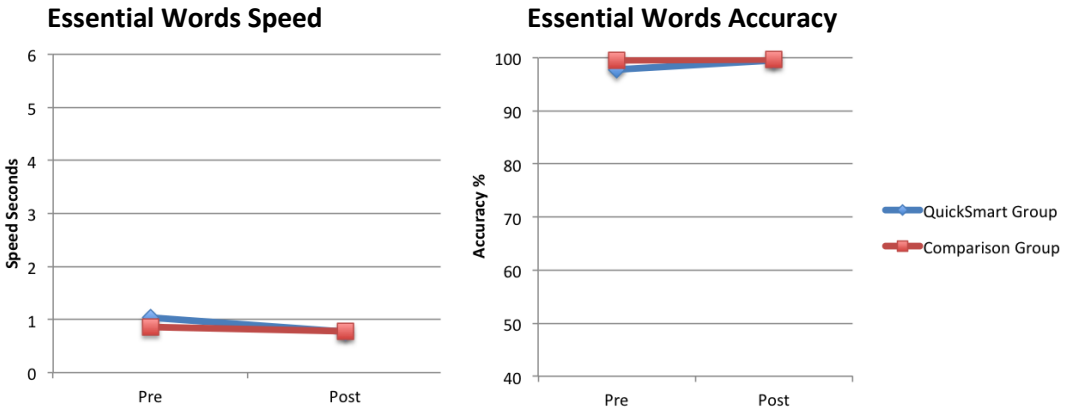
In terms of accuracy, the *QuickSmart* students' average scores have improved by more than 9.3 percentage points, which is a very strong result. The effect size is 0.637, which indicates very strong improvement for the *QuickSmart* group.

Table 2 shows that when compared to the scores of the comparison students, *QuickSmart* students' scores indicate greater improvement in terms of speed and accuracy in comprehension. The diagrams illustrate the narrowing of the gap between the *QuickSmart* students and comparison students as a result of the *QuickSmart* intervention.

3.1.1.4 Essential Words

Table 3: OZCAAS Essential Words - all students 2013

CAAS Operation	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	p	Effect size
Essential words QS (speed)	978	1.03	0.456	0.77	0.313	-0.26	<0.001*	-0.665
Essential words Comp (speed)	273	0.86	0.306	0.78	0.254	-0.08	<0.001*	-0.284
Essential words QS (acc)	978	97.779	5.76	99.465	2.095	1.685	<0.001*	0.389
Essential words Comp (acc)	273	99.458	1.728	99.768	1.083	0.31	0.009*	0.215

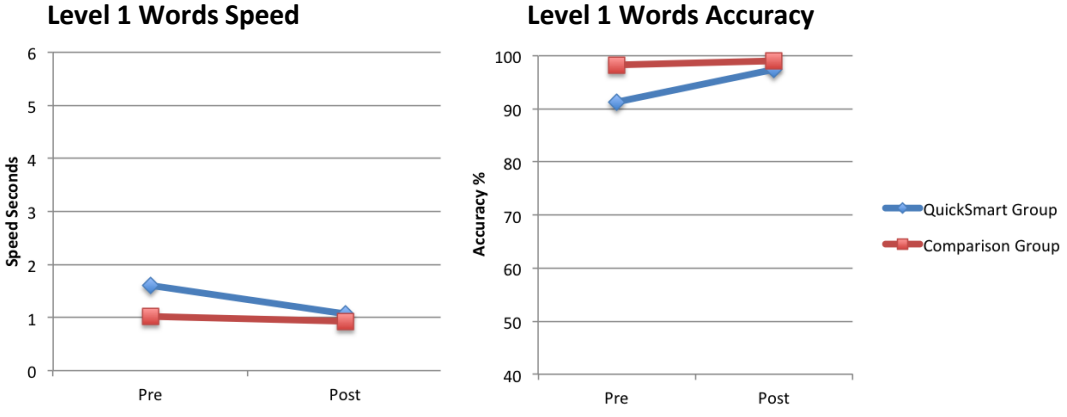


The results for Essential Words, the most commonly used words that should be known by middle school students, indicate a stronger improvement for the *QuickSmart* students. However, the accuracy results show a strong ceiling effect as the results were already at a high level at pre-test for both groups.

3.1.1.5 Level 1 Words

Table 4: OZCAAS Level 1 Words - all students 2013

CAAS Operation	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Level 1 Words QS (speed secs)	1054	1.598	1.203	1.07	0.762	-0.528	<0.001*	-0.525
Level 1 Words COMP (speed secs)	302	1.029	0.418	0.93	0.331	-0.099	<0.001*	-0.263
Level 1 Words QS (accuracy %)	1054	91.29	14.137	97.449	7.895	6.159	<0.001*	0.538
Level 1 Words COMP (acc %)	302	98.28	3.893	99.113	2.418	0.833	<0.001*	0.257

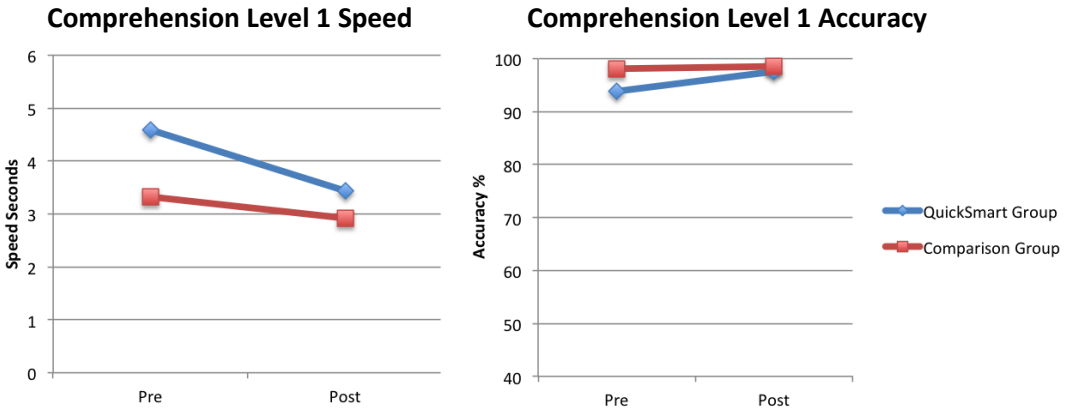


The results for Level 1 Words indicate a strong improvement for the *QuickSmart* students. The diagrams illustrate the narrowing of the gap between the *QuickSmart* students and comparison students. The accuracy results for the comparison group show a strong ceiling effect.

3.1.1.6 Comprehension Level 1

Table 5: OZCAAS Comprehension Level 1 - all students 2013

CAAS Operation	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Comprehension Level 1 QS (speed secs)	1018	4.596	2.172	3.43	1.671	-1.166	<0.001*	-0.602
Comprehension Level 1 COMP (speed secs)	300	3.331	1.087	2.92	0.906	-0.411	<0.001*	-0.411
Comprehension Level 1 QS (accuracy %)	1018	93.79	11.085	97.603	6.621	3.813	<0.001*	0.418
Comprehension Level 1 COMP (accuracy %)	300	98.11	4.098	98.611	3.123	0.501	0.069	0.138

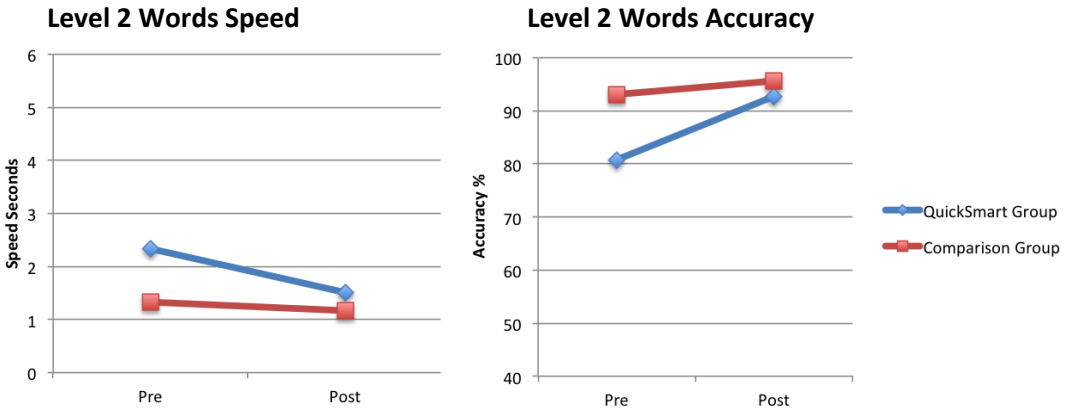


The results for Comprehension Level 1 indicate a strong improvement for the *QuickSmart* students. The diagrams illustrate the narrowing of the gap between the *QuickSmart* students and comparison students. The accuracy results for the comparison group show a strong ceiling effect.

3.1.1.7 Level 2 Words

Table 6: OZCAAS Level 2 Words - all students 2013

CAAS Operation	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Level 2 Words *QS* (speed secs)	1011	2.327	1.822	1.51	1.325	-0.817	<0.001*	-0.513
Level 2 Words COMP (speed secs)	298	1.333	0.727	1.16	0.544	-0.173	<0.001*	-0.269
Level 2 Words *QS* (accuracy %)	1011	80.78	19.993	92.69	13.751	11.91	<0.001*	0.694
Level 2 Words COMP (acc %)	298	93.09	9.117	95.57	6.554	2.48	<0.001*	0.312



The results for Level 2 Words indicate a very strong improvement for the *QuickSmart* students. The diagrams illustrate the narrowing of the gap between the *QuickSmart* students and comparison students as a result of the *QuickSmart* intervention.

3.1.2 OZCAAS By Demographics

3.1.2.1 Essential words by Gender

The following tables show an analysis of OZCAAS results for each test by gender (Tables 7, 8, 9, 10, 11, 12) and for Indigenous students (Table 13).

Table 7: OZCAAS Essential Words results – all students by gender 2013

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	559	1.01	0.424	0.77	0.321	-0.24	<0.001*	-0.638
Male COMP (speed)	121	0.86	0.275	0.78	0.222	-0.08	0.006*	-0.32
Female QS (speed)	419	1.05	0.494	0.77	0.304	-0.28	<0.001*	-0.683
Female COMP (speed)	152	0.86	0.329	0.79	0.277	-0.07	0.004*	-0.23
Male QS (accuracy)	559	97.871	4.808	99.498	1.955	1.627	<0.001*	0.443
Male COMP (accuracy)	121	99.568	1.598	99.737	1.155	0.169	0.333	0.122
Female QS (accuracy)	419	97.657	6.831	99.42	2.271	1.763	<0.001*	0.346
Female COMP (accuracy)	152	99.371	1.825	99.793	1.026	0.422	0.009*	0.285

The results of *QuickSmart* students show that in both speed and accuracy the females have improved slightly more than the males. However, care should be exercised in interpreting these results because they exhibit a strong ceiling effect.

3.1.2.2 Level 1 Words by Gender

Table 8: OZCAAS Level 1 Words results – all students by gender 2013

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	613	1.553	1.116	1.05	0.688	-0.503	<0.001*	-0.542
Male COMP (speed)	138	1.042	0.431	0.93	0.36	-0.112	0.001*	-0.281
Female QS (speed)	441	1.662	1.312	1.09	0.855	-0.572	<0.001*	-0.517
Female COMP (speed)	164	1.019	0.408	0.92	0.304	-0.099	0.003*	-0.275
Male QS (accuracy)	613	91.23	13.385	97.441	7.367	6.211	<0.001*	0.575
Male COMP (accuracy)	138	98.56	3.523	99.223	1.999	0.663	0.025	0.232
Female QS (accuracy)	441	91.36	15.136	97.462	8.582	6.102	<0.001*	0.496
Female COMP (accuracy)	164	98.04	4.173	99.02	2.724	0.98	0.002*	0.278

The results of *QuickSmart* students show that in speed the females have improved slightly more than the males. For accuracy the males have improved slightly more than the females.

3.1.2.3 Comprehension Level 1 by Gender

Table 9: OZCAAS Comprehension Level 1 results – all students by gender 2013

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	589	4.593	2.147	3.46	1.722	-1.133	<0.001*	-0.582
Male COMP (speed)	137	3.389	1.181	2.94	1.004	-0.449	<0.001*	-0.409
Female QS (speed)	429	4.601	2.208	3.39	1.601	-1.211	<0.001*	-0.628
Female COMP (speed)	163	3.283	1.002	2.91	0.819	-0.373	<0.001*	-0.408
Male QS (accuracy)	589	93.71	10.653	97.529	6.411	3.819	<0.001*	0.434
Male COMP (accuracy)	137	98.8	2.737	98.531	3.318	-0.269	0.407	-0.089
Female QS (accuracy)	429	93.9	11.663	97.706	6.905	3.806	<0.001*	0.397
Female COMP (accuracy)	163	97.53	4.895	98.679	2.958	1.149	0.007*	0.284

The results of *QuickSmart* students show that in speed the females have improved slightly more than the males. For accuracy the males have improved marginally more than the females.

3.1.2.4 Level 2 Words by Gender

Table 10: OZCAAS Level 2 Words results – all students by gender 2013

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	595	2.219	1.742	1.47	1.296	-0.749	<0.001*	-0.488
Male COMP (speed)	136	1.288	0.704	1.09	0.497	-0.198	<0.001*	-0.324
Female QS (speed)	416	2.482	1.923	1.55	1.365	-0.932	<0.001*	-0.559
Female COMP (speed)	162	1.371	0.746	1.21	0.577	-0.161	0.009*	-0.241
Male QS (accuracy)	595	81.26	18.62	92.93	12.789	11.67	<0.001*	0.731
Male COMP (accuracy)	136	94.64	7.981	95.73	7.086	1.09	0.067	0.144
Female QS (accuracy)	416	80.09	21.811	92.34	15.03	12.25	<0.001*	0.654
Female COMP (accuracy)	162	91.79	9.809	95.43	6.091	3.64	<0.001*	0.446

The results of *QuickSmart* students show that in both speed of response and accuracy the females have improved slighty more than the males.

3.1.2.5 Comprehension Level 2 by Gender

Table 11: OZCAAS Comprehension Level 2 results – all students by gender 2013

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	549	7.442	3.022	5.732	2.82	-1.71	<0.001*	-0.585
Male COMP (speed)	134	5.6	2.107	4.897	1.847	-0.703	<0.001*	-0.355
Female QS (speed)	389	7.469	3.181	5.784	2.559	-1.685	<0.001*	-0.584
Female COMP (speed)	160	5.744	2.105	5.035	1.668	-0.708	<0.001*	-0.373
Male QS (accuracy)	549	81.68	15.591	90.72	11.434	9.04	<0.001*	0.661
Male COMP (accuracy)	134	90.91	9.324	92.32	7.309	1.41	0.071	0.168
Female QS (accuracy)	389	81.34	18.502	91.13	13.003	9.79	<0.001*	0.612
Female COMP (accuracy)	160	89.82	9.513	91.2	8.964	1.38	0.096	0.149

The results of *QuickSmart* students show that in speed the males have improved slightly more than the females. For accuracy the females have improved slightly more than the males.

3.1.2.6 Level 3 Words by Gender

Table 12: OZCAAS Level 3 Words results – all students by gender 2013

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	510	3.51	2.426	2.44	1.899	-1.07	<0.001*	-0.491
Male COMP (speed)	127	2.13	1.292	1.81	1.146	-0.32	<0.001*	-0.262
Female QS (speed)	359	3.98	2.473	2.84	2.252	-1.14	<0.001*	-0.482
Female COMP (speed)	150	2.28	1.32	2.16	1.481	-0.12	0.275	-0.086
Male QS (accuracy)	510	59.96	26.099	79.5	23.268	19.54	<0.001*	0.79
Male COMP (accuracy)	127	80.56	18.545	86.02	14.515	5.46	<0.001*	0.328
Female QS (accuracy)	359	60.1	27.154	79.06	23.565	18.96	<0.001*	0.746
Female COMP (accuracy)	150	73.63	21.474	82.7	17.417	9.07	<0.001*	0.464

The results of *QuickSmart* students show that in speed the females have improved marginally more than the males. For accuracy the males have improved slightly more than the females.

3.1.2.7 Indigenous students

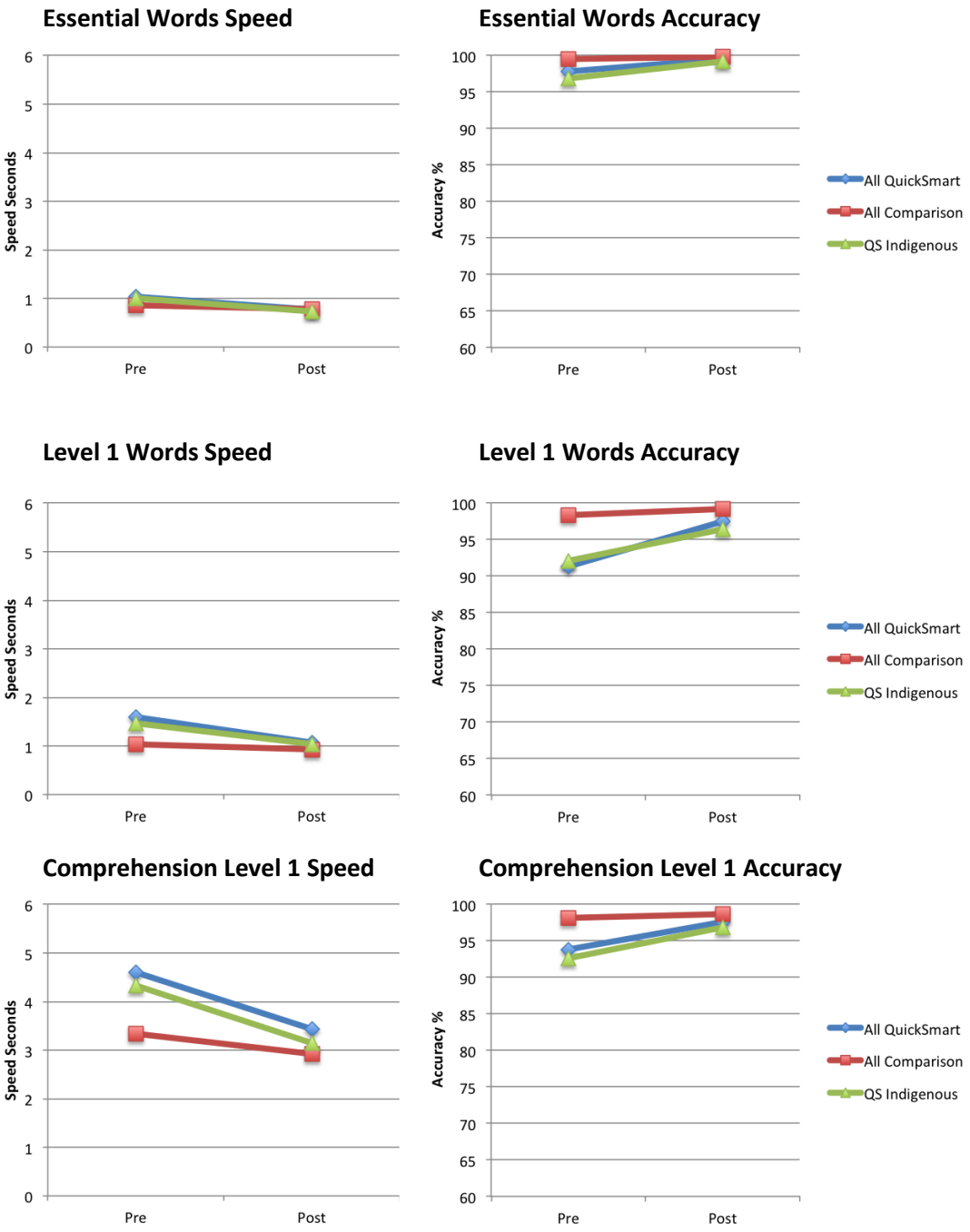
Table 13: OZCAAS results **-** Indigenous students 2013

Test	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Essential words QS (speed)	114	1.01	0.484	0.73	0.459	-0.28	<0.001*	-0.594
Essential words QS (acc)	114	96.781	8.999	99.178	3.187	2.397	0.001	0.355
Level 1 words QS (speed)	116	1.473	1.298	1.04	0.881	-0.433	<0.001*	-0.39
Level 1 words QS (acc)	116	92.06	17.454	96.409	11.343	4.349	<0.001*	0.295
Comprehension Level 1 QS (speed)	118	4.33	2.405	3.14	1.546	-1.19	<0.001*	-0.589
Comprehension Level 1 QS (acc)	118	92.59	16.4	96.801	10.405	4.211	<0.001*	0.307
Level 2 words QS (speed)	111	1.996	1.515	1.41	1.268	-0.586	<0.001*	-0.42
Level 2 words QS (acc)	111	83.93	24.324	93.4	16.249	9.47	<0.001*	0.458
Comprehension Level 2 QS (speed)	102	6.76	3.076	5.615	2.626	-1.145	<0.001*	-0.4
Comprehension Level 2 QS (acc)	102	84.55	19.672	91.5	13.657	6.95	<0.001*	0.41
Level 3 words QS (speed)	97	3.4	2.246	2.67	2.138	-0.73	0.001	-0.333
Level 3 words QS (acc)	97	70.26	28.744	83.99	23.387	13.73	<0.001*	0.524

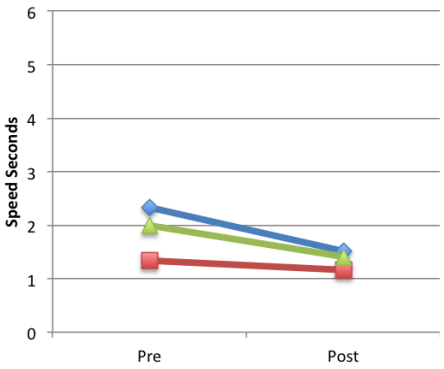
These results indicate that the Indigenous students' gains are comparable to those of the overall *QuickSmart* group. For Essential Words and Level 1 words, both the speed and accuracy results are limited by the ceiling effect (the pre-intervention scores were so high that the

students did not have much room for further improvement). For Comprehension Level 1 the accuracy results exhibit the ceiling effect.

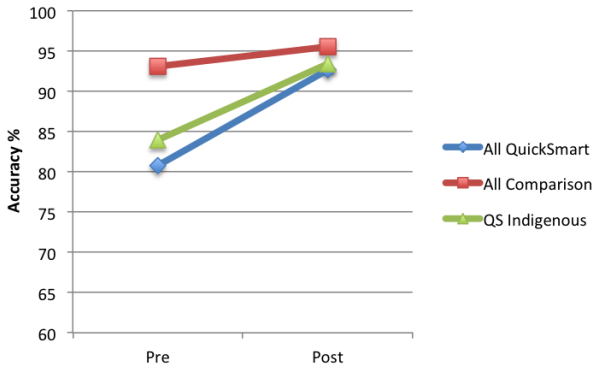
The following graphs illustrate how the Indigenous students (green) have performed in each test compared to the whole *QuickSmart* group (blue) as well as the comparison students (red).



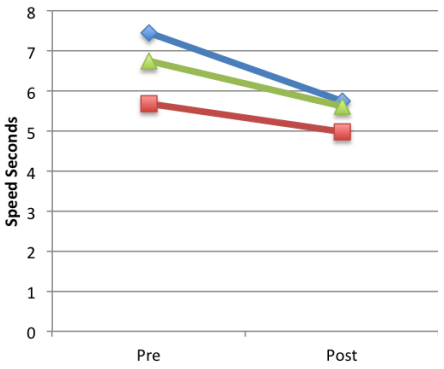
Level 2 Words Speed



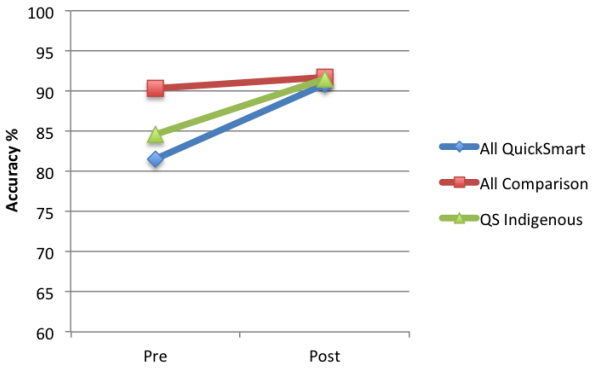
Level 2 Words Accuracy



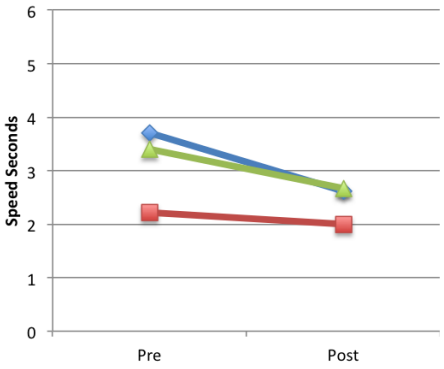
Comprehension Level 2 Speed



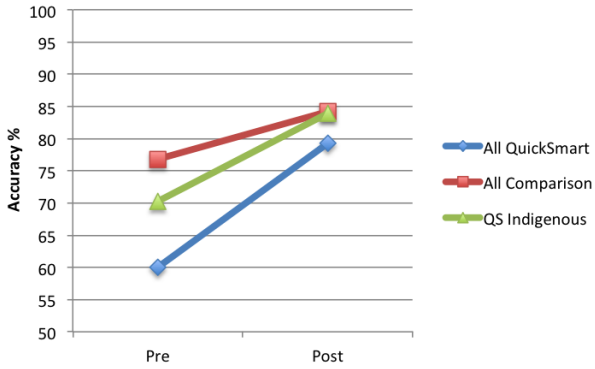
Comprehension Level 2 Accuracy



Level 3 Words Speed



Level 3 Words Accuracy



3.1.3 Students who were unable to complete the pre-intervention test

To complete this section on OZCAAS results, it is important to note that there were students who the instructors confirmed were not able to complete all the OZCAAS pre-tests. In such cases Instructors were advised not to continue collecting data as doing so would have confronted these students dramatically with their weaknesses at the beginning of the program. A mark of the success of *QuickSmart* is that many of these students were able to complete all OZCAAS assessments at the end of the program. These students' results could not be included in the previous analyses and are presented in Table 14 below.

Table 14: OZCAAS results where no pre-test data was available - 2013

	N	Mean	Std. Deviation
Essential words QS (speed)	27	0.706	0.199
Essential words QS (acc)	27	100	0
Level 1 words QS (speed)	29	0.972	0.418
Level 1 words QS (acc)	29	97.49	6.226
Comprehension Level 1 QS (speed)	54	3.359	1.541
Comprehension Level 1 QS (acc)	54	97.313	6.358
Level 2 words QS (speed)	63	1.97	1.824
Level 2 words QS (acc)	63	85.89	18.283
Comprehension Level 2 QS (speed)	110	6.555	2.845
Comprehension Level 2 QS (acc)	110	87.556	13.336
Level 3 words QS (speed)	118	3.025	2.181
Level 3 words QS (acc)	118	66.34	25.818

The results in Table 14 are impressive given that these students did not have the skills or confidence to complete the OZCAAS pre-tests initially. In Essential words and Level 1 words, the average response rates at the end of the program were below one second, with accuracy results close to the goal of 100%. In Level 2 words, the average response rates were within the goal range, with average accuracy above 85%. In Comprehension Level 1, the average response rates were also within the goal range, with average accuracy above 97%. Even though some of these students may not have progressed to Level 3 Words during *QuickSmart* lessons, their post-test results are encouraging with response speeds below 3.1 seconds and accuracy over 66% at post-test. It is likely that part of this improvement may be due to the fact that: (1) students increased their ability to benefit from classroom instruction; and (2) students' improved levels of confidence may have led to a 'have a go attitude' that was not present at the beginning of the *QuickSmart* program.

3.1.4 Conclusion for OZCAAS Testing

Overall, the *QuickSmart* students showed strong growth in their understanding and use of reading skills. At all levels, they either closed the gap between their scores and those of average-achieving comparison students or narrowed this gap to a very small margin. Such growth is critical for lower-achieving students, as reading is a vital skill underpinning learning in general. This improvement provides the foundation for students to improve in areas related to the application of reading skills that are not specifically taught in *QuickSmart*.

Some small differences between male and female students were observed. However, these do not reveal any consistent trend and do not warrant further investigation.

It is acknowledged that Indigenous students had lower finishing points on some assessments but their overall pre-test to post-test improvement is significant.

3.2 Independent Assessments

3.2.1 Why these assessments are used

The *QuickSmart* pre- and post-assessments include independent tests in order to demonstrate whether students are able to take the basic knowledge and strategies taught in *QuickSmart* and apply these to higher-level literacy tasks.

3.2.2 Results on the PAT Assessments

Table 15 reports the analysis of the PAT data for all students for whom paired data were available. PAT analyses for individual regions are provided in an Appendix to this report. (Note: Students who were absent at the end of the year were not included in the analysis). Separate PAT test analyses are provided for Vocabulary and Comprehension.

The PAT (2008) Norm Tables were used to convert raw scores from various levels of the PAT test to consistent Scale scores, which were used for all subsequent calculations. Two analyses are reported in Table 15. The first analysis presents a calculation of a standard gain score and the significance of this result. The second analysis is an Effect Size calculated from the Means and Standard Deviations on PAT scores for each group. Effect size statistics indicate the magnitude of the change in academic achievement for the *QuickSmart* and comparison students.

Table 15: PAT results - (Scale scores) 2013

Group	Students with paired data	Average Gain score	Significance	Effect size
All *QuickSmart* Vocabulary	829	6.338	<0.001*	0.573
All Comparison Vocabulary	254	3.47	<0.001*	0.326
All *QuickSmart* Comprehension	883	5.948	<0.001*	0.558
All Comparison Comprehension	272	4.826	<0.001*	0.402

The results indicate a very strong improvement for *QuickSmart* students in both Vocabulary and Comprehension. These improvements are greater than those recorded for the comparison group of average-achieving peers.

Specifically, the Vocabulary gain recorded for the *QuickSmart* group represents almost 8 months' growth, based on the expected yearly growth in PAT-V of 10 scale score points. The gain in Comprehension for the *QuickSmart* group is well in excess of the expected yearly growth of students' scores as measured on the PAT-C assessment of between 4 and 5 scale score points.

Table 16 reports the same information as Table 15 but shows a comparison of male and female students included in the *QuickSmart* program.

Table 16: PAT results - By Gender (Scale scores) 2013

Gender	Students with paired data	Average Gain score	Significance	Effect size
Vocabulary – QS Male	463	6.738	<0.001*	0.595
Vocabulary – Comp Male	113	2.914	<0.001*	0.271
Vocabulary – QS Female	506	5.953	<0.001*	0.546
Vocabulary – Comp Female	141	3.916	<0.001*	0.371
Comprehension – QS Male	366	5.833	<0.001*	0.543
Comprehension – Comp Male	126	4.716	<0.001*	0.377
Comprehension – QS Female	377	5.941	<0.001*	0.584
Comprehension – Comp Female	146	4.921	<0.001*	0.428

In terms of Scale scores, the results indicate that male *QuickSmart* students improved slightly more in vocabulary compared to female *QuickSmart* students. The female *QuickSmart* students improved slightly more in comprehension.

Table 17 reports the same information as Table 15 but does so for the scores of Indigenous students included in the *QuickSmart* program.

Table 17: PAT results - Indigenous (Scale scores) 2013

Group	Students with paired data	Average Gain score	Significance	Effect size
Indigenous QS Vocab	83	6.208	<0.001*	0.522
All Comparison Vocab	254	3.47	<0.001*	0.326
Indig QS Comprehension	89	6.32	<0.001*	0.519
All Comparison Comprehension	272	4.826	<0.001*	0.402

These results show strong comprehension improvement for the Indigenous students who participated in *QuickSmart*. These students were able to report a rate of growth higher than the total cohort of *QuickSmart* students and in excess of that achieved by the comparison group. The Indigenous students' Vocabulary results also show a strong improvement, although not as strong as that shown by the rest of the *QuickSmart* group. The rate of growth for Indigenous students in Vocabulary was in excess of that achieved by the comparison group.

The following table shows the percentage of *QuickSmart* students that achieved a gain on the PAT results for either Vocabulary or Comprehension.

Table 18: Percentage students with PAT Gain

Student Type	N with gain	N with PAT	Percentage with Gain
***QuickSmart* Vocab**	617	829	74.4
Comparison Vocab	168	254	66.1
***QuickSmart* Comprehension**	654	883	74.1
Comparison Comprehension	189	272	69.5

These results show that in the *QuickSmart* group, a greater percentage of students achieved gain in PAT than in the comparison group of their average-achieving peers.

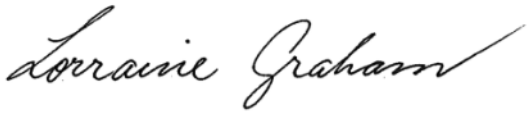
4 Conclusion to Report

The support provided by the Schools and Clusters has been critical in making more positive the hopes and aspirations of students participating in the *QuickSmart* program. This report has focused on the quantitative aspects of the program. In all analyses, the data report a narrowing of the achievement gap between *QuickSmart* students and their average-performing comparison group peers. Impressive effect sizes have been reported as well as highly significant gains on the part of individual students who, in some cases, could not complete the full suite of pre-test assessments.

Additionally, substantial qualitative data (reported in school presentations during professional workshops 2 and 3) indicate that *QuickSmart* students gained a new confidence in the area of literacy learning. Many stories within the corpus of qualitative data document improvements for *QuickSmart* students not only in relation to their performance in class, but also with regard to students' attitudes to school, their attendance rates and levels of academic confidence both inside and outside the classroom.

The data collected to date from thousands of *QuickSmar*t students indicate that the narrowing of the achievement gap between *QuickSmart* and comparison students results in low-achieving students proceeding with their studies more successfully by learning to 'trust their heads' in the same ways that effective learners do. Importantly, previous *QuickSmart* studies (references at http://www.une.edu.au/simerr/quicksmart/pages/qsresearchpublications.php) demonstrate that *QuickSmart* students can maintain the gains made during the program for years after they completed the program. Analyses have consistently identified impressive statistically significant end-of-program and longitudinal gains in terms of probability measures and effect sizes that mirror the qualitative improvements reported by teachers, paraprofessionals, parents and *QuickSmart* students.

If you have any questions concerning this report or *QuickSmart* please contact us at the SiMERR National Centre at UNE on (02) 67735065.



Professor John Pegg

Associate Professor Lorraine Graham

5 APPENDIX – Independent Assessment Results

5.1 Standardised Test results by Region – (PAT Scale scores) 2013

Cluster of Schools		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
Adelaide Vocab - QS Group	102	108.223	8.821	113.541	9.268	5.319	<0.001*	0.588
Adelaide Comprehension - QS Group	104	108.744	11.473	114.762	12.923	6.017	<0.001*	0.492
Ballarat Vocab - QS Group	11	110.864	9.949	117.955	11.937	7.091	0.002*	0.645
Ballarat Comprehension - QS Group	8	121.75	3.431	122.5	8.485	0.75	0.797	0.116
Horsham Vocab - QS Group	70	118.209	8.891	122.223	9.683	4.014	<0.001*	0.432
Horsham Comprehension - QS Group	72	122.108	7.78	126.969	9.535	4.861	<0.001*	0.559
Hunter Vocab - QS Group	67	115.082	9.804	127.469	13.086	12.387	<0.001*	1.071
Hunter Comprehension - QS Group	65	119.135	9.355	126.842	9.339	7.706	<0.001*	0.824
Melbourne Vocab - QS Group	135	109.181	10.697	115.874	10.442	6.693	<0.001*	0.633
Melbourne Comprehension - QS Group	142	112.74	10.608	118.594	9.505	5.854	<0.001*	0.581
North Coast NSW Vocab - QS Group	247	112.434	11.333	118.698	13.674	6.265	<0.001*	0.499
North Coast NSW Comprehension - QS Group	268	114.196	11.254	120.107	11.2	5.912	<0.001*	0.527
North West NSW Vocab - QS Group	37	114.549	7.969	121.341	9.79	6.792	<0.001*	0.761
North West NSW Comprehension - QS Group	41	117.863	6.592	123.673	8.605	5.81	<0.001*	0.758
Riverina Vocab - QS Group	27	114.07	8.417	117.259	8.891	3.189	0.011	0.368
Riverina Comprehension - QS Group	36	113.875	9.195	123.892	9.502	10.017	<0.001*	1.071
South Sydney Vocab - QS Group	9	112.756	4.748	116.778	6.071	4.022	0.038	0.738
South Sydney Comprehension - QS Group	24	109.979	7.22	115.15	8.426	5.171	0.005*	0.659
Sydney Vocab - QS Group	70	109.403	8.708	116.483	7.762	7.08	<0.001*	0.858
Sydney Comprehension - QS Group	70	115.587	6.891	121.424	8.627	5.837	<0.001*	0.748
Tasmania Vocab - QS Group	30	109.777	8.419	114.267	7.645	4.49	0.001*	0.558
Tasmania Comprehension - QS Group	29	116.197	7.172	121.321	8.091	5.124	<0.001*	0.67
Western NSW Vocab - QS Group	24	106.525	7.81	109.375	8.945	2.85	0.046	0.339
Western NSW Comprehension - QS Group	24	112.167	5.787	115.225	9.549	3.058	0.115	0.387

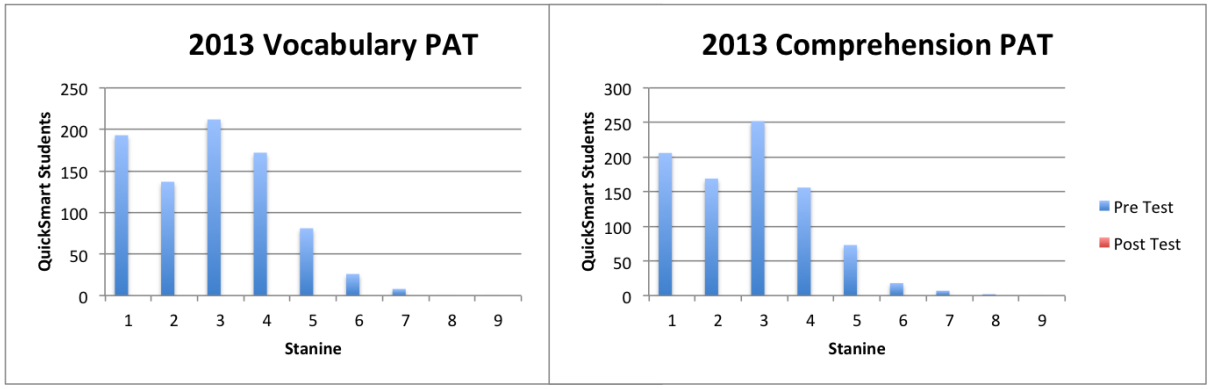
Note: only students who did both 'pre' and 'post' test are included in the table.

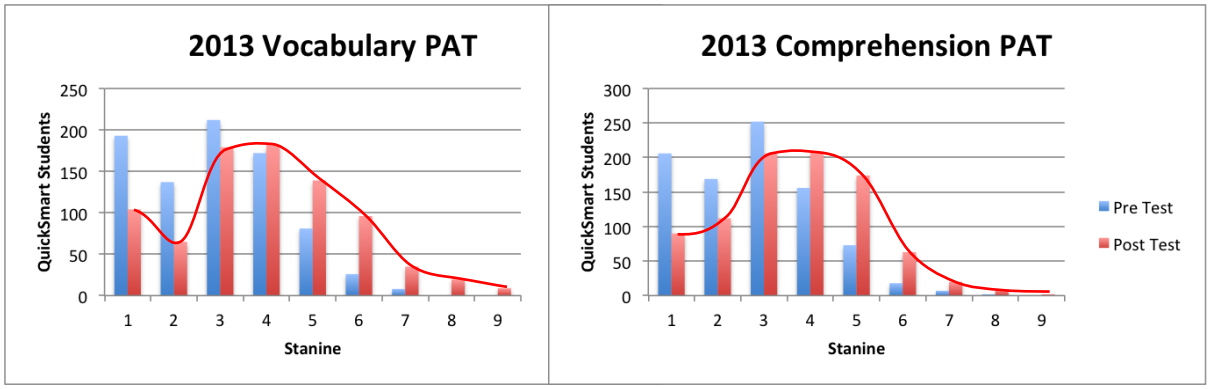
5.2 PAT results – by demographic (Scale scores) 2013

Demographic		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
All Schools Vocabulary – QS Group	**829**	**111.695**	**10.317**	**118.033**	**11.774**	**6.338**	**<0.001***	**0.573**
All Schools Vocabulary – Comp Group	**254**	**122.751**	**10.335**	**126.222**	**10.917**	**3.47**	**<0.001***	**0.326**
All Schools Comprehension – QS Group	**883**	**114.56**	**10.42**	**120.508**	**10.895**	**5.948**	**<0.001***	**0.558**
All Schools Comprehension – Comp Group	**272**	**125.297**	**11.411**	**130.123**	**12.571**	**4.826**	**<0.001***	**0.402**
Vocabulary – QS Indigenous	83	111.673	12.205	117.882	11.552	6.208	<0.001*	0.522
Comprehension – QS Indigenous	89	113.863	12.275	120.183	12.082	6.32	<0.001*	0.519
Vocabulary – QS Male	463	111.609	10.298	118.347	12.279	6.738	<0.001*	0.595
Vocabulary – Comp Male	113	123.29	11.023	126.204	10.502	2.914	<0.001*	0.271
Vocabulary – QS Female	506	113.485	10.435	119.438	11.342	5.953	<0.001*	0.546
Vocabulary – Comp Female	141	122.319	9.767	126.235	11.276	3.916	<0.001*	0.371
Comprehension – QS Male	366	111.804	10.353	117.637	11.107	5.833	<0.001*	0.543
Comprehension – Comp Male	126	124.26	12.069	128.975	12.952	4.716	<0.001*	0.377
Comprehension – QS Female	377	116.003	10.238	121.944	10.103	5.941	<0.001*	0.584
Comprehension – Comp Female	146	126.192	10.773	131.113	12.191	4.921	<0.001*	0.428

Note: only students who did both 'pre' and 'post' test are included in the table.

5.3 National Literacy PAT Improvement of QuickSmart Students for 2013





The Australian Council for Educational Research (ACER) PAT tests use a framework for describing results against national Australian norms. This technique applies stanine scores that divide the population using a scale of 1 to 9.

A stanine score of:

- 1 represents performance in the bottom 4% of the population,
- 2 represents performance in the lower or 4-10% of the population
- 3 represents performance in the lower or top 11-22% of the population
- 4 represents performance in the lower 23-39% of the population
- 5 represents performance in middle 40-59% of the population
- 6 represents performance in the higher 60-76% of the population
- 7 represents performance in the higher77-88% of the population
- 8 represents performance in the higher 89-96% of the population
- 9 represents performance in the top 4% of the population.

It is particularly difficult to move students out of the lower stanine bands. The results above show that *QuickSmart* has been quite successful in moving students into higher bands, as measured by the PAT tests.

6 APPENDIX B: *QuickSmart* sessions

6.1 Attendance summary

QS Students	N (students)	N (schools)	Mean Sessions Offered	Mean Sessions Attended	% Mean Attended	Weeks completed	% Program completed
All QS	**760**	**55**	**56.259**	**43.414**	**77.200**	**14.471**	**48.238**
Male	433	55	54.878	42.557	77.628	14.186	47.285
Female	327	52	58.089	44.550	76.633	14.850	49.501
Indigenous	85	23	49.753	32.659	66.603	10.886	36.288
Grade 4	84	18	56.405	47.417	84.445	15.806	52.685
Grade 5	178	28	54.539	46.826	86.467	15.609	52.029
Grade 6	119	28	57.101	46.218	82.525	15.406	51.354
Grade 7	225	20	60.996	44.898	73.252	14.966	49.886
Grade 8	132	17	51.682	33.932	65.291	11.311	37.702
Grade 9	9	5	59.889	33.778	51.897	11.259	37.531
> Grade 9	13	2	33.154	22.462	61.497	7.487	24.957

Note: only students and schools for whom attendance data were provided are included in the table (about 59% of students).
Note: 'Weeks completed' is based on the assumption that the school did three *QuickSmart* sessions a week
Note: '% Program completed' is calculated relative to the full *QuickSmart* program of 30 weeks.