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Annual Literacy Program Report 2014

The SiMERR National Research Centre
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quicksmart

Acknowledgements

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1 *QuickSmart* Executive Summary in 2014

Students who experience ongoing failure in upper-primary and lower-secondary school face a myriad of difficulties in pursuing post-school options and contributing to society through employment and aware citizenship. Those who exhibit consistent weaknesses in basic skills, such as the recall of number facts, or who experience difficulty with reading and comprehension are particularly vulnerable. These students are usually caught in a cycle of continued failure, as it is particularly difficult to bring about sustainable change within the usual classroom environments for students who by Year 4 are persistently at or below national benchmarks.

Three issues confront schools in Australia with regard to addressing the needs of at-risk students.

1. Too many Australian Indigenous and non-Indigenous students have shown to be resistant to improvements in learning despite large investments of funds to overcome their problems. Longitudinal national data indicate that low-achieving students have not drawn lasting benefits from most current in-class and withdrawal instructional activities.
2. Teaching assistants are an underutilised, poorly supported, and seldom recognised resource in school education. With appropriate training these adults are highly motivated, and offer cost-effective, long-term sustainable ways to close the achievement gap for low-achieving students. In remote and rural areas, trained Indigenous teaching assistants (as *QuickSmart* Instructors) are a resource able to enrich their whole community.
3. Educational support programs need to be sustainable in the short- and long-term without large drains on the public purse. Sustainability means cost-efficient, clear exit criteria, proven longitudinal results, documented ongoing benefits for students and instructors, and replicable (including quality assurance) across all regions of Australia.

The analyses presented in this report provide information about students' performance in the QuickSmart Numeracy program. In particular, the focus here is on the Cognitive Aptitude Assessment System, Australian version (OZCAAS) and on standardised test measures, specifically the Progressive Achievement Tests in Vocabulary (V) and Comprehension (C) (ACER, 2005). Some schools provided data for other independent tests, however, there was insufficient use of these tests for inclusion in this report. Further investigation of the data provided in this report examines the results in terms of gender and for the participating Indigenous students.

In 2014, the *QuickSmart* team at the University of New England received data from 1224 students who participated in *QuickSmart* Literacy lessons and 328 average-achieving comparison peers. These students were drawn from schools from 14 regions around Australia. Further data were also submitted for independent analysis to the Northern Territory (NT) Department of Education and Training by NT schools.

In terms of the OZCAAS (a random letter and word computer generated testing approach that measures the time and the accuracy of basic literacy) the results for Vocabulary and Comprehension indicate a strong to substantial improvement for the *QuickSmart* students in terms of accuracy and speed. The diagrammatic evidence illustrate that the *QuickSmart* students narrowed the achievement gap by improving to such an extent that there was either

no substantial difference between them and the comparison students or they had reached a slightly better level of performance than their comparison group peers.

Such growth is critical requirement for these *QuickSmart* students as basic literacy skills are a vital skill underpinning functioning in general. This improvement provides the necessary foundation for students to improve in other areas of the syllabus that are not specifically taught in *QuickSmart*.

Some small differences between male and female students were observed. However, except in one of the twelve analyses undertaken the statistical differences were not significant. As a result, these data do not warrant further investigation.

In the case of Indigenous students, the gains identified are comparable to those of the overall *QuickSmart* group.

Another mark of the success of *QuickSmart* is the results of those students, who did not succeed in completing the pre-test. 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. These students did manage to complete all OZCAAS assessments at the end of the program.

The results 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 two seconds, with accuracy results above 90%. In Level 2 Words, the average response rates were below 3.2 seconds, with average accuracy above 70%.

In Comprehension Level 1, the average response rates were within the goal range, with average accuracy above 94%. 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 3.8 seconds and accuracy over 60% at post-test. It is likely that part of this improvement may be due to the fact that students':

- increased their ability to benefit from classroom instruction; and
- improved their levels of confidence may have led to a 'have a go attitude' that was not present at the beginning of the *QuickSmart* program.

In the case of the ACER PAT-V and PAT-C tests, Norm Tables (2008) were used to convert raw scores from various forms of the PAT to consistent Scale scores, which were used for all subsequent calculations. Two analyses were undertaken on the PAT scores.

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.

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.

In terms of Scale scores dervived from the PAT-V and PAT-C tests, the results indicate that male *QuickSmart* students improved slightly more in vocabulary compared to female *QuickSmart* students. The female *QuickSmart* students improved marginally more in comprehension. The Independent samples *t*-tests showed that these differences are not statistically significant at the 0.01 significance level (p = 0.118 for vocabulary and 0.886 for comprehension).

In the case of Indigenous students, who participated in *QuickSmart*, the results show strong vocabulary improvement. 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' Comprehension results also show a strong improvement, although not as strong as that shown by the rest of the *QuickSmart* group.

In overview, this report focuses 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 mathematics. 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 tens of 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 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.

2 Background

2.1 Purpose of *QuickSmart*

The prime purpose of the *QuickSmart in Schools* 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.

A second purpose concerns the professional learning program 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/or 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, involving many tens of thousands of students.

The intervention is called *QuickSmart* to encourage students to become *quick* in their response speed and *smart* in their understanding and the strategic use of mental and other resources. 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.

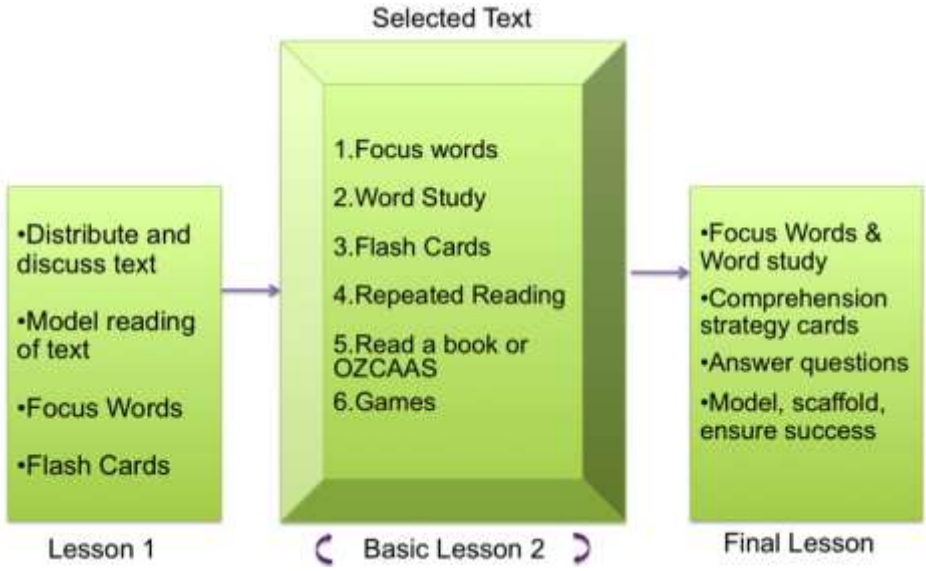


Figure 1: Literacy lesson structures

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 *QuickSmart* Tests – 2014

3.1 Introduction

Three major sets of analyses help quantify the academic benefits of the *QuickSmart* program. These analyses are presented in this report and provide information about students' performance:

(i) on the Cognitive Aptitude Assessment System, Australian version (OZCAAS);
(ii) on standardised test measures, specifically the Progressive Achievement Tests in Vocabulary and Comprehension (ACER, 2008); and
(iii) in terms of gender and participating Indigenous students.

The first analysis examines data from speed and accuracy OZCAAS measures related to vocabulary and comprehension 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 the *QuickSmart* lessons.

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; and
6. Level 3 Words.

The second set of analyses concern the results of independent tests. Most schools have utilised the Progressive Achievement Test (PAT) assessments in Vocabulary (V) and Reading Comprehension (C) for this purpose. These are standardised tests developed by the Australian Council for Education Research (ACER). PAT-V and PAT-C 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, which are not the target of *QuickSmart* instruction.

The third set of analyses includes further analyses of the data by gender and participating Indigenous students.

The results from these analyses are reported below in separate sections. (Note: Some schools provided data for other independent tests, however, there was insufficient use of these tests for inclusion in this report.)

3.2 Background to Test interpretation

For all tests in this study (OZCAAS, and PAT-V and PAT-C) 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* small-class instruction. It is important to note that the comparison students do not represent a 'true' control group because they do not share the same achievement starting points with the *QuickSmart* students. The former were average-achieving students, the latter were low-achieving students. This point is demonstrated in 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 could be ethically problematic since this would potentially deprive a selected group of low-achieving students of the educational benefits that other low-achieving students, (often) 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 most 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 even a true 'comparison' group. This occurs as more and more *QuickSmart* practitioners are sharing *QuickSmart* teaching practices, resources and activities throughout their schools. Our information from school reports is that a 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* approaches, activities and resources 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 the 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*-tests 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.

4 Results on the OZCAAS assessments

4.1 Introduction

In 2014, the *QuickSmart* team at the University of New England received data from 1224 students who participated in *QuickSmart* Literacy lessons and 328 average-achieving comparison peers. These students were drawn from schools from 14 regions around Australia. Further data were also submitted for independent analysis to the Northern Territory (NT) Department of Education and Training by NT schools.

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 and this does 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.

The results of our analyses of data related to OZCAAS are 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.

4.2 Combined OZCAAS Analysis

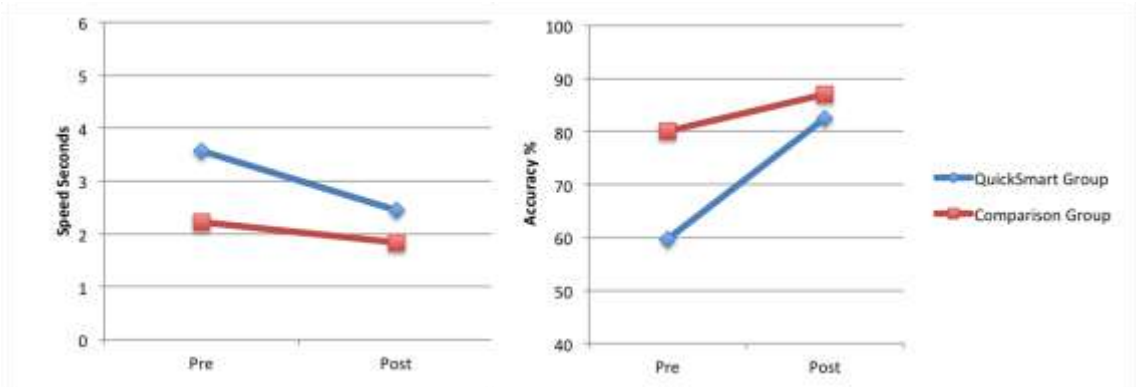
Table 1 summarises the data submitted for OZCAAS Level 3 Words.

4.2.1 Level 3 Words

Table 1: OZCAAS Level 3 Words results – all students 2014

Level 3 Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Speed (secs) QS	977	3.57	2.38	2.444	1.844	-1.127	<0.001*	0.529
Speed (secs) Comp	298	2.225	1.534	1.838	1.288	-0.387	<0.001*	0.273
Accuracy (%) QS	977	59.702	25.106	82.532	21.182	22.83	<0.001*	0.983
Accuracy (%) Comp	298	80.035	18.526	87.023	15.676	6.988	<0.001*	0.407

Level 3 Words Speed **Level 3 Words Accuracy**



On the Level 3 Words test, there were paired data for 977 *QuickSmart* students and 298 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 1.127 seconds. (Note: The negative number in the table means that the post-test time is lower than the pre-test time which is the desired pattern of improvement). The effect size for this result is 0.529, which indicates strong 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 over an academic year for a student cohort:

- Effect sizes below 0.2 are considered **poor**;
- Effect sizes within the range of 0.2 to 0.4 are considered **appropriate**;
- Effect sizes within the range of 0.4 to 0.6 are considered **strong**;
- Effect sizes within the range of 0.6 and 0.8 are considered **very strong**; and
- Effect sizes above 0.8 are considered **substantial improvement** of the order of nearly three years' growth.

In terms of accuracy, the *QuickSmart* students' average scores have improved by over 22.8 percentage points, which is a very strong result. The effect size of 0.983, indicates a substantial improvement for the *QuickSmart* group.

In summary, 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.

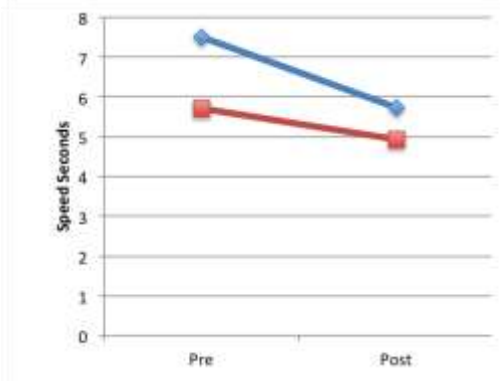
4.2.2 Comprehension Level 2

Table 2 summarises the data submitted for OZCAAS for Comprehension Level 2.

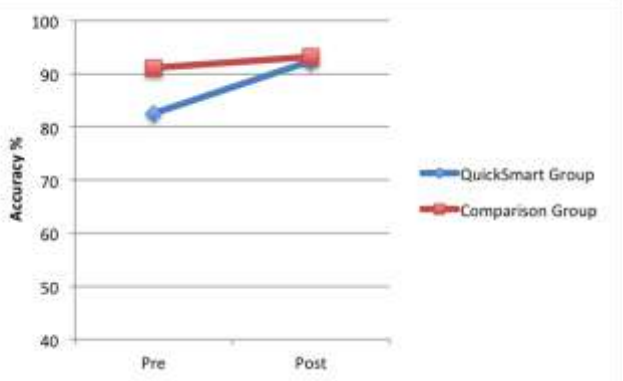
Table 2: OZCAAS Comprehension Level 2 – all students 2014

Comprehension Level 2	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Speed (secs) QS	1032	7.491	2.973	5.73	2.66	-1.762	<0.001*	0.624
Speed (secs) Comp	302	5.707	2.299	4.926	1.967	-0.781	<0.001*	0.365
Accuracy (%) QS	1032	82.546	15.371	92.438	10.535	9.892	<0.001*	0.751
Accuracy (%) Comp	302	91.143	9.434	93.163	8.351	2.02	<0.001*	0.227

Comprehension Level 2 Speed



Comprehension Level 2 Accuracy



On the Comprehension Level 2 test, there were paired data for 1032 *QuickSmart* students and 302 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 1.762 seconds, which is a strong result. The effect size for this result is 0.624, which indicates very strong improvement.

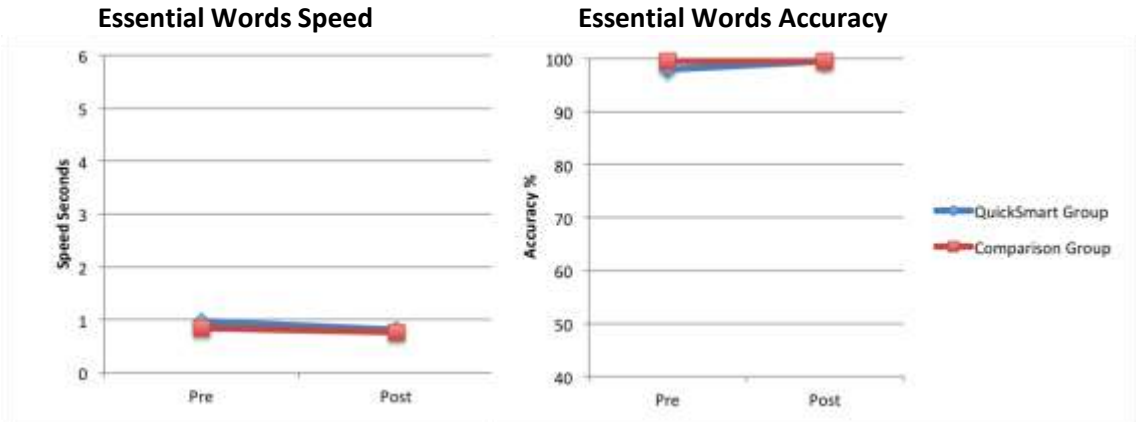
In terms of accuracy, the *QuickSmart* students' average scores have improved by nearly 10 percentage points, which is a strong result. The effect size is 0.751, which indicates very strong improvement for the *QuickSmart* group.

In summary, 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 that as a result of the *QuickSmart* intervention, the *QuickSmart* students narrowed the gap to the comparison students in speed. In accuracy, they improved to such an extent that there was no substantial difference between them and the comparison students.

4.2.3 Essential Words

Table 3: OZCAAS Essential Words – all students 2014

Essential Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	p	Effect size
Speed (secs) QS	1070	0.979	0.415	0.809	0.569	-0.17	<0.001*	0.342
Speed (secs) Comp	284	0.837	0.278	0.767	0.24	-0.07	<0.001*	0.27
Accuracy (%) QS	1070	97.97	5.499	99.586	2.006	1.616	<0.001*	0.39
Accuracy (%) Comp	284	99.533	1.691	99.586	1.508	0.053	0.672	0.033



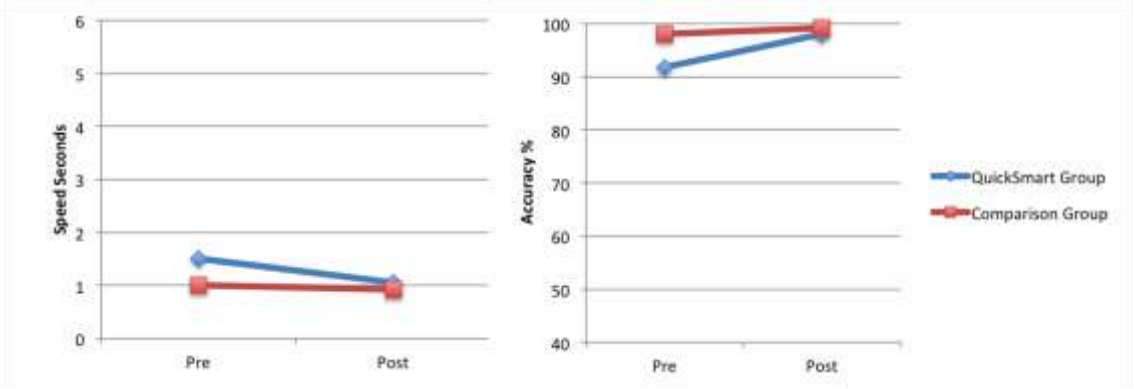
In summary, the results for Essential Words, the most commonly used words that should be known by middle school students, indicate a stronger improvement for the *QuickSmart* students. However, both the speed and accuracy results show a strong ceiling effect as the results were already at a high level at pre-test for both groups. The diagrams illustrate that the *QuickSmart* students improved to such an extent that there was no substantial difference between them and the comparison students.

4.2.4 Level 1 Words

Table 4: OZCAAS Level 1 Words – all students 2014

Level 1 Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Speed (secs) QS	1142	1.502	1.206	1.056	0.734	-0.446	<0.001*	0.447
Speed (secs) Comp	309	1.013	0.511	0.927	0.641	-0.086	0.027	0.148
Accuracy (%) QS	1142	91.798	13.098	98.004	6.268	6.206	<0.001*	0.604
Accuracy (%) Comp	309	98.03	6.974	99.136	4.17	1.106	0.001*	0.192

Level 1 Words Speed **Level 1 Words Accuracy**



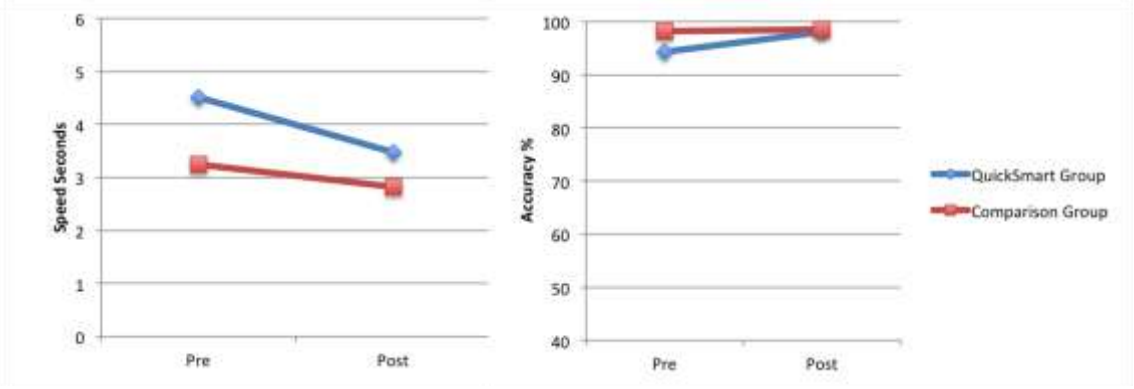
In summary, the results for Level 1 Words indicate a strong improvement for the *QuickSmart* students. The diagrams illustrate that the *QuickSmart* students improved to such an extent that there was no substantial difference between them and the comparison students. The accuracy results for the comparison group show a strong ceiling effect.

4.2.5 Comprehension Level 1

Table 5: OZCAAS Comprehension Level 1 – all students 2014

Comprehension Level 1	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Speed (secs) QS	1109	4.514	2.044	3.475	1.654	-1.039	<0.001*	0.559
Speed (secs) Comp	308	3.235	1.242	2.822	0.974	-0.413	<0.001*	0.37
Accuracy (%) QS	1109	94.262	10.096	98.099	5.503	3.837	<0.001*	0.472
Accuracy (%) Comp	308	98.182	3.988	98.542	3.435	0.36	0.167	0.097

Comprehension Level 1 Speed **Comprehension Level 1 Accuracy**



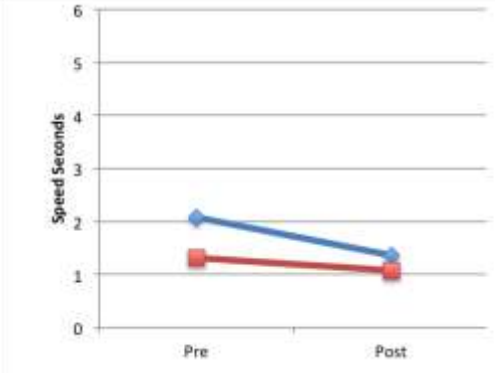
In summary, the results for Comprehension Level 1 indicate a strong improvement for the *QuickSmart* students. The diagrams illustrate that the *QuickSmart* students narrowed the gap to the comparison students in speed. In accuracy, they improved to such an extent that there was no substantial difference between them and the comparison students. The accuracy results for the comparison group show a strong ceiling effect.

4.2.6 Level 2 Words

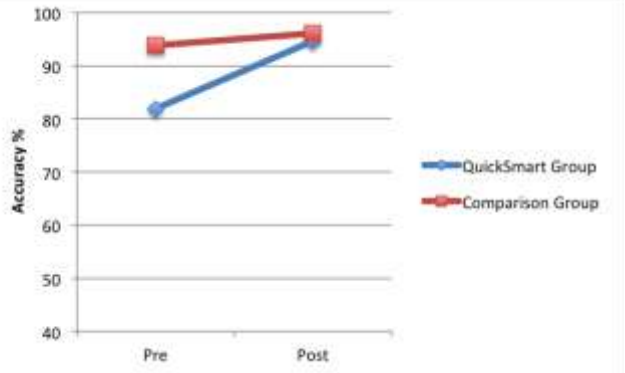
Table 6: OZCAAS Level 2 Words – all students 2014

Level 2 Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Speed (secs) QS	1123	2.078	1.466	1.358	0.986	-0.72	<0.001*	0.576
Speed (secs) Comp	309	1.316	0.843	1.076	0.48	-0.24	<0.001*	0.349
Accuracy (%) QS	1123	81.928	19.626	94.6	11.338	12.672	<0.001*	0.791
Accuracy (%) Comp	309	93.852	8.481	96.056	7.379	2.204	<0.001*	0.277

Level 2 Words Speed



Level 2 Words Accuracy



The results for Level 2 Words indicate a strong improvement for the *QuickSmart* students. The diagrams illustrate that the *QuickSmart* students narrowed the gap to the comparison students in speed. In accuracy, they improved to such an extent that there was no substantial difference between them and the comparison students.

4.3 OZCAAS By Demographics

4.3.1 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 2014

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	600	0.996	0.452	0.833	0.715	-0.163	<0.001*	0.273
Male COMP (speed)	138	0.853	0.26	0.765	0.239	-0.088	<0.001*	0.35
Female QS (speed)	470	0.958	0.362	0.779	0.289	-0.179	<0.001*	0.547
Female COMP (speed)	146	0.821	0.294	0.768	0.241	-0.053	0.028	0.199
Male QS (accuracy)	600	97.674	5.91	99.501	2.307	1.827	<0.001*	0.407
Male COMP (accuracy)	138	99.503	1.661	99.378	1.852	-0.125	0.536	n/i*
Female QS (accuracy)	470	98.349	4.905	99.695	1.535	1.346	<0.001*	0.37
Female COMP (accuracy)	146	99.562	1.723	99.782	1.056	0.22	0.132	0.154

* n/i – no improvement

In summary, 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. However, care should be exercised in interpreting these results because they exhibit a strong ceiling effect. The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level (p = 0.647 for speed and 0.715 for accuracy).

4.3.2 Level 1 Words by Gender

Table 8: OZCAAS Level 1 Words results – all students by gender 2014

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	641	1.562	1.196	1.111	0.86	-0.45	<0.001*	0.433
Male COMP (speed)	152	1.03	0.479	0.898	0.357	-0.132	<0.001*	0.314
Female QS (speed)	501	1.426	1.216	0.985	0.522	-0.441	<0.001*	0.471
Female COMP (speed)	157	0.996	0.541	0.955	0.828	-0.041	0.546	0.059
Male QS (accuracy)	641	90.764	14.085	97.577	7.152	6.813	<0.001*	0.61
Male COMP (accuracy)	152	97.938	7.973	99.013	3.316	1.075	0.093	0.176
Female QS (accuracy)	501	93.122	11.595	98.549	4.865	5.427	<0.001*	0.61
Female COMP (accuracy)	157	98.12	5.872	99.255	4.865	1.135	<0.001*	0.21

In summary, the results of *QuickSmart* students show that in both speed and accuracy the males have improved slightly more than the females. However, care should be exercised in interpreting these results because they exhibit a strong ceiling effect. The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level (p = 0.888 for speed and 0.073 for accuracy).

4.3.3 Comprehension Level 1 by Gender

Table 9: OZCAAS Comprehension Level 1 results – all students by gender 2014

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	628	4.721	2.235	3.635	1.854	-1.086	<0.001*	0.529
Male COMP (speed)	152	3.394	1.306	2.929	1.066	-0.465	<0.001*	0.39
Female QS (speed)	481	4.244	1.73	3.267	1.322	-0.977	<0.001*	0.635
Female COMP (speed)	156	3.08	1.159	2.718	0.865	-0.362	<0.001*	0.354
Male QS (accuracy)	628	93.546	10.611	97.939	5.851	4.393	<0.001*	0.513
Male COMP (accuracy)	152	97.923	4.026	98.161	4.087	0.238	0.567	0.059
Female QS (accuracy)	481	95.198	9.309	98.308	5.01	3.11	<0.001*	0.416
Female COMP (accuracy)	156	98.435	3.948	98.913	2.612	0.478	0.134	0.143

In summary, the results of *QuickSmart* students show that in both speed and accuracy the males have improved slightly more than the females. However, care should be exercised in interpreting the accuracy results because they exhibit a strong ceiling effect. The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level ($p = 0.257$ for speed and 0.112 for accuracy).

4.3.4 Level 2 Words by Gender

Table 10: OZCAAS Level 2 Words results – all students by gender 2014

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	640	2.078	1.488	1.373	1.001	-0.705	<0.001*	0.556
Male COMP (speed)	152	1.315	0.774	1.091	0.536	-0.223	<0.001*	0.336
Female QS (speed)	483	2.077	1.439	1.337	0.966	-0.74	<0.001*	0.603
Female COMP (speed)	157	1.317	0.908	1.061	0.42	-0.256	<0.001*	0.361
Male QS (accuracy)	640	81.129	20.141	94.446	11.722	13.317	<0.001*	0.808
Male COMP (accuracy)	152	94.152	7.592	96.494	5.87	2.342	<0.001*	0.345
Female QS (accuracy)	483	82.987	18.892	94.805	10.817	11.818	<0.001*	0.768
Female COMP (accuracy)	157	93.561	9.277	95.631	8.59	2.07	<0.001*	0.232

In summary, 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. The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level ($p = 0.613$ for speed and 0.060 for accuracy).

4.3.5 Comprehension Level 2 by Gender

Table 11: OZCAAS Comprehension Level 2 results – all students by gender 2014

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	581	7.669	3.072	5.796	2.775	-1.873	<0.001*	0.64
Male COMP (speed)	151	5.877	2.434	5.051	2.234	-0.826	<0.001*	0.354
Female QS (speed)	451	7.263	2.829	5.644	2.504	-1.619	<0.001*	0.606
Female COMP (speed)	151	5.537	2.15	4.801	1.657	-0.736	<0.001*	0.383
Male QS (accuracy)	581	81.244	16.512	92.418	11.223	11.174	<0.001*	0.792
Male COMP (accuracy)	151	90.692	9.009	92.77	7.84	2.078	0.007*	0.246
Female QS (accuracy)	451	84.223	13.599	92.464	9.59	8.241	<0.001*	0.7
Female COMP (accuracy)	151	91.593	9.851	93.557	8.842	1.964	0.017	0.21

In summary, the results of *QuickSmart* students show that in both speed and accuracy the males have improved slightly more than the females. The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level for speed ($p = 0.122$). However, they are statistically significant for accuracy ($p = 0.001$).

This finding is possibly an artefact of large sample sizes, which tend to increase the power of the test to the point when even small differences become statistically significant. This was confirmed by a weak effect size (Cohen's $d = 0.230$) for gender differences in accuracy. The small effect size indicates that the statistical finding is not meaningful for practical purposes.

4.3.6 Level 3 Words by Gender

Table 12: OZCAAS Level 3 Words results – all students by gender 2014

Group	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Male QS (speed)	554	3.493	2.306	2.398	1.894	-1.095	<0.001*	0.519
Male COMP (speed)	148	2.301	1.664	1.77	1.208	-0.531	<0.001*	0.365
Female QS (speed)	423	3.672	2.471	2.503	1.775	-1.169	<0.001*	0.543
Female COMP (speed)	150	2.15	1.396	1.906	1.364	-0.244	0.022	0.177
Male QS (accuracy)	554	58.591	25.876	81.744	22.558	23.153	<0.001*	0.954
Male COMP (accuracy)	148	79.832	18.063	87.492	14.652	7.66	<0.001*	0.466
Female QS (accuracy)	423	61.158	24.012	83.564	19.209	22.406	<0.001*	1.03
Female COMP (accuracy)	150	80.235	19.029	86.561	16.661	6.326	<0.001*	0.354

In summary, 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. The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level (p = 0.636 for speed and 0.260 for accuracy).

4.3.7 Indigenous students

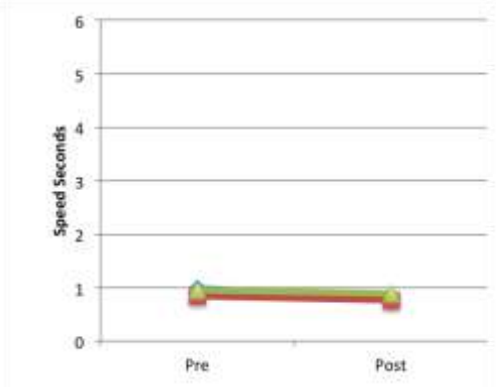
Table 13: OZCAAS results – Indigenous students 2014

Test	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Essential Words QS (speed)	127	0.959	0.486	0.887	0.986	-0.072	0.215	0.093
Essential Words QS (accuracy)	127	97.678	8.083	99.516	3.256	1.838	0.004*	0.298
Level 1 Words QS (speed)	124	1.43	1.103	1.167	1.334	-0.263	0.001*	0.215
Level 1 Words QS (accuracy)	124	92.315	12.827	97.879	5.961	5.564	<0.001*	0.556
Comprehension Level 1 QS (speed)	122	4.349	1.9	3.498	1.54	-0.851	<0.001*	0.492
Comprehension Level 1 QS (accuracy)	122	95.082	7.695	98.165	4.892	3.083	<0.001*	0.478
Level 2 Words QS (speed)	121	2.114	1.568	1.54	1.145	-0.574	<0.001*	0.418
Level 2 Words QS (accuracy)	121	82.499	19.313	94.24	10.398	11.741	<0.001*	0.757
Comprehension Level 2 QS (speed)	115	7.195	2.849	6.111	2.934	-1.083	<0.001*	0.375
Comprehension Level 2 QS (accuracy)	115	82.469	13.777	91.373	10.315	8.904	<0.001*	0.732
Level 3 Words QS (speed)	105	3.488	2.126	2.741	1.705	-0.747	<0.001*	0.388
Level 3 Words QS (accuracy)	105	62.711	25.452	79.999	21.015	17.288	<0.001*	0.741

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.

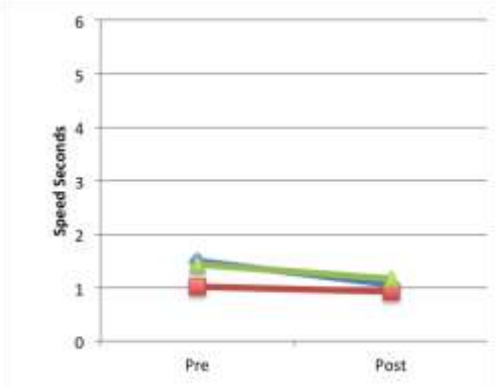
The following graphs illustrate how the Indigenous students (green) have performed in each test compared to the whole *QuickSmart* group (blue) as well as the comparison students (red).

Essential Words Speed



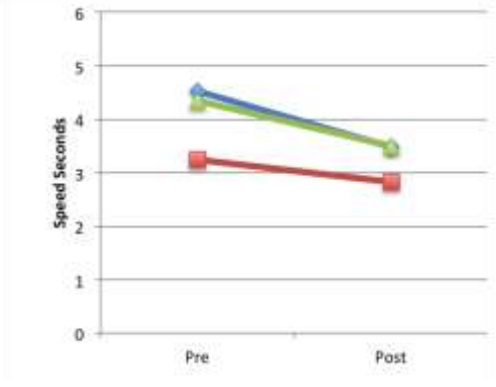
Essential Words Accuracy

Level 1 Words Speed



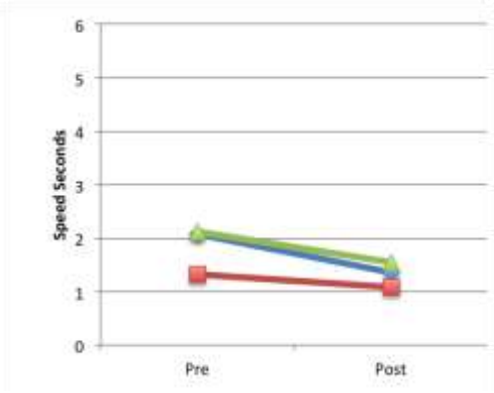
Level 1 Words Accuracy

Comprehension Level 1 Speed

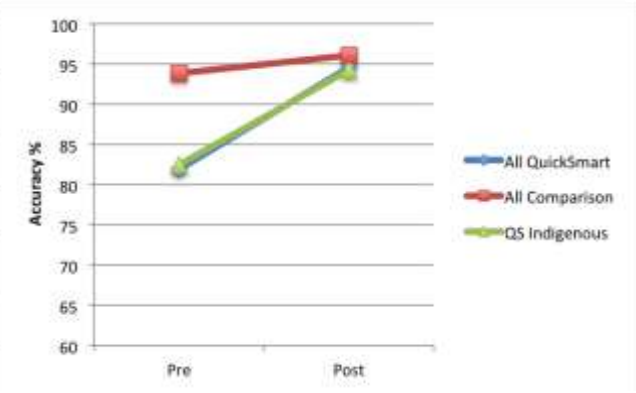


Comprehension Level 1 Accuracy

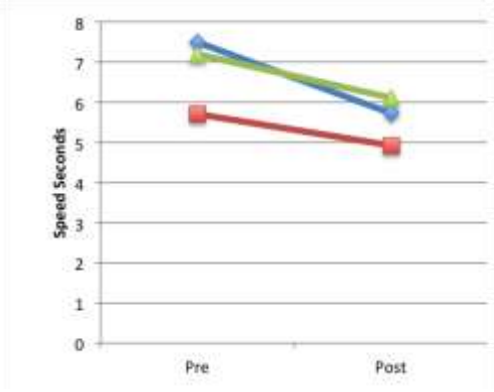
Level 2 Words Speed



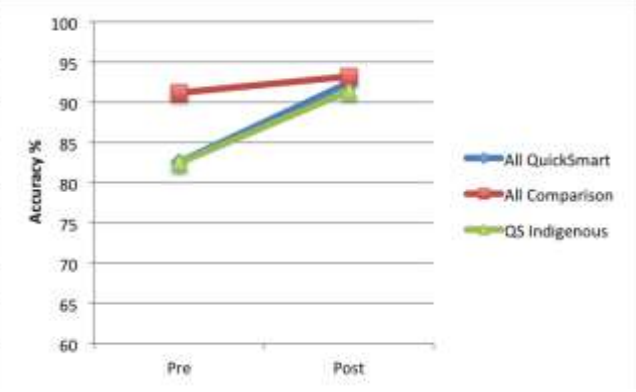
Level 2 Words Accuracy



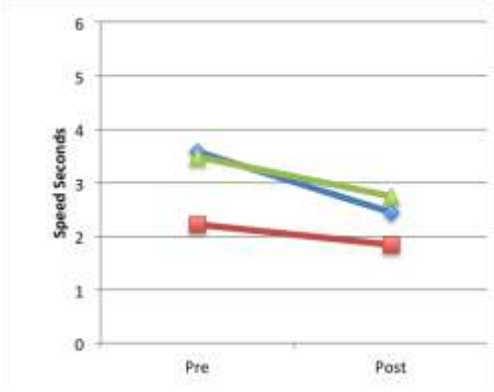
Comprehension Level 2 Speed



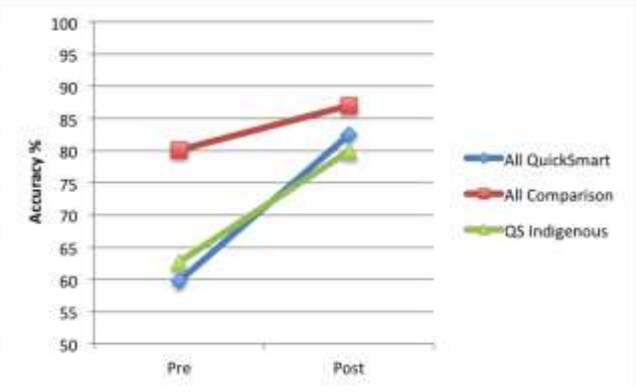
Comprehension Level 2 Accuracy



Level 3 Words Speed



Level 3 Words Accuracy



4.4 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 were available – 2014

	N	Mean	Std. Deviation
Essential Words QS (speed)	8	0.848	0.394
Essential Words QS (accuracy)	8	99.38	1.768
Level 1 Words QS (speed)	15	1.803	1.733
Level 1 Words QS (accuracy)	15	91.573	18.099
Comprehension Level 1 QS (speed)	22	3.841	2.832
Comprehension Level 1 QS (accuracy)	22	94.082	9.004
Level 2 Words QS (speed)	38	3.187	3.009
Level 2 Words QS (accuracy)	38	70.061	23.426
Comprehension Level 2 QS (speed)	62	6.955	3.289
Comprehension Level 2 QS (accuracy)	62	81.392	17.082
Level 3 Words QS (speed)	117	3.701	2.556
Level 3 Words QS (accuracy)	117	60.213	27.83

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 two seconds, with accuracy results above 90%. In Level 2 Words, the average response rates were below 3.2 seconds, with average accuracy above 70%.

In Comprehension Level 1, the average response rates were within the goal range, with average accuracy above 94%. 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 3.8 seconds and accuracy over 60% at post-test. It is likely that part of this improvement may be due to the fact that students':

- increased their ability to benefit from classroom instruction; and
- improved their levels of confidence may have led to a 'have a go attitude' that was not present at the beginning of the *QuickSmart* program.

4.5 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 and comparable to that of the overall *QuickSmart* group.

5 Independent Assessments

5.1 Why they 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.

5.2 Results on the PAT-V and PAT-C 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-V and PAT-C results – (Scale scores) 2014

Group	Students with paired data	Average Gain score	Significance	Effect size
All *QuickSmart* Vocabulary	805	6.212	<0.001*	0.595
All Comparison Vocabulary	223	3.389	<0.001*	0.337
All *QuickSmart* Comprehension	977	6.179	<0.001*	0.642
All Comparison Comprehension	271	5.09	<0.001*	0.51

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-V and PAT-C results – by Gender (Scale scores) 2014

Gender	Students with paired data	Average Gain score	Significance	Effect size
Vocabulary – QS Male	443	6.707	<0.001*	0.616
Vocabulary – Comp Male	110	2.617	<0.001*	0.236
Vocabulary – QS Female	362	5.607	<0.001*	0.568
Vocabulary – Comp Female	113	4.142	<0.001*	0.468
Comprehension – QS Male	547	6.173	<0.001*	0.618
Comprehension – Comp Male	133	4.869	<0.001*	0.48
Comprehension – QS Female	430	6.183	<0.001*	0.683
Comprehension – Comp Female	138	5.302	<0.001*	0.539

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 marginally more in comprehension. The Independent samples t-tests showed that these differences are not statistically significant at the 0.01 significance level (p = 0.118 for vocabulary and 0.886 for 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-V and PAT-C results – Indigenous (Scale scores) 2014

Group	Students with paired data	Average Gain score	Significance	Effect size
Indigenous QS Vocabulary	93	7.238	<0.001*	0.686
All Comparison Vocabulary	223	3.389	<0.001*	0.337
Indigenous QS Comprehension	110	4.118	<0.001*	0.406
All Comparison Comprehension	271	5.09	<0.001*	0.51

These results show strong vocabulary 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' Comprehension results also show a strong improvement, although not as strong as that shown by the rest of the *QuickSmart* group.

The following figure shows that the *QuickSmart* students consistently achieve the gains in PAT across the middle school grades targeted by the program, that is Grade 5 through to Grade 8. The tables of figures for these graphs are available in the Appendices.

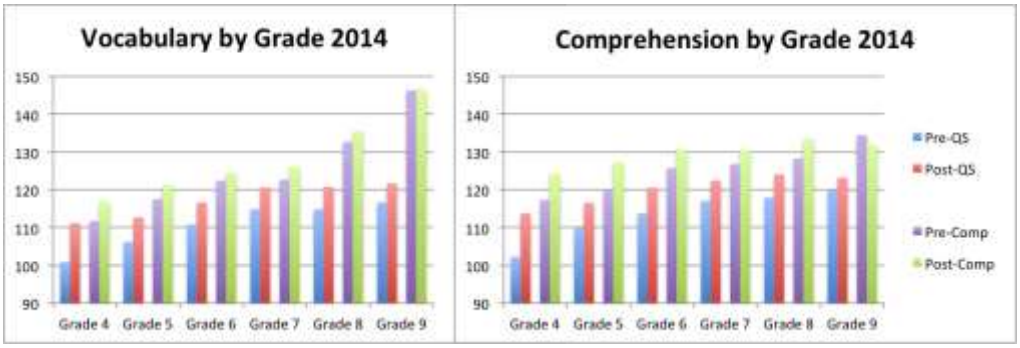


Figure 2: PAT-V and PAT-C by Grade

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* Vocabulary**	629	805	78.137
Comparison Vocabulary	152	223	68.161
***QuickSmart* Comprehension**	735	977	75.23
Comparison Comprehension	192	271	70.849

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.

6 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

7 APPENDIX A: Independent Assessment Results

7.1 PAT results by Region – (Scale scores) 2014

Cluster of Schools		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
Adelaide Vocabulary – QS Group	70	108.576	9.922	113.774	10.571	5.198	<0.001*	0.507
Adelaide Comprehension – QS Group	101	112.608	7.936	117.122	10.545	4.514	<0.001*	0.484
Ballarat Vocabulary – QS Group	<10	116.722	8.447	117.133	11.77	0.411	0.798	n/a
Ballarat Comprehension – QS Group	<10	119.02	10.033	119.02	10.033	0.0		n/a
Horsham Vocabulary – QS Group	55	116.133	6.704	120.813	6.961	4.68	<0.001*	0.685
Horsham Comprehension – QS Group	75	119.14	7.477	124.563	7.367	5.423	<0.001*	0.731
Hunter Vocabulary – QS Group	67	116.876	9.317	127.016	10.937	10.14	<0.001*	0.998
Hunter Comprehension – QS Group	67	118.169	10.243	128.572	8.346	10.403	<0.001*	1.113
Melbourne Vocabulary – QS Group	99	112.327	10.295	118.665	9.816	6.338	<0.001*	0.63
Melbourne Comprehension – QS Group	107	114.036	9.516	121.028	10.111	6.992	<0.001*	0.712
North Coast NSW Vocabulary – QS Group	201	110.326	11.126	117.667	10.25	7.341	<0.001*	0.686
North Coast NSW Comprehension – QS Group	232	113.45	10.029	120.111	9.827	6.661	<0.001*	0.671
North West NSW Vocabulary – QS Group	68	107.104	9.729	113.672	9.338	6.568	<0.001*	0.689
North West NSW Comprehension – QS Group	67	112.019	8.855	117.554	10.61	5.535	<0.001*	0.566
Queensland Vocabulary – QS Group	11	118.027	5.582	124.936	5.904	6.909	0.002*	1.203
Queensland Comprehension – QS Group	46	120.08	7.053	125.848	7.373	5.768	<0.001*	0.799
Riverina Vocabulary – QS Group	37	111.586	10.363	117.554	11.533	5.968	<0.001*	0.544
Riverina Comprehension – QS Group	50	116.314	8.682	121.57	10.997	5.256	<0.001*	0.531
South Sydney Vocabulary – QS Group	33	112.682	6.684	115.785	7.282	3.103	0.005*	0.444
South Sydney Comprehension – QS Group	58	116.69	5.699	121.576	7.757	4.886	<0.001*	0.718
Sydney Vocabulary – QS Group	65	115.623	8.283	120.063	9.994	4.44	<0.001*	0.484
Sydney Comprehension – QS Group	83	117.124	9.091	123.183	9.539	6.059	<0.001*	0.65
Tasmania Vocabulary – QS Group	26	103.104	7.836	110.827	6.003	7.723	<0.001*	1.107
Tasmania Comprehension – QS Group	26	107.273	8.639	115.762	8.893	8.489	<0.001*	0.968
Western NSW Vocabulary – QS Group	64	112.559	11.106	116.598	12.039	4.039	<0.001*	0.349
Western NSW Comprehension – QS Group	60	116.127	8.879	120.733	9.456	4.606	<0.001*	0.502

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

7.2 PAT results – by demographic (Scale scores) 2014

Demographic		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
All Schools Vocabulary – QS Group	**805**	**111.793**	**10.305**	**118.005**	**10.569**	**6.212**	**<0.001***	**0.595**
All Schools Vocabulary – Comp Group	**223**	**122.029**	**10.484**	**125.418**	**9.612**	**3.389**	**<0.001***	**0.337**
All Schools Comprehension – QS Group	**977**	**115.08**	**9.286**	**121.259**	**9.954**	**6.179**	**<0.001***	**0.642**
All Schools Comprehension – Comp Group	**271**	**124.809**	**9.756**	**129.899**	**10.206**	**5.09**	**<0.001***	**0.51**
Vocabulary – QS Indigenous	93	107.971	9.709	115.209	11.331	7.238	<0.001*	0.686
Comprehension – QS Indigenous	110	114.087	9.3	118.205	10.914	4.118	<0.001*	0.406
Vocabulary – QS Male	443	111.713	10.749	118.420	11.013	6.707	<0.001*	0.616
Vocabulary – Comp Male	110	123.56	11.635	126.177	10.469	2.617	<0.001*	0.236
Vocabulary – QS Female	362	111.891	9.748	117.498	9.99	5.607	<0.001*	0.568
Vocabulary – Comp Female	113	120.538	9.031	124.68	8.681	4.142	<0.001*	0.468
Comprehension – QS Male	547	114.251	9.629	120.424	10.326	6.173	<0.001*	0.618
Comprehension – Comp Male	133	124.418	9.715	129.287	10.572	4.869	<0.001*	0.48
Comprehension – QS Female	430	116.137	8.727	122.32	9.365	6.183	<0.001*	0.683
Comprehension – Comp Female	138	125.186	9.816	130.488	9.843	5.302	<0.001*	0.539

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

7.3 PAT results – by State (Scale scores) 2014

Demographic		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
NSW Vocabulary – QS Group	535	111.88	10.507	118.37	10.948	6.49	<0.001*	0.605
NSW Vocabulary – Comp Group	121	122.529	9.604	125.819	8.106	3.29	<0.001*	0.37
NSW Comprehension – QS Group	617	115.098	9.434	121.482	9.995	6.384	<0.001*	0.657
NSW Comprehension – Comp Group	142	126.198	9.05	131.586	9.899	5.388	<0.001*	0.568
Qld Vocabulary – QS Group	11	118.027	5.582	124.936	5.904	6.909	0.002*	1.203
Qld Vocabulary – Comp Group	0							
Qld Comprehension – QS Group	46	120.08	7.053	125.848	7.373	5.768	<0.001*	0.799
Qld Comprehension – Comp Group	9	122.367	9.806	125.778	7.576	3.411	0.246	0.389
SA Vocabulary – QS Group	70	108.576	9.922	113.774	10.571	5.198	<0.001*	0.507
SA Vocabulary – Comp Group	32	118.65	8.723	122.203	7.92	3.553	0.003*	0.426
SA Comprehension – QS Group	101	112.608	7.936	117.122	10.545	4.514	<0.001*	0.484
SA Comprehension – Comp Group	49	121.151	11.168	124.133	8.831	2.982	0.023	0.296
Tas Vocabulary – QS Group	26	103.104	7.836	110.827	6.003	7.723	<0.001*	1.107
Tas Vocabulary – Comp Group	8	115.275	6.813	121.938	5.574	6.663	0.008*	1.07
Tas Comprehension – QS Group	26	107.273	8.639	115.762	8.893	8.489	<0.001*	0.968
Tas Comprehension – Comp Group	8	120.775	9.235	129.138	9.485	8.363	0.02	0.893
Vic Vocabulary – QS Group	163	113.854	9.288	119.305	9.086	5.451	<0.001*	0.593
Vic Vocabulary – Comp Group	62	123.668	12.625	126.745	12.744	3.077	<0.001*	0.243
Vic Comprehension – QS Group	187	116.216	9.078	122.392	9.236	6.176	<0.001*	0.674
Vic Comprehension – Comp Group	63	125.386	9.556	131.267	10.751	5.881	<0.001*	0.578

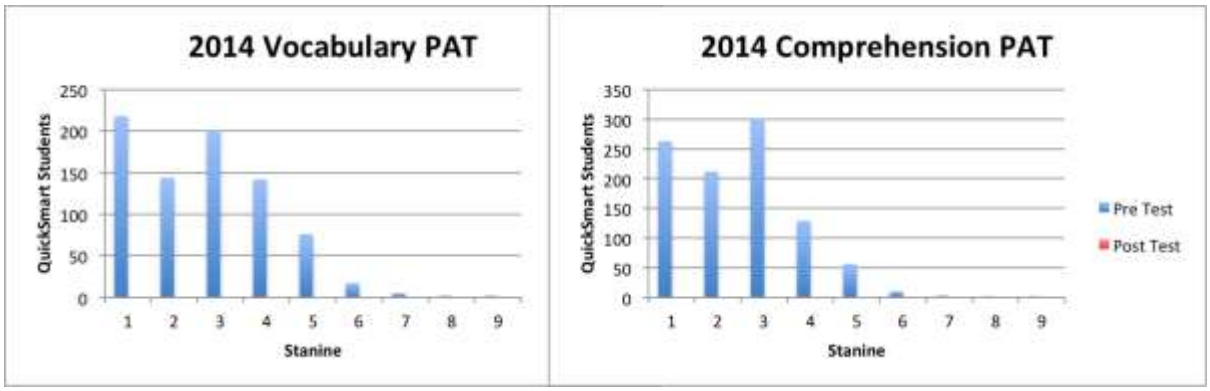
Note: only students who did both 'pre' and 'post' test are included in the table.

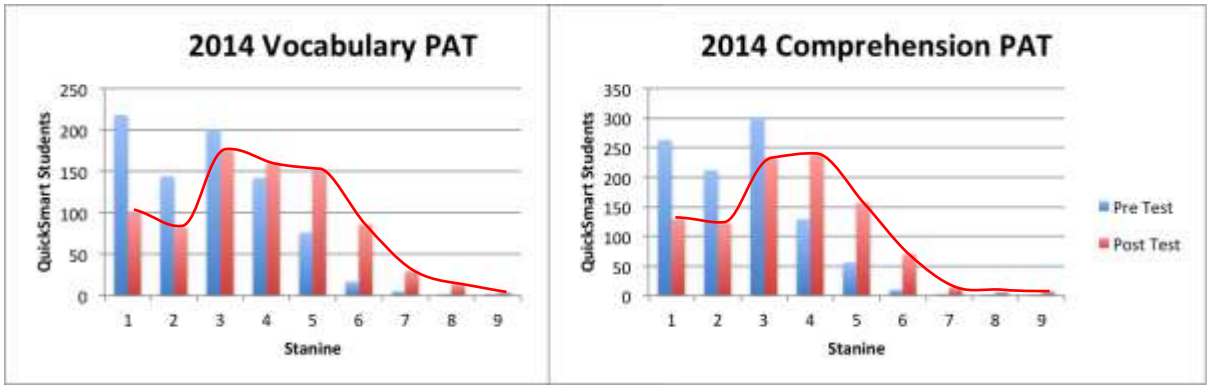
7.4 PAT results – by Grade (Scale scores) 2014

Grade		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
Grade 4 Vocabulary – QS Group	53	100.934	8.039	111.242	7.381	10.308	<0.001*	1.336
Grade 4 Vocabulary – Comp Group	25	111.752	7.51	116.9	6.237	5.148	<0.001*	0.746
Grade 4 Comprehension – QS Group	53	102.311	10.415	113.783	10.382	11.472	<0.001*	1.103
Grade 4 Comprehension – Comp Group	24	117.392	8.841	124.337	8.169	6.945	<0.001*	0.816
Grade 5 Vocabulary – QS Group	154	106.231	10.347	112.71	10.094	6.479	<0.001*	0.634
Grade 5 Vocabulary – Comp Group	46	117.591	7.635	121.337	6.651	3.746	<0.001*	0.523
Grade 5 Comprehension – QS Group	159	109.883	8.875	116.565	10.309	6.682	<0.001*	0.695
Grade 5 Comprehension – Comp Group	50	119.956	9.791	127.344	9.433	7.388	<0.001*	0.769
Grade 6 Vocabulary – QS Group	119	110.827	9.499	116.639	9.654	5.812	<0.001*	0.607
Grade 6 Vocabulary – Comp Group	46	122.443	7.774	124.637	6.889	2.194	0.022	0.299
Grade 6 Comprehension – QS Group	128	113.764	8.513	120.552	10.42	6.788	<0.001*	0.713
Grade 6 Comprehension – Comp Group	52	125.746	8.879	130.871	10.405	5.125	<0.001*	0.53
Grade 7 Vocabulary – QS Group	258	114.901	8.99	120.605	9.998	5.704	<0.001*	0.6
Grade 7 Vocabulary – Comp Group	73	122.667	8.093	126.177	8.6	3.51	<0.001*	0.42
Grade 7 Comprehension – QS Group	327	117.095	7.952	122.463	8.867	5.368	<0.001*	0.637
Grade 7 Comprehension – Comp Group	98	126.821	8.326	130.529	9.945	3.708	<0.001*	0.404
Grade 8 Vocabulary – QS Group	175	114.855	9.151	120.807	9.888	5.952	<0.001*	0.625
Grade 8 Vocabulary – Comp Group	23	132.665	8.298	135.557	6.303	2.892	0.021	0.392
Grade 8 Comprehension – QS Group	252	117.922	7.527	124.109	9.251	6.187	<0.001*	0.734
Grade 8 Comprehension – Comp Group	40	128.338	9.998	133.563	11.038	5.225	0.001*	0.496
Grade 9 Vocabulary – QS Group	41	116.7	7.915	121.69	12.069	4.99	0.001*	0.489
Grade 9 Vocabulary – Comp Group	6	146.3	14.464	146.717	14.086	0.417	0.776	0.029
Grade 9 Comprehension – QS Group	52	119.835	7.921	123.183	8.479	3.348	<0.001*	0.408
Grade 9 Comprehension – Comp Group	3	134.5	4.912	132.033	7.834	-2.467	0.496	no improvement

Note: Grades 3 and 10 had less than 5 students and were excluded from the analysis.

7.5 National Literacy PAT Improvement of QuickSmart Students for 2014





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 below the bottom 4% of the population,
- 2 represents performance in the lower 4-10% of the population
- 3 represents performance in the lower 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 above 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.

8 APPENDIX B: *QuickSmart* sessions

8.1 Attendance summary

QS Students	N (students)	N (schools)	Mean Sessions Offered	Mean Sessions Attended	% Mean Attended	Weeks completed	% Program completed
All QS	**747**	**53**	**66.286**	**52.186**	**78.302**	**17.395**	**57.985**
Male	430	53	66.898	53.081	78.951	17.694	58.979
Female	317	50	65.457	50.972	77.423	16.991	56.635
Indigenous	87	27	64.103	47.529	73.045	15.843	52.81
Grade 4	50	10	75.6	62.98	83.576	20.993	69.978
Grade 5	127	22	75.063	63.559	84.892	21.186	70.621
Grade 6	126	24	70.23	57.643	83.741	19.214	64.048
Grade 7	209	24	62.048	48.689	77.99	16.23	54.099
Grade 8	198	24	63.571	46.076	72.161	15.359	51.195
Grade 9	34	6	47.618	32.265	65.325	10.755	35.85
> Grade 9	3	1	60.0	34.333	57.222	11.444	38.148

Note: only students and schools for whom attendance data were provided are included in the table (about 61% 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.