quicksmart

Annual Literacy Program Report

2017

The SiMERR National Research Centre
The University of New England
ARMIDALE NSW

SiMERR

une University of New England

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1 *QuickSmart* Executive Summary in 2017

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 replicability (including quality assurance) across all regions of Australia.

The analyses presented in this report provide information about students' performance in the QuickSmart Literacy 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 participating Indigenous students.

In 2017, the *QuickSmart* team at the University of New England received matched data from 1,275 students who participated in *QuickSmart* Literacy lessons and 319 average-achieving comparison peers. These students were drawn from schools from 20 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 reaction time (speed) 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 response time. The diagrammatic evidence illustrates that the *QuickSmart* students narrowed the achievement gap between them and their average-achieving 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. Males performed slightly better than females and some of these results are statistically significant. However, the small effect sizes indicate that these statistical findings are not meaningful for practical purposes.

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 1.2 seconds, with accuracy results above 98%. In Level 2 Words, the average response rates were below 2.5 seconds, with average accuracy above 78%.

In Sentence Understanding Level 1, the average response rates were below 5.3 seconds, 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 times below 3.6 seconds and accuracy over 68% 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 which 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 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.

In terms of Scale scores derived from the PAT-V and PAT-C tests, the results indicate that female *QuickSmart* students improved slightly more in vocabulary compared to male *QuickSmart* students, and male students improved more in comprehension The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level ($p = 0.717$ for vocabulary and 0.196 for comprehension).

In the case of Indigenous students who participated in *QuickSmart*, the results show strong improvement in both vocabulary and comprehension. These students were able to report a rate of growth close to that of the total cohort of *QuickSmart* students and in excess of that achieved by the comparison 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 literacy. 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 many 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 continuous development and improvement since 2001, based on the results of many tens of thousands of students.

The intervention is called *QuickSmart* to encourage students to become *quick* in their response time 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.

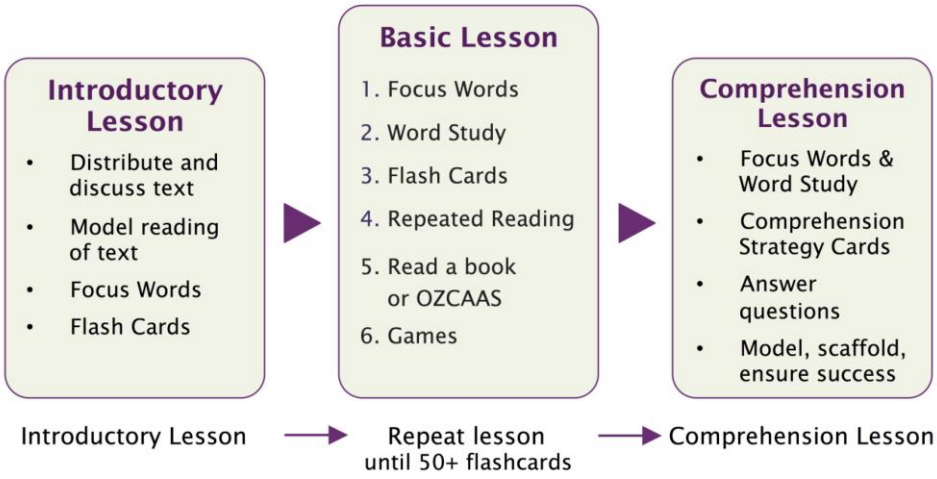


Figure 1: *QuickSmart* Literacy lesson structures

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 – 2017

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 set of analyses examine data from response time and accuracy OZCAAS measures. These are related to vocabulary and comprehension and are 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' response time and accuracy both before *QuickSmart* began and at the end of the program. There were four vocabulary tests and two sentence comprehension tests. The levels of comprehension tests are not linked to the levels for Vocabulary tests.

The vocabulary tests were:

1. Essential Words;
2. Level 1 Words;
3. Level 2 Words; and
4. Level 3 Words.

The comprehension tests were:

1. Sentence Understanding Level 1; and
2. Sentence Understanding Level 2.

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, 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 a 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 2017, the *QuickSmart* team at the University of New England received data from 1,275 students who participated in *QuickSmart* Literacy lessons and 319 'average-achieving' comparison peers. These students were drawn from schools from 20 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 Sentence Understanding 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.

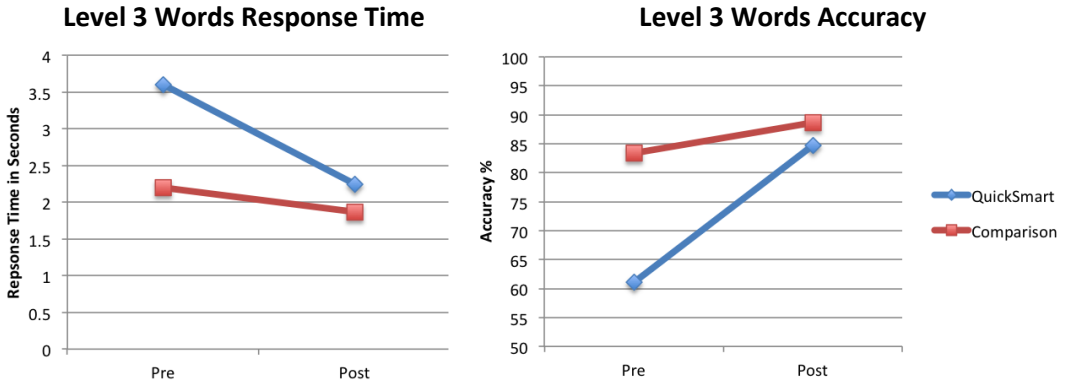
4.2 Combined OZCAAS Analysis

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 2017

Level 3 Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	1099	3.598	2.427	2.251	1.755	-1.347	<0.001*	0.636
Res Time (secs) Comp	279	2.198	1.389	1.87	1.203	-0.328	<0.001*	0.252
Accuracy (%) QS	1099	61.084	24.527	84.755	20.299	23.671	<0.001*	1.051
Accuracy (%) Comp	279	83.371	16.198	88.665	13.882	5.294	<0.001*	0.351



On the Level 3 Words test, there were paired data for 1,099 *QuickSmart* students and 279 comparison students. The desired criterion for response time 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 1.347 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 0.636, which indicates very 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 two-to-three years' growth.

In terms of accuracy, the *QuickSmart* students' average scores have improved by over 23 percentage points, which is a very strong result. The effect size of 1.051, 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 response time 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.

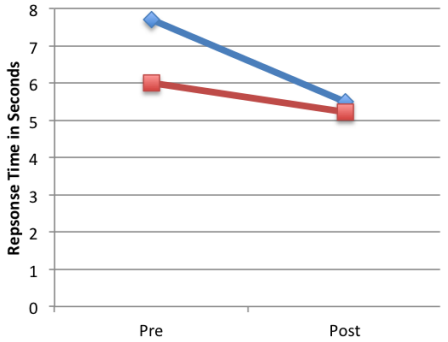
4.2.2 Sentence Understanding Level 2

Table 2 summarises the data submitted for OZCAAS for Sentence Understanding Level 2.

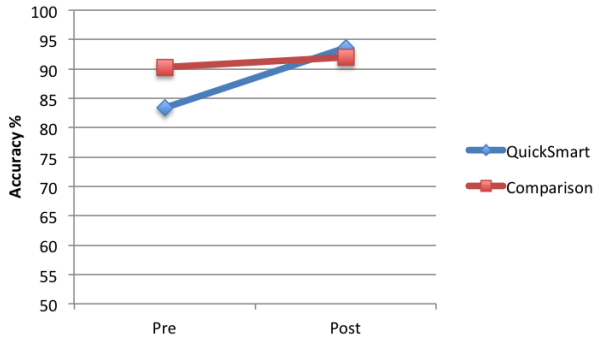
Table 2: OZCAAS Sentence Understanding Level 2 – all students 2017

Sentence Understanding Level 2	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	1095	7.721	3.054	5.503	2.571	-2.218	<0.001*	0.786
Res Time (secs) Comp	279	6.005	2.209	5.227	2.018	-0.778	<0.001*	0.368
Accuracy (%) QS	1095	83.389	13.463	93.554	9.697	10.165	<0.001*	0.866
Accuracy (%) Comp	279	90.31	9.414	92.011	9.283	1.701	0.009*	0.182

Sentence Understanding Level 2 Response Time



Sentence Understanding Level 2 Accuracy



On the Sentence Understanding Level 2 test, there were paired data for 1,095 *QuickSmart* students and 279 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 time 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 2.217 seconds, which is a strong result. The effect size for this result is 0.786, which indicates very strong improvement.

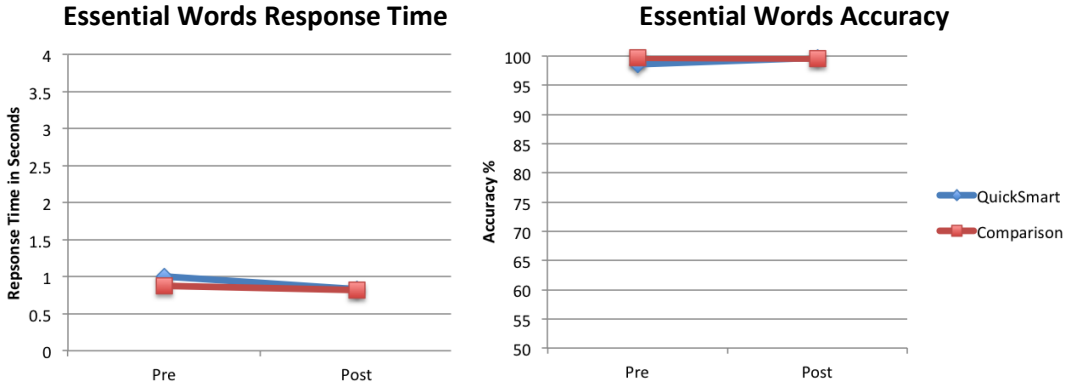
In terms of accuracy, the *QuickSmart* students' average scores have improved by more than 10 percentage points, which is a strong result. The effect size is 0.866, which indicates substantial improvement for the *QuickSmart* group.

In summary, Table 2 shows that when compared to the scores of the comparison students, *QuickSmart* students' scores indicate greater improvement in terms of response time 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 response time. 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 2017

Essential Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	p	Effect size
Res Time (secs) QS	1182	1.004	0.423	0.832	0.403	-0.172	<0.001*	0.415
Res Time (secs) Comp	268	0.876	0.277	0.82	0.24	-0.056	<0.001*	0.215
Accuracy (%) QS	1182	98.598	3.97	99.674	1.983	1.076	<0.001*	0.343
Accuracy (%) Comp	268	99.666	1.508	99.568	1.643	-0.098		no improvement

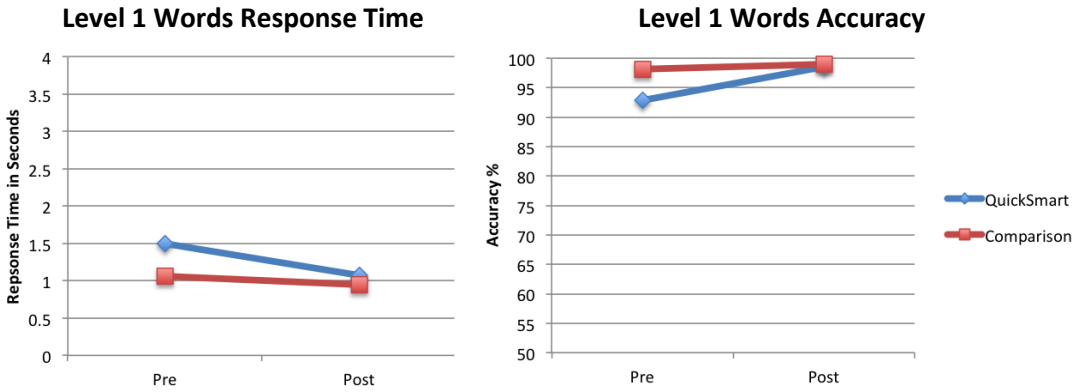


In summary, the results for Essential Words, the most commonly used words that should be known by middle school students, indicate a stronger improvement for the *QuickSmart* students than for the comparison students. However, both the response time and accuracy results show a strong ceiling effect as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

4.2.4 Level 1 Words

Table 4: OZCAAS Level 1 Words – all students 2017

Level 1 Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	1215	1.501	0.968	1.068	0.547	-0.433	<0.001*	0.551
Res Time (secs) Comp	287	1.066	0.444	0.948	0.322	-0.118	<0.001*	0.304
Accuracy (%) QS	1215	92.865	11.648	98.57	5.254	5.705	<0.001*	0.631
Accuracy (%) Comp	287	98.162	4.728	98.999	3.729	0.837	<0.001*	0.197

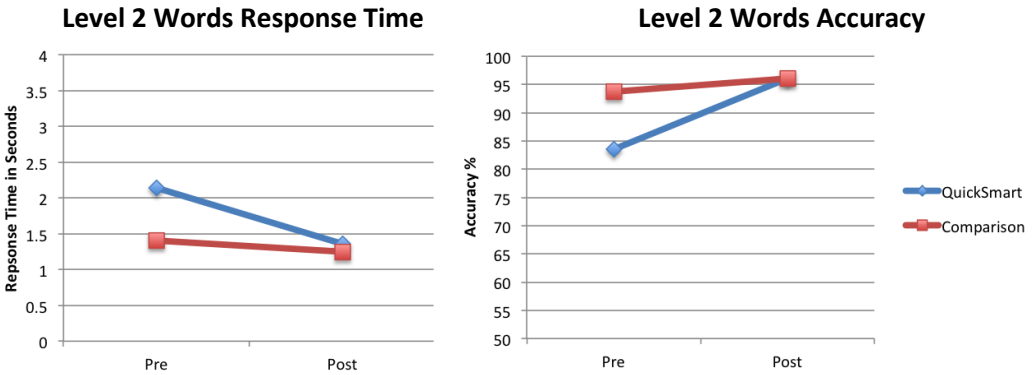


In summary, the results for Level 1 Words indicate a strong improvement for the *QuickSmart* students. The diagrams illustrate that as a result of the *QuickSmart* intervention, the *QuickSmart* students narrowed the gap to the comparison students in response time. In accuracy, they improved to such an extent that there was no substantial difference between them and the comparison students. However, both response time and accuracy results show a strong ceiling effect.

4.2.5 Level 2 Words

Table 5: OZCAAS Level 2 Words – all students 2017

Level 2 Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	1182	2.148	1.512	1.358	0.905	-0.79	<0.001*	0.634
Res Time (secs) Comp	289	1.411	0.877	1.25	0.769	-0.161	<0.001*	0.195
Accuracy (%) QS	1182	83.552	16.649	96.103	8.961	12.551	<0.001*	0.939
Accuracy (%) Comp	289	93.732	10.155	96.115	7.927	2.383	<0.001*	0.262



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

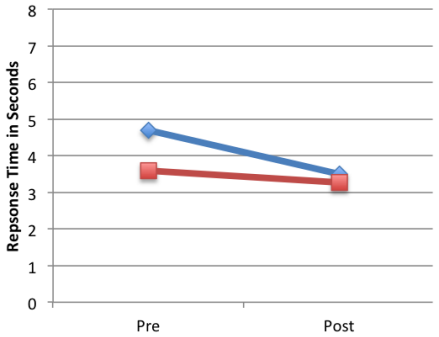
students in response time. In accuracy, they improved to such an extent that there was no substantial difference between them and the comparison students.

4.2.6 Sentence Understanding Level 1

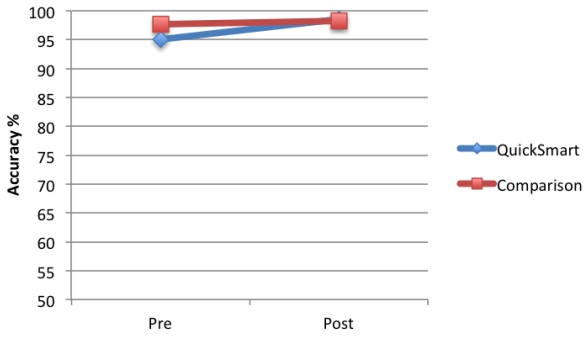
Table 6: OZCAAS Sentence Understanding Level 1 – all students 2017

Sentence Understanding Level 1	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	1157	4.689	2.045	3.495	1.565	-1.194	<0.001*	0.656
Res Time (secs) Comp	286	3.592	1.284	3.262	1.246	-0.33	<0.001*	0.261
Accuracy (%) QS	1157	95.03	8.13	98.51	4.757	3.48	<0.001*	0.522
Accuracy (%) Comp	286	97.659	5.564	98.307	4.465	0.648	0.067	0.128

Sentence Understanding Level 1 Response Time



Sentence Understanding Level 1 Accuracy



In summary, the results for Sentence Understanding 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 response time. In accuracy, they improved to such an extent that there was no substantial difference between them and the comparison students. The accuracy results show a strong ceiling effect.

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 2017

Essential Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)								
Male *QuickSmart*	689	1.018	0.441	0.854	0.484	-0.164	<0.001*	0.354
Male Comparison	140	0.907	0.316	0.84	0.257	-0.067	0.010	0.233
Female *QuickSmart*	493	0.983	0.397	0.801	0.248	-0.182	<0.001*	0.550
Female Comparison	128	0.842	0.222	0.799	0.22	-0.043	0.014	0.195
Accuracy (%)								
Male *QuickSmart*	689	98.386	4.298	99.596	2.247	1.21	<0.001*	0.353
Male Comparison	140	99.586	1.794	99.436	1.957	-0.15		No improvement
Female *QuickSmart*	493	98.893	3.441	99.783	1.534	0.89	<0.001*	0.334
Female Comparison	128	99.754	1.114	99.712	1.201	-0.042		No improvement

In summary, the results of *QuickSmart* students show that in response time the females have improved slightly more than the males. In 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.

4.3.2 Level 1 Words by Gender

Table 8: OZCAAS Level 1 Words results – all students by gender 2017

Level 1 Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)								
Male *QuickSmart*	703	1.503	0.952	1.098	0.597	-0.405	<0.001*	0.51
Male Comparison	153	1.088	0.484	0.964	0.34	-0.124	<0.001*	0.296
Female *QuickSmart*	512	1.497	0.99	1.026	0.468	-0.471	<0.001*	0.608
Female Comparison	134	1.042	0.394	0.929	0.301	-0.113	<0.001*	0.322
Accuracy (%)								
Male *QuickSmart*	703	92.529	11.592	98.471	5.534	5.942	<0.001*	0.654
Male Comparison	153	97.98	5.386	98.707	4.627	0.727	0.012	0.145
Female *QuickSmart*	512	93.326	11.718	98.705	4.844	5.379	<0.001*	0.6
Female Comparison	134	98.369	3.853	99.332	2.286	0.963	<0.001*	0.304

In summary, the results of *QuickSmart* students show that in response time the females have improved slightly more than the males. In 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.

4.3.3 Level 2 Words by Gender

Table 9: OZCAAS Level 2 Words results – all students by gender 2017

Level 2 Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)								
Male *QuickSmart*	690	2.169	1.531	1.381	0.917	-0.788	<0.001*	0.624
Male Comparison	156	1.434	0.992	1.254	0.744	-0.18	<0.001*	0.205
Female *QuickSmart*	492	2.118	1.484	1.326	0.888	-0.792	<0.001*	0.648
Female Comparison	133	1.383	0.722	1.245	0.8	-0.138	0.040	0.181
Accuracy (%)								
Male *QuickSmart*	690	82.785	16.85	96.146	8.866	13.361	<0.001*	0.992
Male Comparison	156	93.439	11.369	95.938	6.749	2.499	0.001	0.267
Female *QuickSmart*	492	84.628	16.318	96.043	9.102	11.415	<0.001*	0.864
Female Comparison	133	94.075	8.544	96.323	9.139	2.248	0.013	0.254

In summary, the results of *QuickSmart* students show that in response time the females have improved slightly more than the males. In 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 ($p = 0.171$ for response time and 0.490 for accuracy).

4.3.4 Level 3 Words by Gender

Table 10: OZCAAS Level 3 Words results – all students by gender 2017

Level 3 Words	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)								
Male *QuickSmart*	634	3.481	2.352	2.287	1.894	-1.194	<0.001*	0.559
Male Comparison	149	2.074	1.205	1.938	1.333	-0.136	0.164	0.107
Female *QuickSmart*	465	3.758	2.519	2.201	1.546	-1.557	<0.001*	0.745
Female Comparison	130	2.34	1.566	1.793	1.033	-0.547	<0.001*	0.412
Accuracy (%)								
Male *QuickSmart*	634	61.237	25.281	84.289	20.944	23.052	<0.001*	0.993
Male Comparison	149	84.13	16.392	88.137	14.029	4.007	<0.001*	0.263
Female *QuickSmart*	465	60.876	23.485	85.39	19.39	24.514	<0.001*	1.138
Female Comparison	130	82.5	15.992	89.27	13.741	6.77	<0.001*	0.454

In summary, the results of *QuickSmart* students show that in response time the males have improved slightly more than the females. In accuracy the females have improved more than the males. The results of independent sample *t*-tests of *QuickSmart* students show that in accuracy the differences are not statistically significant at the 0.01 significance level ($p = 0.219$) but they are significant in response time ($p = 0.007$). However, the small effect size for response time (Cohen's $d = 0.169$) indicates that this statistical finding is not meaningful for practical purposes.

4.3.5 Sentence Understanding Level 1 by Gender

Table 11: OZCAAS Sentence Understanding Level 1 results – all students by gender 2017

Sentence Understanding Level 1	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)								
Male *QuickSmart*	673	4.784	2.033	3.562	1.689	-1.222	<0.001*	0.654
Male Comparison	152	3.725	1.455	3.375	1.207	-0.35	<0.001*	0.262
Female *QuickSmart*	484	4.557	2.056	3.401	1.372	-1.156	<0.001*	0.661
Female Comparison	134	3.441	1.041	3.134	1.281	-0.307	0.001	0.263
Accuracy (%)								
Male *QuickSmart*	673	94.424	8.389	98.325	5.357	3.901	<0.001*	0.554
Male Comparison	152	96.974	6.798	98.03	4.27	1.056	0.042	0.186
Female *QuickSmart*	484	95.873	7.685	98.768	3.756	2.895	<0.001*	0.479
Female Comparison	134	98.437	3.568	98.622	4.672	0.185	0.695	0.045

In summary, the results of *QuickSmart* students show that in both response time 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 (p = 0.521 for response time and 0.028 for accuracy). The accuracy result are statistically significant at the 0.05 significance level. However, the small effect size for accuracy (Cohen's d = 0.130) indicates that this statistical finding is not meaningful for practical purposes.

4.3.6 Sentence Understanding Level 2 by Gender

Table 12: OZCAAS Sentence Understanding Level 2 results – all students by gender 2017

Sentence Understanding Level 2	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)								
Male *QuickSmart*	637	7.86	3.263	5.608	2.736	-2.252	<0.001*	0.748
Male Comparison	149	6.052	2.248	5.34	2.165	-0.712	<0.001*	0.323
Female *QuickSmart*	458	7.527	2.73	5.358	2.317	-2.169	<0.001*	0.857
Female Comparison	130	5.951	2.17	5.097	1.836	-0.854	<0.001*	0.425
Accuracy (%)								
Male *QuickSmart*	637	82.892	13.618	93.032	9.921	10.14	<0.001*	0.851
Male Comparison	149	89.702	9.973	91.593	10.046	1.891	0.041	0.189
Female *QuickSmart*	458	84.082	13.229	94.279	9.34	10.197	<0.001*	0.891
Female Comparison	130	91.007	8.716	92.489	8.337	1.482	0.108	0.174

In summary, the results of *QuickSmart* students show that in response time the males have improved slightly more than the females. In accuracy the females have improved slightly more than the males. The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level (p = 0.649 for response time and 0.942 for accuracy).

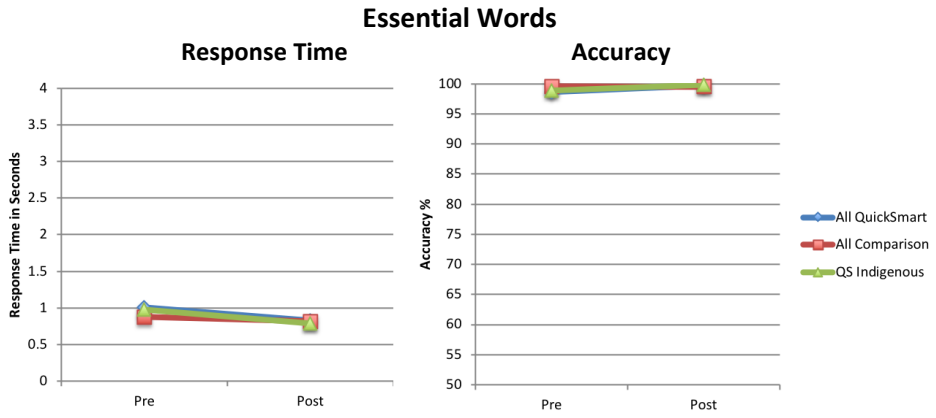
4.3.7 Indigenous Students

Table 13: OZCAAS results – Indigenous *QuickSmart* students 2017

Test	N	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Essential Words								
Response time (seconds)	87	0.982	0.391	0.785	0.424	-0.197	<0.001*	0.483
Accuracy (%)	87	98.861	3.023	99.818	1.255	0.957	0.009	0.413
Level 1 Words								
Response time (seconds)	88	1.469	0.91	1.084	0.877	-0.385	0.002	0.431
Accuracy (%)	88	93.432	12.919	99.519	2.062	6.087	<0.001*	0.658
Level 2 Words								
Response time (seconds)	86	2.2	1.633	1.379	0.878	-0.821	<0.001*	0.626
Accuracy (%)	86	83.994	16.032	95.697	8.459	11.703	<0.001*	0.913
Level 3 Words								
Response time (seconds)	79	3.516	2.065	2.284	1.522	-1.232	<0.001*	0.679
Accuracy (%)	79	66.177	27.07	87.087	18.684	20.91	<0.001*	0.899
Sentence Understanding Level 1								
Response time (seconds)	86	4.732	2.26	3.306	1.343	-1.426	<0.001*	0.767
Accuracy (%)	86	94.953	7.356	98.73	4.086	3.777	<0.001*	0.635
Sentence Understanding Level 2								
Response time (seconds)	80	7.389	2.407	5.332	2.049	-2.057	<0.001*	0.920
Accuracy (%)	80	83.828	13.543	94.788	7.819	10.96	<0.001*	0.991

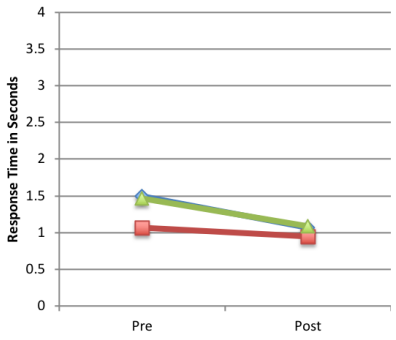
These results indicate that the Indigenous students' gains are comparable to those of the overall *QuickSmart* group. For Essential Words and Level 1 Words, both the response time and accuracy results are impacted by the ceiling effect (the pre-intervention scores were so high that the students did not have much room for further improvement). For Sentence Understanding 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).

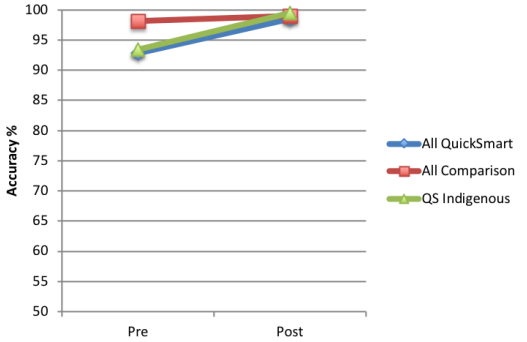


Level 1 Words

Response Time

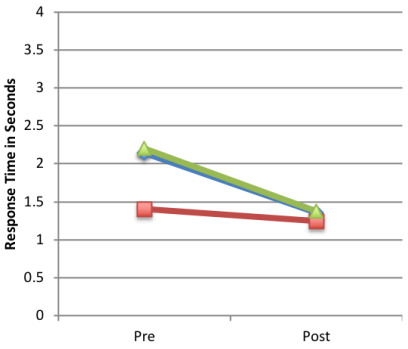


Accuracy

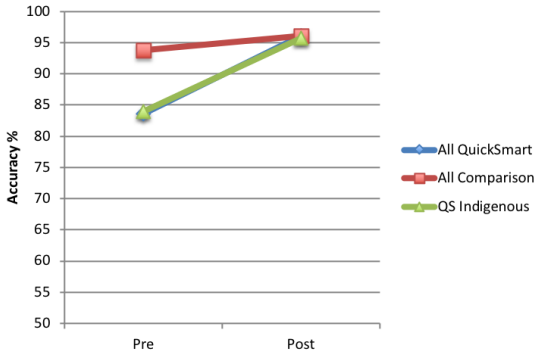


Level 2 Words

Response Time

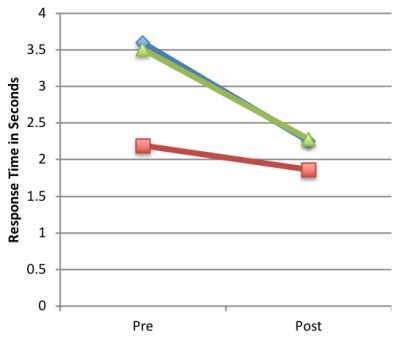


Accuracy

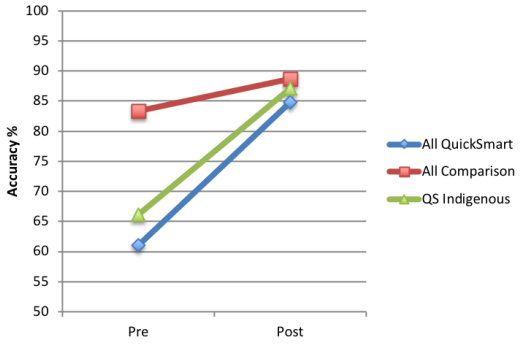


Level 3 Words

Response Time

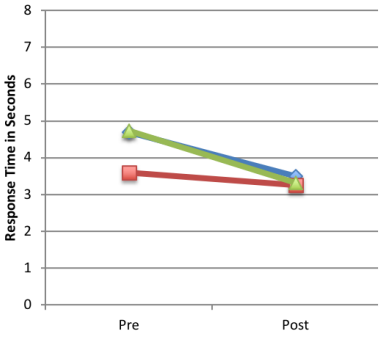


Accuracy

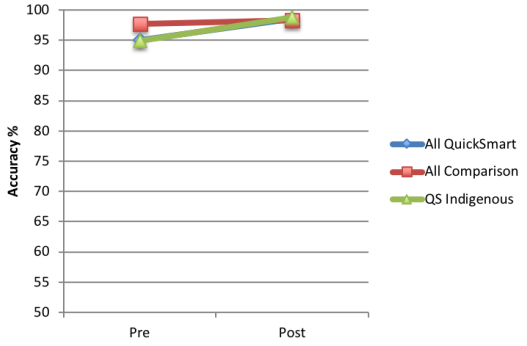


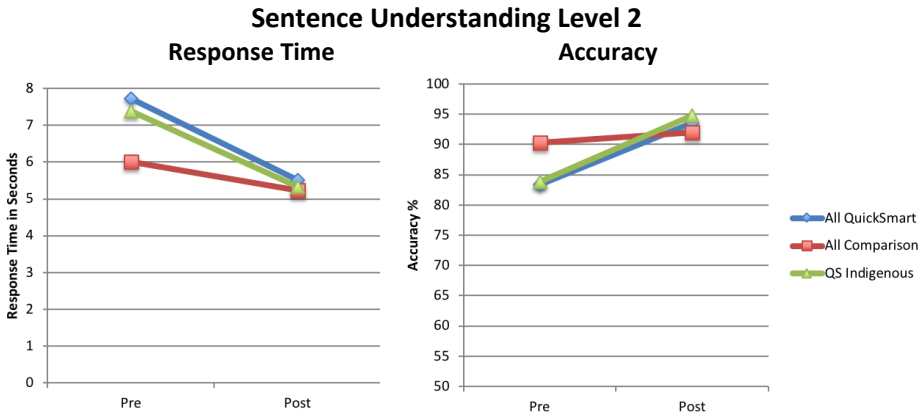
Sentence Understanding Level 1

Response Time



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 dramatically confronted these students 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 – 2017

	N	Mean	Std. Deviation
Essential Words			
Response time (seconds)	6	0.904	0.344
Accuracy (%)	6	100	0
Level 1 Words			
Response time (seconds)	16	1.181	0.302
Accuracy (%)	16	98.044	3.763
Level 2 Words			
Response time (seconds)	31	2.471	1.683
Accuracy (%)	31	78.387	20.82
Level 3 Words			
Response time (seconds)	49	3.561	2.259
Accuracy (%)	49	68.614	25.223
Sentence Understanding Level 1			
Response time (seconds)	10	5.265	2.446
Accuracy (%)	10	94.37	8.702
Sentence Understanding Level 2			
Response time (seconds)	26	7.92	3.892
Accuracy (%)	26	84.777	17.62

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 1.2 seconds, with accuracy results above 98%. In Level 2 Words, the average response rates were below 2.5 seconds, with average accuracy above 78%.

In Sentence Understanding Level 1, the average response rates were below 5.3 seconds, 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 times below 3.6 seconds and accuracy over 68% 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 which 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.

The Indigenous students showed improvements comparable to those 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 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) 2017

Group	Students with paired data	Average Gain score	Significance	Effect size
Vocabulary				
All *QuickSmart*	644	6.061	<0.001*	0.578
All Comparison	120	3.941	<0.001*	0.516
Comprehension				
All *QuickSmart*	918	6.733	<0.001*	0.677
All Comparison	256	4.786	<0.001*	0.481

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

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) 2017

Gender	Students with paired data	Average Gain score	Significance	Effect size
Vocabulary				
QuickSmart Male	372	5.952	<0.001*	0.533
Comparison Male	60	3.134	<0.001*	0.409
QuickSmart Female	272	6.211	<0.001*	0.66
Comparison Female	60	4.748	<0.001*	0.621
Comprehension				
QuickSmart Male	532	7.086	<0.001*	0.675
Comparison Male	138	4.144	<0.001*	0.417
QuickSmart Female	386	6.246	<0.001*	0.686
Comparison Female	118	5.538	<0.001*	0.563

In terms of Scale scores, the results indicate that female *QuickSmart* students improved more than male *QuickSmart* students in vocabulary and male QuickSmart students improved more in comprehension. The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level (p = 0.717 for vocabulary and 0.196 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) 2017

Group	Students with paired data	Average Gain score	Significance	Effect size
Vocabulary				
Indigenous *QuickSmart*	53	5.655	<0.001*	0.501
All Comparison	120	3.941	<0.001*	0.516
Comprehension				
Indigenous *QuickSmart*	70	5.955	<0.001*	0.518
All Comparison	256	4.786	<0.001*	0.481

These results show strong vocabulary improvement for the Indigenous students who participated in *QuickSmart*. These students were able to report a rate of growth close to that of 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, with the Indigenous students again reporting a growth rate only slightly smaller than that shown by the rest of the *QuickSmart* group and in excess of that achieved by the comparison group.

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

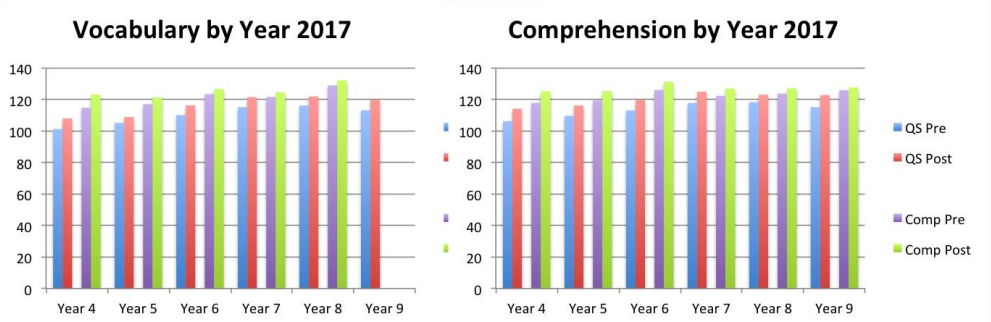


Figure 2: PAT-V and PAT-C by Year

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
Vocabulary			
QuickSmart	519	644	80.59
Comparison	88	120	73.333
Comprehension			
QuickSmart	713	918	77.669
Comparison	194	256	75.781

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) 2017

Cluster of Schools		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
Adelaide Comprehension - QuickSmart Group	47	106.604	10.972	115.362	9.729	8.758	<0.001*	0.845
Geelong Vocab - QuickSmart Group	29	111.648	9.028	125.59	12.364	13.942	<0.001*	1.288
Geelong Comprehension - QuickSmart Group	24	112.971	6.058	121.604	6.474	8.633	<0.001*	1.377
Gippsland Vocab - QuickSmart Group	31	117.865	8.259	122.226	7.196	4.361	<0.001*	0.563
Gippsland Comprehension - QuickSmart Group	31	120.2	7.196	128.813	6.235	8.613	<0.001*	1.279
Horsham Vocab - QuickSmart Group	8	112.538	10.753	115.925	12.716	3.387	0.128	0.288
Horsham Comprehension - QuickSmart Group	21	115.557	12.869	120.995	14.071	5.438	0.016	0.403
Hunter Vocab - QuickSmart Group	38	103.971	9.234	108.792	14.852	4.821	0.077	0.39
Hunter Comprehension - QuickSmart Group	38	107.487	11.94	113.711	14.469	6.224	0.045	0.469
Melbourne Vocab - QuickSmart Group	141	114.704	7.581	120.106	8.806	5.402	<0.001*	0.657
Melbourne Comprehension - QuickSmart Group	156	117.821	7.869	124.879	9.103	7.058	<0.001*	0.83
Mornington Vocab - QuickSmart Group	19	111.558	13.765	118.647	7.454	7.089	0.015	0.64
Mornington Comprehension - QuickSmart Group	4	120.6	2.368	121.275	4.895	0.675	0.774	0.176
North Coast Vocab - QuickSmart Group	84	110.999	10.106	116.356	9.773	5.357	<0.001*	0.539
North Coast Comprehension - QuickSmart Group	110	114.878	8.552	121.348	10.748	6.47	<0.001*	0.666
North Tas Comprehension - QuickSmart Group	5	119.92	6.22	123.54	7.486	3.62	0.102	0.526
North West Vocab - QuickSmart Group	72	116.593	8.21	123.485	10.43	6.892	<0.001*	0.734
North West Comprehension - QuickSmart Group	69	120.652	8.57	127.61	9.782	6.958	<0.001*	0.757
Perth Comprehension - QuickSmart Group	11	115.6	9.389	122.745	8.657	7.145	0.043	0.791
Queensland Vocab - QuickSmart Group	31	117.355	5.769	126.326	6.162	8.971	<0.001*	1.503
Queensland Comprehension - QuickSmart Group	162	116.856	7.892	123.671	8.384	6.815	<0.001*	0.837
Riverina Vocab - QuickSmart Group	58	110.584	7.752	115.016	9.206	4.432	<0.001*	0.521
Riverina Comprehension - QuickSmart Group	63	112.797	9.796	117.765	8.818	4.968	<0.001*	0.533
Southern Sydney Vocab - QuickSmart Group	16	114.612	9.319	119.1	9.024	4.488	0.001*	0.489
Southern Sydney Comprehension - QuickSmart Group	16	120.388	8.31	125.825	7.868	5.437	0.020	0.672
Sydney Vocab - QuickSmart Group	100	112.775	11.775	118.408	13.854	5.633	<0.001*	0.438
Sydney Comprehension - QuickSmart Group	144	115.603	10.138	122.094	10.679	6.491	<0.001*	0.623
Western Syd Vocab - QuickSmart Group	17	104.476	5.287	112.759	5.802	8.283	0.001	1.492
Western Syd Comprehension - QuickSmart Group	17	109.971	5.784	116.653	7.057	6.682	<0.001*	1.036

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

7.2 PAT Results – by Demographic (Scale Scores) 2017

Demographic		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
All Schools Vocabulary – *QuickSmart* Group	644	112.878	9.717	118.939	11.187	6.061	<0.001*	0.578
All Schools Vocabulary – Comparison Group	120	120.815	7.791	124.756	7.483	3.941	<0.001*	0.516
All Schools Comprehension – *QuickSmart* Group	918	115.614	9.568	122.347	10.297	6.733	<0.001*	0.677
All Schools Comprehension – Comparison Group	256	122.578	8.708	127.364	11.054	4.786	<0.001*	0.481
Vocabulary – *QuickSmart* Indigenous	53	110.73	9.422	116.385	12.894	5.655	<0.001*	0.501
Comprehension – *QuickSmart* Indigenous	70	113.579	11.233	119.534	11.744	5.955	<0.001*	0.518
Vocabulary – *QuickSmart* Male	372	113.513	10.189	119.465	12.078	5.952	<0.001*	0.533
Vocabulary – Comparison Male	60	121.013	7.637	124.147	7.694	3.134	<0.001*	0.409
Vocabulary – *QuickSmart* Female	272	112.01	8.978	118.221	9.815	6.211	<0.001*	0.66
Vocabulary – Comparison Female	60	120.617	8.002	125.365	7.279	4.748	<0.001*	0.621
Comprehension – *QuickSmart* Male	532	115.25	10.206	122.336	10.794	7.086	<0.001*	0.675
Comprehension – Comparison Male	138	121.801	8.949	125.945	10.838	4.144	<0.001*	0.417
Comprehension – *QuickSmart* Female	386	116.117	8.599	122.363	9.583	6.246	<0.001*	0.686
Comprehension – Comparison Female	118	123.486	8.364	129.024	11.117	5.538	<0.001*	0.563

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

7.3 PAT Results – by State (Scale Scores) 2017

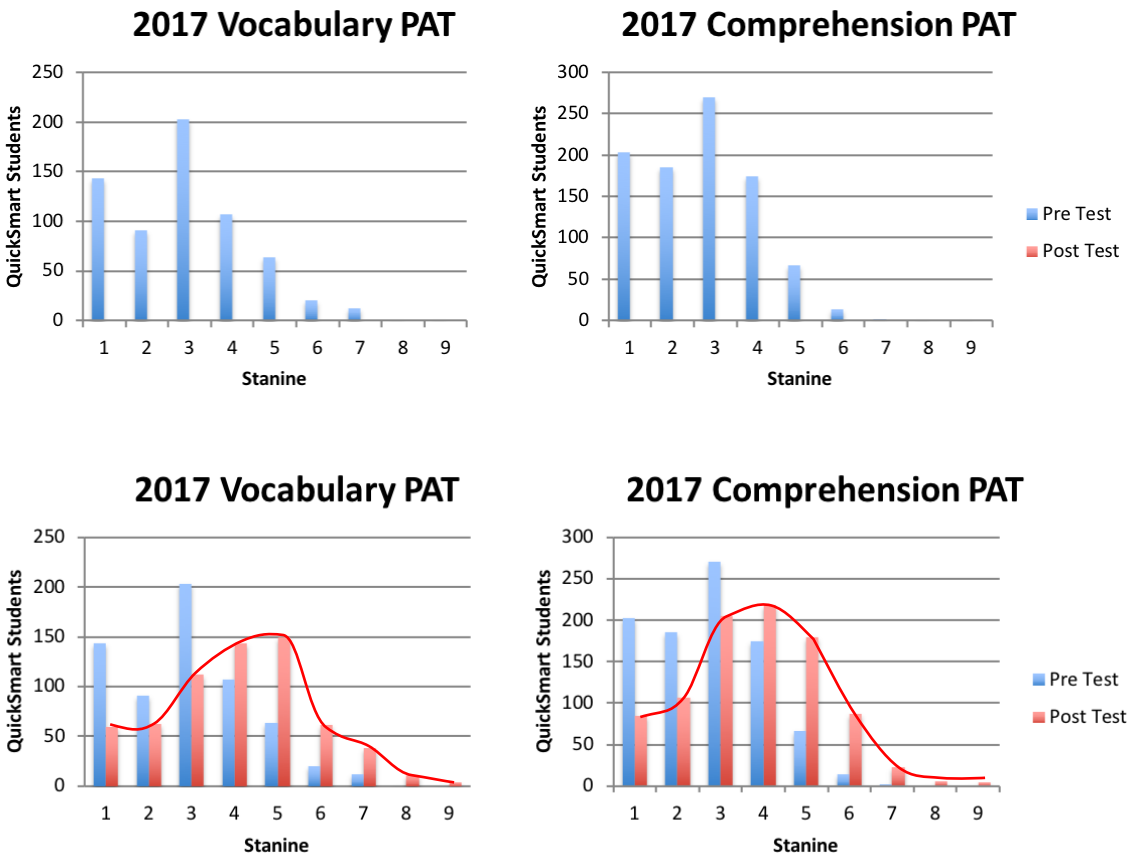
Demographic		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
NSW Vocabulary – *QuickSmart* Group	385	111.612	10.278	117.229	12.056	5.617	<0.001*	0.501
NSW Vocabulary – Comparison Group	65	121.382	8.169	125.595	8.126	4.213	<0.001*	0.517
NSW Comprehension – *QuickSmart* Group	457	115.087	10.05	121.382	11.102	6.295	<0.001*	0.594
NSW Comprehension – Comparison Group	86	124.348	8.314	130.217	9.844	5.869	<0.001*	0.644
Qld Vocabulary – *QuickSmart* Group	31	117.355	5.769	126.326	6.162	8.971	<0.001*	1.503
Qld Vocabulary – Comparison Group	9	125.567	5.49	127.5	4.308	1.933	0.143	0.392
Qld Comprehension – *QuickSmart* Group	162	116.856	7.892	123.671	8.384	6.815	<0.001*	0.837
Qld Comprehension – Comparison Group	67	125.409	8.228	130.145	8.457	4.736	<0.001*	0.568
SA Comprehension – *QuickSmart* Group	47	106.604	10.972	115.362	9.729	8.758	<0.001*	0.845
SA Comprehension – Comparison Group	23	112.33	8.888	114.109	13.376	1.779	0.555	0.157
Tas Comprehension – *QuickSmart* Group	5	119.92	6.22	123.54	7.486	3.62	0.102	0.526
Tas Comprehension – Comparison Group	4	132.75	7.58	131.7	3.956	-1.05		no improvement
Vic Vocabulary – *QuickSmart* Group	228	114.407	8.75	120.823	9.362	6.416	<0.001*	0.708
Vic Vocabulary – Comparison Group	46	119.085	7.226	123.033	6.729	3.948	<0.001*	0.565
Vic Comprehension – *QuickSmart* Group	236	117.486	8.297	124.656	9.248	7.17	<0.001*	0.816
Vic Comprehension – Comparison Group	65	120.982	6.812	125.954	11.016	4.972	<0.001*	0.543
WA Comprehension – *QuickSmart* Group	11	115.6	9.389	122.745	8.657	7.145	0.043	0.791
WA Comprehension – Comparison Group	11	118.664	3.783	122.591	8.569	3.927	0.113	0.593

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

7.4 PAT Results – by Year (Scale Scores) 2017

Year		Pre-Intervention		Post-Intervention				
	N	Mean	SD	Mean	SD	Gain	p	Effect size
Year 3 Comprehension – *QuickSmart* Group	6	99.917	11.007	112.2	6.714	12.283	0.016	1.347
Year 3 Comprehension – Comparison Group	2	113.95	7.849	124.35	2.616	10.4	0.394	1.778
Year 4 Vocabulary – *QuickSmart* Group	57	101.326	7.989	108.014	11.284	6.688	<0.001*	0.684
Year 4 Vocabulary – Comparison Group	16	114.794	3.952	123.138	7.816	8.344	<0.001*	1.347
Year 4 Comprehension – *QuickSmart* Group	73	106.271	9.367	114.221	9.03	7.95	<0.001*	0.864
Year 4 Comprehension – Comparison Group	25	117.952	9.162	125.316	9.862	7.364	<0.001*	0.774
Year 5 Vocabulary – *QuickSmart* Group	60	105.187	9.101	108.948	13.761	3.761	0.038	0.322
Year 5 Vocabulary – Comparison Group	19	117.084	4.945	121.453	7.951	4.369	0.021	0.66
Year 5 Comprehension – *QuickSmart* Group	95	109.726	9.869	116.258	11.834	6.532	<0.001*	0.6
Year 5 Comprehension – Comparison Group	30	119.543	8.448	125.43	11.448	5.887	<0.001*	0.585
Year 6 Vocabulary – *QuickSmart* Group	44	110.166	8.059	116.391	9.614	6.225	<0.001*	0.702
Year 6 Vocabulary – Comparison Group	27	123.526	5.837	126.693	6.955	3.167	0.004	0.493
Year 6 Comprehension – *QuickSmart* Group	68	113.085	9.808	119.938	9.35	6.853	<0.001*	0.715
Year 6 Comprehension – Comparison Group	35	126.154	7.682	131.397	9.874	5.243	<0.001*	0.593
Year 7 Vocabulary – *QuickSmart* Group	328	115.21	8.232	121.58	8.803	6.37	<0.001*	0.747
Year 7 Vocabulary – Comparison Group	52	121.681	8.841	124.598	7.061	2.917	<0.001*	0.365
Year 7 Comprehension – *QuickSmart* Group	459	117.845	7.851	125.037	9.224	7.192	<0.001*	0.84
Year 7 Comprehension – Comparison Group	101	122.396	8.018	127.085	10.26	4.689	<0.001*	0.509
Year 8 Vocabulary – *QuickSmart* Group	144	116.274	8.804	122.01	10.276	5.736	<0.001*	0.599
Year 8 Vocabulary – Comparison Group	6	128.983	6.242	132.183	5.009	3.2	0.070	0.565
Year 8 Comprehension – *QuickSmart* Group	187	118.37	9.125	123.117	9.978	4.747	<0.001*	0.496
Year 8 Comprehension – Comparison Group	45	123.827	9.218	127.267	12.343	3.44	0.054	0.316
Year 9 Vocabulary – *QuickSmart* Group	10	113.23	10.348	120.08	9.473	6.85	0.002*	0.691
Year 9 Comprehension – *QuickSmart* Group	28	115.246	9.003	122.857	7.406	7.611	<0.001*	0.923
Year 9 Comprehension – Comparison Group	18	125.967	8.84	127.733	14.66	1.766	0.457	0.146

7.5 National Literacy PAT Improvement of QuickSmart Students



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.