quicksmart

Annual Literacy Program Report

2019

The SiMERR National Research Centre
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Acknowledgements

This report was compiled by Dr Stefan Horarik (Research Fellow – Data Analysis), Ambrose McDermott (*QuickSmart* Project Officer) and June Billings (Executive Assistant). It would not be possible to do this reporting without the support of the rest of the *QuickSmart* team in SiMERR who have assisted with proof reading and interpretation of data.

We also acknowledge the work of staff in *QuickSmart* schools in collecting the data and entering into the SiMERR data system.

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1 *QuickSmart* Executive Summary in 2019

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, 2008). 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 2019, the *QuickSmart* team at the University of New England received matched data from 1,180 students who participated in *QuickSmart* Literacy lessons and 275 average-achieving comparison peers. These students were drawn from schools from 18 regions around Australia.

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 indicate a strong to substantial improvement for the *QuickSmart* students. The evidence provided illustrates that *QuickSmart* students 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 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. In OZCAAS tests, males performed slightly better than females. However, none of these results are statistically significant.

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

A further mark of the success of *QuickSmart* can be found in the post-test results of those students who did not succeed in completing the pre-test. In such cases, (see Table 14) Instructors are advised not to continue collecting data in the pre-test as doing so would confront these students with the extent of their weaknesses at the beginning of the program. Significantly, the fact that these students are now able to complete all OZCAAS assessments at the end of the program is an achievement in and of itself.

In Essential Words and Level 1 Words, the average response rates at the end of the program were below 2.0 seconds, with accuracy results of 100%. In Level 2 Words, the average response rates were below 2.7 seconds, with average accuracy above 86%.

In Sentence Understanding Level 1, the average response rates were below 5.3 seconds, with average accuracy above 93%. 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 4.6 seconds and accuracy over 63% at post-test. It is likely that part of this improvement may be due to the fact that students:

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

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, the results indicate that male *QuickSmart* students improved more than female *QuickSmart* students in both vocabulary and comprehension. The results of independent sample *t*-tests of *QuickSmart* students show that these differences are not statistically significant at the 0.01 significance level ($p = 0.576$ for vocabulary and 0.206 for comprehension).

In the case of Indigenous students who participated in *QuickSmart*, the results show a substantial improvement in vocabulary and a very strong improvement in 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 indicate 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, initially 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 statistically significant end-of-program and longitudinal gains 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.

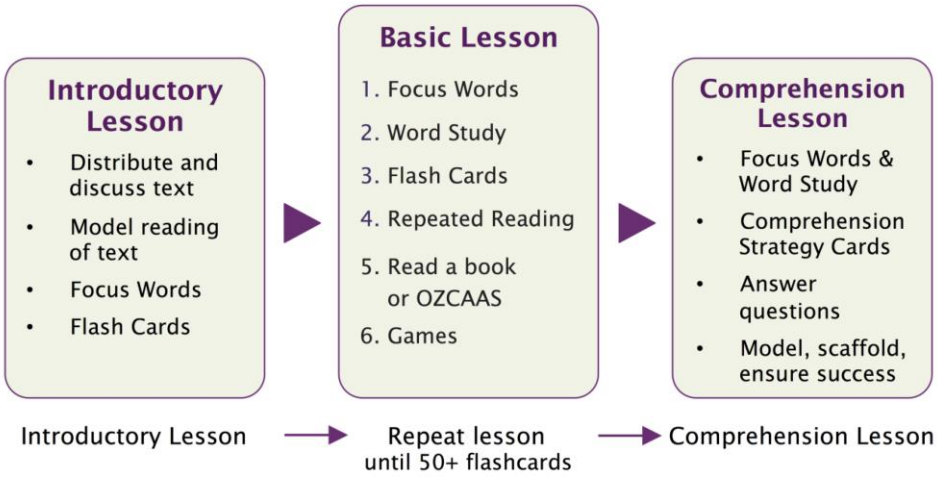


Figure 1: *QuickSmart* Literacy lesson structures

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 – 2019

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 2019, the *QuickSmart* team at the University of New England received data from 1,180 students who participated in *QuickSmart* Literacy lessons and 275 'average-achieving' comparison peers. These students were drawn from schools from 18 regions around Australia.

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.

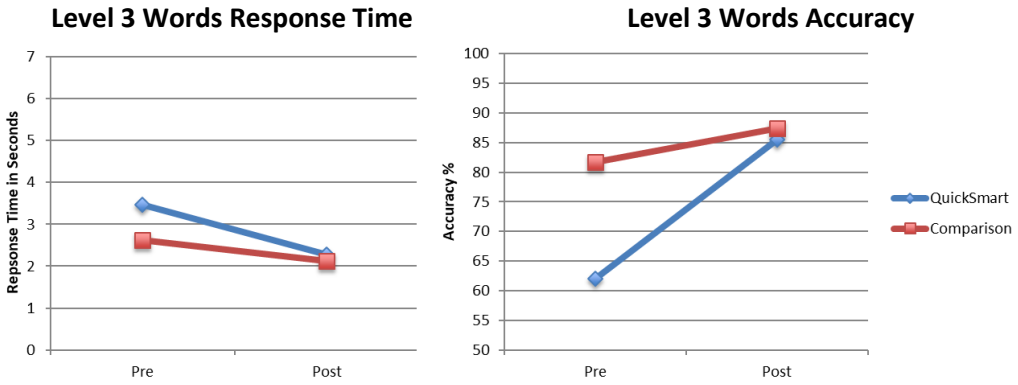
4.2 Combined OZCAAS Analysis

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 2019

Level 3 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	3.473	2.162	2.285	1.654	-1.188	<0.001*	0.617
Res Time (secs) Comp	2.628	2.063	2.125	1.385	-0.503	<0.001*	0.286
Accuracy (%) QS	62.052	24.427	85.493	19.867	23.441	<0.001*	1.053
Accuracy (%) Comp	81.747	17.472	87.470	14.088	5.723	<0.001*	0.361



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 1.188 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 0.617, 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 1.053, 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.

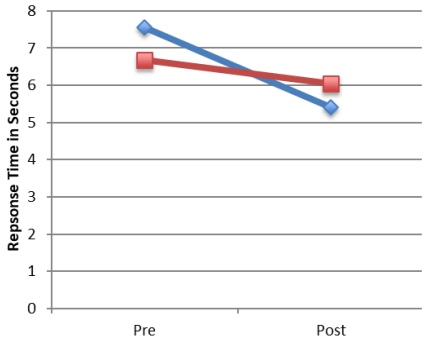
4.2.2 Sentence Understanding Level 2

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

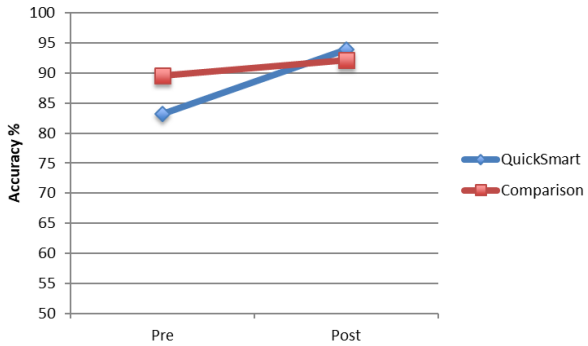
Table 2: OZCAAS Sentence Understanding Level 2 – all students 2019

Sentence Understanding Level 2	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	7.567	2.983	5.410	2.444	-2.157	<0.001*	0.791
Res Time (secs) Comp	6.689	2.676	6.045	2.285	-0.644	<0.001*	0.259
Accuracy (%) QS	83.176	14.847	93.984	9.705	10.808	<0.001*	0.862
Accuracy (%) Comp	89.565	11.246	92.218	9.705	2.653	<0.001*	0.253

Sentence Understanding Level 2 Response Time



Sentence Understanding Level 2 Accuracy



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 2.157 seconds, which is a strong result. The effect size for this result is 0.791, which indicates very strong improvement.

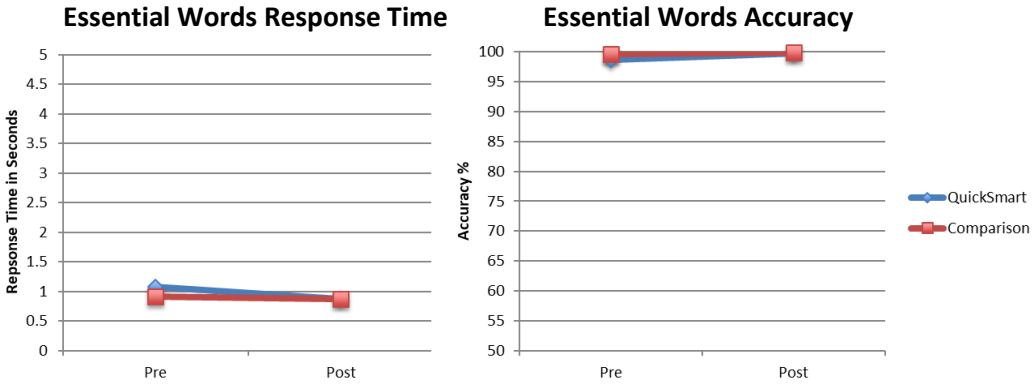
In terms of accuracy, the *QuickSmart* students' average scores have improved by more than 10 percentage points, which is a strong result. The effect size is 0.862, which indicates substantial improvement for the *QuickSmart* group.

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 Sentence Understanding Level 2. The diagrams illustrate that as a result of the *QuickSmart* intervention, the *QuickSmart* students narrowed the gap to the comparison students 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 2019

Essential Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	p	Effect size
Res Time (secs) QS	1.078	0.500	0.874	0.314	-0.204	<0.001*	0.489
Res Time (secs) Comp	0.921	0.331	0.876	0.246	-0.045	0.023	0.155
Accuracy (%) QS	98.713	4.482	99.739	1.380	1.026	<0.001*	0.309
Accuracy (%) Comp	99.617	1.460	99.896	0.732	0.279	0.008	0.242

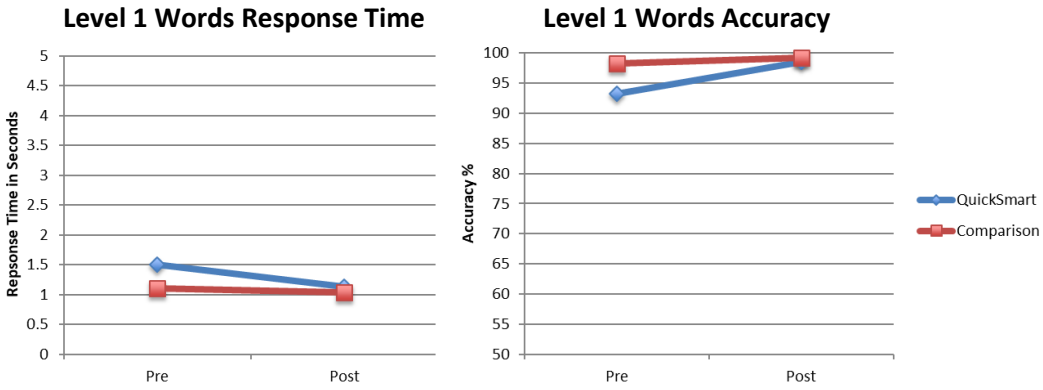


In summary, the results for Essential Words, the most commonly used words that should be known by middle school students, indicate a stronger improvement for the *QuickSmart* students than for the comparison students. However, both the response time and accuracy results show a strong ceiling effect as 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 2019

Level 1 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	1.505	0.980	1.134	0.699	-0.371	<0.001*	0.436
Res Time (secs) Comp	1.109	0.481	1.037	0.433	-0.072	0.002	0.158
Accuracy (%) QS	93.293	11.665	98.575	5.382	5.282	<0.001*	0.581
Accuracy (%) Comp	98.266	4.652	99.158	3.659	0.892	0.001	0.213

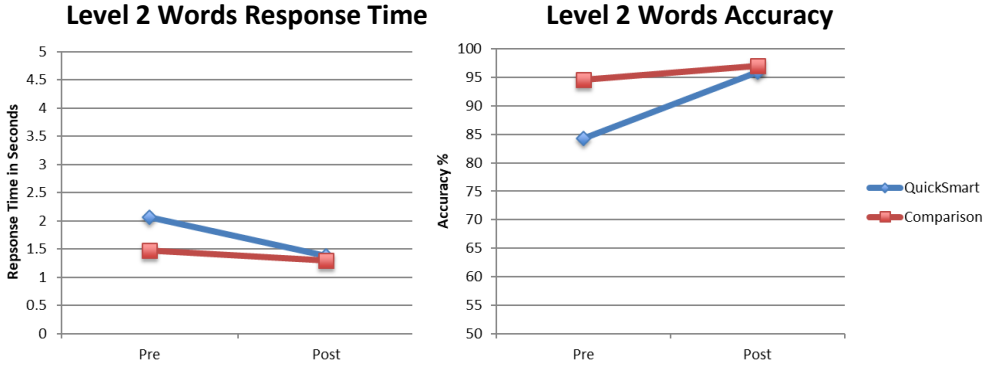


In summary, the results for Level 1 Words indicate a strong improvement for the *QuickSmart* students in response time and accuracy. The diagrams illustrate that as a result of the *QuickSmart* intervention, the *QuickSmart* students narrowed the gap to the comparison students in both response time and accuracy. 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 2019

Level 2 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	2.067	1.380	1.382	0.814	-0.685	<0.001*	0.605
Res Time (secs) Comp	1.474	0.885	1.292	0.666	-0.182	<0.001*	0.232
Accuracy (%) QS	84.341	16.620	95.965	9.355	11.624	<0.001*	0.862
Accuracy (%) Comp	94.601	8.026	97.018	5.259	2.417	<0.001*	0.356



The results for Level 2 Words indicate a strong improvement for the *QuickSmart* students in response time and a substantial improvement in accuracy. The diagrams illustrate that the

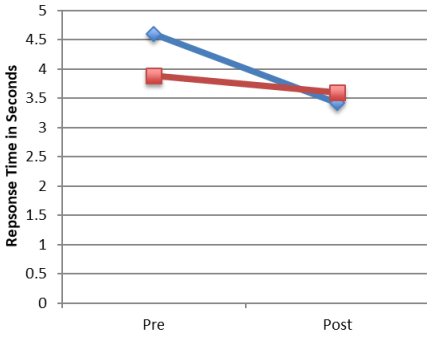
QuickSmart students narrowed the gap to the comparison students in both response time and accuracy.

4.2.6 Sentence Understanding Level 1

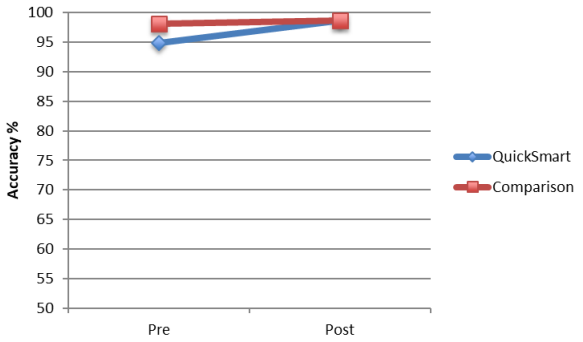
Table 6: OZCAAS Sentence Understanding Level 1 – all students 2019

Sentence Understanding Level 1	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	4.602	2.053	3.420	1.472	-1.182	<0.001*	0.662
Res Time (secs) Comp	3.883	1.632	3.602	1.360	-0.281	<0.001*	0.187
Accuracy (%) QS	94.857	8.942	98.640	4.379	3.783	<0.001*	0.537
Accuracy (%) Comp	98.146	4.199	98.677	3.958	0.531	0.056	0.130

Sentence Understanding Level 1 Response Time



Sentence Understanding Level 1 Accuracy



In summary, the results for Sentence Understanding Level 1 indicate a very strong improvement for the *QuickSmart* students in response time and a strong improvement in accuracy. The diagrams illustrate that the *QuickSmart* students narrowed the gap to the comparison students in both response time and accuracy. 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 2019

Essential Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	1.108	0.558	0.882	0.312	-0.226	<0.001*	0.498
Male Comparison	0.962	0.349	0.900	0.250	-0.062	0.039	0.205
Female *QuickSmart*	1.040	0.411	0.863	0.316	-0.177	<0.001*	0.482
Female Comparison	0.878	0.306	0.851	0.240	-0.027	0.294	0.098
Accuracy (%)							
Male *QuickSmart*	98.511	4.286	99.665	1.477	1.154	<0.001*	0.360
Male Comparison	99.585	1.586	99.918	0.655	0.333	0.030	0.274
Female *QuickSmart*	98.975	4.715	99.836	1.238	0.861	<0.001*	0.250
Female Comparison	99.652	1.319	99.872	0.809	0.220	0.126	0.201

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

4.3.2 Level 1 Words by Gender

Table 8: OZCAAS Level 1 Words results – all students by gender 2019

Level 1 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	1.518	0.982	1.134	0.620	-0.385	<0.001*	0.468
Male Comparison	1.131	0.499	1.031	0.363	-0.100	0.005	0.230
Female *QuickSmart*	1.488	0.977	1.134	0.791	-0.354	<0.001*	0.398
Female Comparison	1.086	0.461	1.043	0.498	-0.043	0.172	0.089
Accuracy (%)							
Male *QuickSmart*	92.951	11.777	98.369	5.427	5.418	<0.001*	0.591
Male Comparison	98.778	3.220	99.189	3.041	0.411	0.099	0.131
Female *QuickSmart*	93.733	11.515	98.841	5.318	5.108	<0.001*	0.570
Female Comparison	97.722	5.766	99.125	4.232	1.403	0.003	0.277

In summary, the results of *QuickSmart* students show that in both the response time 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.

4.3.3 Level 2 Words by Gender

Table 9: OZCAAS Level 2 Words results – all students by gender 2019

Level 2 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	2.045	1.332	1.375	0.840	-0.670	<0.001*	0.601
Male Comparison	1.475	0.854	1.319	0.682	-0.156	0.005	0.201
Female *QuickSmart*	2.095	1.441	1.390	0.780	-0.705	<0.001*	0.609
Female Comparison	1.473	0.920	1.263	0.650	-0.210	<0.001*	0.264
Accuracy (%)							
Male *QuickSmart*	84.103	17.272	95.669	9.778	11.566	<0.001*	0.824
Male Comparison	94.733	8.487	97.155	5.712	2.422	<0.001*	0.335
Female *QuickSmart*	84.649	15.748	96.348	8.773	11.699	<0.001*	0.918
Female Comparison	94.459	7.528	96.869	4.740	2.410	<0.001*	0.383

In summary, the results of *QuickSmart* students show that in both the response time and 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 ($p = 0.613$ for response time and 0.910 for accuracy).

4.3.4 Level 3 Words by Gender

Table 10: OZCAAS Level 3 Words results – all students by gender 2019

Level 3 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	3.365	2.034	2.253	1.614	-1.112	<0.001*	0.606
Male Comparison	2.470	1.525	2.098	1.072	-0.372	0.001	0.282
Female *QuickSmart*	3.619	2.317	2.329	1.708	-1.290	<0.001*	0.634
Female Comparison	2.800	2.516	2.155	1.663	-0.645	<0.001*	0.302
Accuracy (%)							
Male *QuickSmart*	62.637	24.938	85.268	20.843	22.631	<0.001*	0.985
Male Comparison	82.925	17.205	87.073	14.205	4.148	<0.001*	0.263
Female *QuickSmart*	61.269	23.731	85.794	18.498	24.525	<0.001*	1.153
Female Comparison	80.470	17.739	87.900	14.007	7.430	<0.001*	0.465

In summary, the results of *QuickSmart* students show that in both the response time and 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 ($p = 0.124$ for response time and 0.133 for accuracy).

4.3.5 Sentence Understanding Level 1 by Gender

Table 11: OZCAAS Sentence Understanding Level 1 results – all students by gender 2019

Sentence Understanding Level 1	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	4.656	2.075	3.433	1.514	-1.223	<0.001*	0.673
Male Comparison	4.082	1.788	3.662	1.452	-0.42	<0.001*	0.258
Female *QuickSmart*	4.531	2.023	3.405	1.416	-1.126	<0.001*	0.645
Female Comparison	3.668	1.422	3.538	1.255	-0.130	0.245	0.097
Accuracy (%)							
Male *QuickSmart*	94.328	9.394	98.540	4.189	4.212	<0.001*	0.579
Male Comparison	98.075	4.491	98.528	3.566	0.453	0.252	0.112
Female *QuickSmart*	95.542	8.280	98.770	4.616	3.228	<0.001*	0.482
Female Comparison	98.223	3.875	98.838	4.353	0.615	0.115	0.149

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 = 0.433 for response time and 0.061 for accuracy).

4.3.6 Sentence Understanding Level 2 by Gender

Table 12: OZCAAS Sentence Understanding Level 2 results – all students by gender 2019

Sentence Understanding Level 2	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	7.646	2.957	5.355	2.427	-2.291	<0.001*	0.847
Male Comparison	7.023	2.648	6.071	2.249	-0.952	<0.001*	0.387
Female *QuickSmart*	7.466	3.015	5.482	2.466	-1.984	<0.001*	0.720
Female Comparison	6.327	2.670	6.016	2.334	-0.311	0.105	0.124
Accuracy (%)							
Male *QuickSmart*	83.143	14.788	93.680	10.360	10.537	<0.001*	0.825
Male Comparison	89.542	12.718	92.356	9.761	2.814	0.005	0.248
Female *QuickSmart*	83.218	14.939	94.376	8.785	11.158	<0.001*	0.911
Female Comparison	89.590	9.447	92.069	9.683	2.479	0.010	0.259

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 = 0.107 for response time and 0.528 for accuracy).

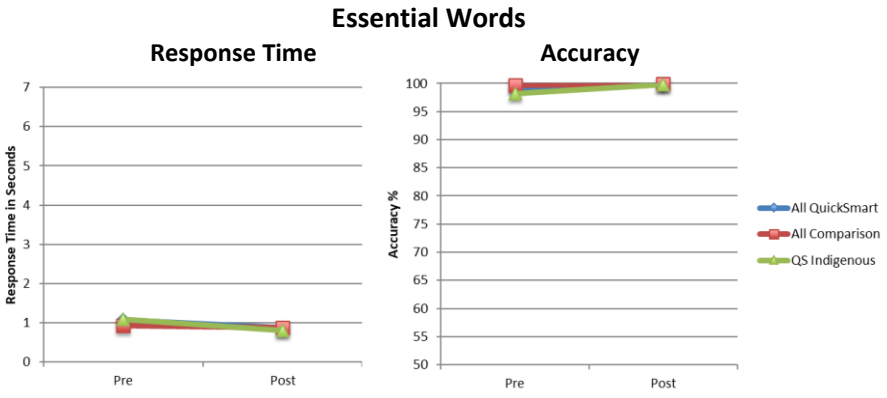
4.3.7 Indigenous Students

Table 13: OZCAAS results – Indigenous *QuickSmart* students 2019

Test	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Essential Words							
Response time (seconds)	1.086	0.432	0.810	0.359	-0.276	<0.001*	0.696
Accuracy (%)	98.174	4.413	99.786	1.049	1.612	<0.001*	0.503
Level 1 Words							
Response time (seconds)	1.526	0.945	1.074	0.600	-0.452	<0.001*	0.571
Accuracy (%)	92.550	13.711	98.403	6.903	5.853	<0.001*	0.539
Level 2 Words							
Response time (seconds)	2.255	1.486	1.409	0.755	-0.846	<0.001*	0.718
Accuracy (%)	82.591	20.466	95.251	12.043	12.660	<0.001*	0.754
Level 3 Words							
Response time (seconds)	4.157	2.498	2.436	1.684	-1.721	<0.001*	0.808
Accuracy (%)	58.289	26.996	83.940	23.283	25.651	<0.001*	1.018
Sentence Understanding Level 1							
Response time (seconds)	4.753	1.958	3.374	1.321	-1.379	<0.001*	0.826
Accuracy (%)	94.929	9.685	98.305	4.728	3.376	<0.001*	0.443
Sentence Understanding Level 2							
Response time (seconds)	7.808	2.980	5.446	2.432	-2.362	<0.001*	0.868
Accuracy (%)	81.602	17.354	93.396	13.256	11.794	<0.001*	0.764

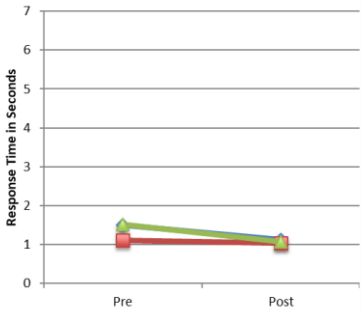
These results indicate that the Indigenous students' gains are comparable to those of the overall *QuickSmart* group. For Essential Words and Level 1 Words, both the response time and accuracy results are impacted by the ceiling effect (the pre-intervention scores were so high that the students did not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

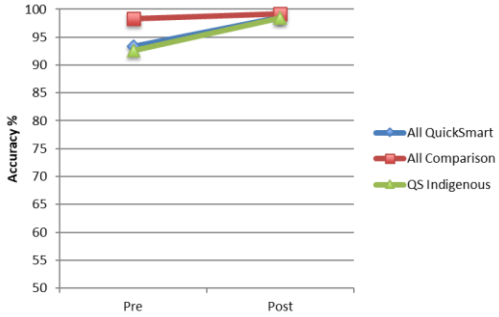


Level 1 Words

Response Time

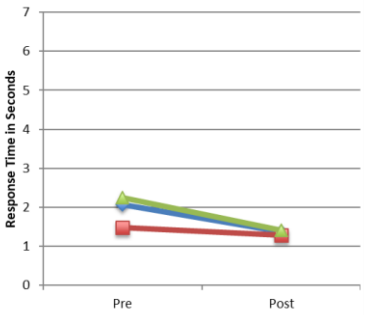


Accuracy

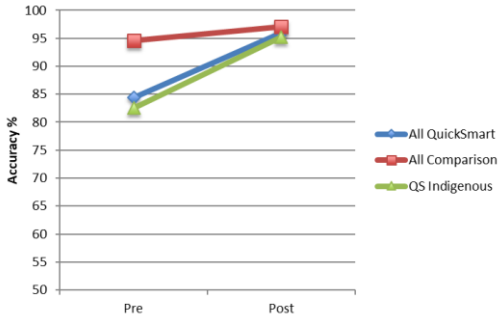


Level 2 Words

Response Time

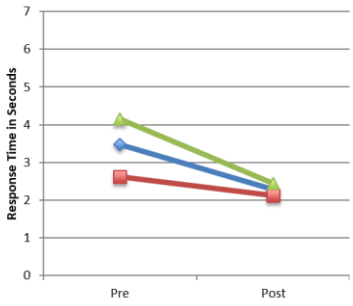


Accuracy

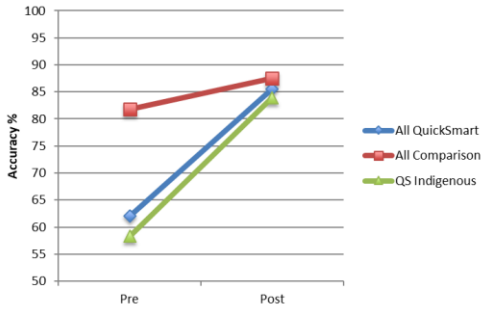


Level 3 Words

Response Time

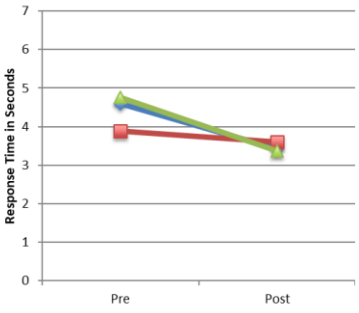


Accuracy

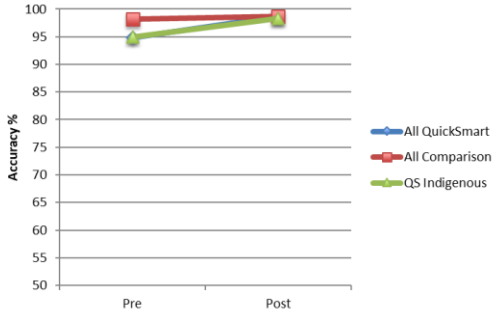


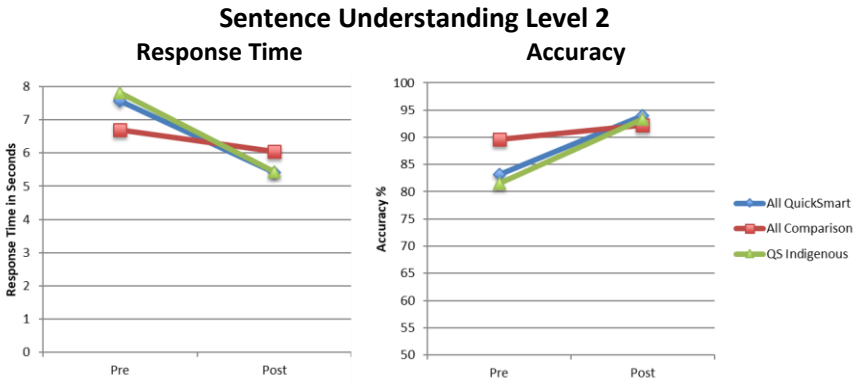
Sentence Understanding Level 1

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 – 2019

	Mean	Std. Deviation
Essential Words		
Response time (seconds)	0.745	0.120
Accuracy (%)	100	0
Level 1 Words		
Response time (seconds)	1.532	0.757
Accuracy (%)	100	0
Level 2 Words		
Response time (seconds)	2.696	1.564
Accuracy (%)	86.108	13.511
Level 3 Words		
Response time (seconds)	4.5	2.946
Accuracy (%)	63.284	26.821
Sentence Understanding Level 1		
Response time (seconds)	5.227	3.242
Accuracy (%)	93.867	7.173
Sentence Understanding Level 2		
Response time (seconds)	7.289	3.912
Accuracy (%)	80.108	20.304

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 2.0 seconds, with accuracy results of 100%. In Level 2 Words, the average response rates were below 2.7 seconds, with average accuracy above 86%.

In Sentence Understanding Level 1, the average response rates were below 5.3 seconds, with average accuracy above 93%.

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 4.6

seconds and accuracy over 63% 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 basic reading skills (word recognition and sentence level understanding). 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) 2019

Group	Average Gain score	Significance	Effect size
Vocabulary			
All *QuickSmart*	6.788	<0.001*	0.753
All Comparison	3.395	<0.001*	0.335
Comprehension			
All *QuickSmart*	5.998	<0.001*	0.649
All Comparison	3.648	<0.001*	0.392

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.

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) 2019

Gender	Average Gain score	Significance	Effect size
Vocabulary			
QuickSmart Male	6.978	<0.001*	0.796
Comparison Male	4.370	<0.001*	0.454
QuickSmart Female	6.545	<0.001*	0.702
Comparison Female	2.169	0.005	0.201
Comprehension			
QuickSmart Male	6.364	<0.001*	0.681
Comparison Male	3.709	<0.001*	0.411
QuickSmart Female	5.549	<0.001*	0.610
Comparison Female	3.570	0.001	0.369

In terms of Scale scores, the results indicate that male *QuickSmart* students improved more than female *QuickSmart* students in both vocabulary and comprehension. The results of independent sample *t*-tests of *QuickSmart* students show that these differences are not statistically significant at the 0.01 significance level ($p = 0.576$ for vocabulary and 0.206 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) 2019

Group	Average Gain score	Significance	Effect size
Vocabulary			
Indigenous *QuickSmart*	9.896	<0.001*	1.030
All Comparison	3.395	<0.001*	0.335
Comprehension			
Indigenous *QuickSmart*	5.577	<0.001*	0.646
All Comparison	3.648	<0.001*	0.392

These results show substantial vocabulary improvement for the Indigenous students who participated in *QuickSmart*. These students were able to report a rate of growth in excess of that achieved by the comparison students as well as the total cohort of *QuickSmart* students. The Indigenous students' Comprehension results show a very strong improvement, with the Indigenous students 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 4 through to Year 8. The tables of figures for these graphs are available in the Appendices. Other years were not included due to being outside the range targeted by the program.

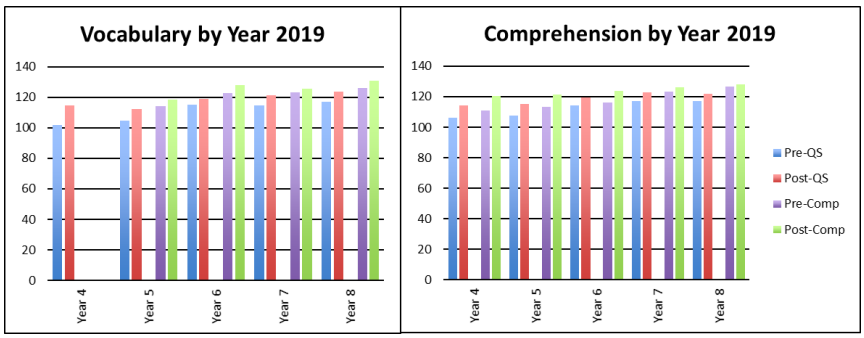


Figure 2: PAT-V and PAT-C by Year

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	449	558	80.5
Comparison	75	122	61.5
Comprehension			
QuickSmart	558	777	71.8
Comparison	105	172	61

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 indicate 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) 6773 5065.

Professor John Pegg

7 APPENDIX A: Independent Assessment Results

7.1 PAT Results by Region – (Scale Scores) 2019

Cluster of Schools	Pre-Intervention		Post-Intervention				
***QuickSmart* group**	**Mean**	**SD**	**Mean**	**SD**	**Gain**	**p**	**Effect size**
Geelong Vocabulary	111.844	8.846	119.056	11.156	7.212	<0.001*	0.716
Geelong Comprehension	113.847	10.051	118.658	4.567	4.811	0.056	0.616
Gippsland Vocabulary	113.950	5.981	118.563	8.167	4.613	0.001	0.644
Gippsland Comprehension	121.697	5.463	124.871	6.418	3.174	0.002	0.533
Horsham Vocabulary	109.200	8.404	115.900	7.006	6.700	0.016	0.866
Horsham Comprehension	110.100	5.011	119.600	7.690	9.500	0.144	1.464
Melbourne Vocabulary	116.033	7.937	121.376	8.034	5.343	<0.001*	0.669
Melbourne Comprehension	116.048	8.770	125.313	8.801	9.265	<0.001*	1.055
Mid-West Vocabulary	108.813	7.355	118.363	10.206	9.550	0.008	1.074
Mid-West Comprehension	115.750	9.510	121.000	6.173	5.250	0.138	0.655
Mornington Vocabulary	114.288	9.585	115.900	7.867	1.612	0.234	0.184
Mornington Comprehension	116.073	4.937	116.733	5.482	0.660	0.719	0.127
North Coast Vocabulary	110.382	9.511	115.238	9.522	4.856	<0.001*	0.510
North Coast Comprehension	115.486	7.787	122.439	9.589	6.953	<0.001*	0.796
North West Vocabulary	114.446	10.080	125.531	9.038	11.085	<0.001*	1.158
North West Comprehension	115.547	6.239	121.841	9.457	6.294	<0.001*	0.786
Perth Comprehension	119.156	9.461	124.525	11.026	5.369	0.143	0.523
Queensland Vocabulary	113.067	6.029	124.170	6.152	11.103	<0.001*	1.823
Queensland Comprehension	115.835	8.566	117.981	8.059	2.146	0.001	0.258
Riverina Vocabulary	111.302	10.325	119.342	10.082	8.040	<0.001*	0.788
Riverina Comprehension	115.734	10.430	122.913	12.511	7.179	<0.001*	0.623
Southern Sydney Vocabulary	119.721	6.744	128.084	8.110	8.363	<0.001*	1.121
Southern Sydney Comprehension	119.553	5.647	127.995	8.226	8.442	<0.001*	1.197
Sydney Vocabulary	115.698	9.442	122.003	7.852	6.305	<0.001*	0.726
Sydney Comprehension	112.936	11.858	119.961	9.523	7.025	<0.001*	0.653
Western Vocabulary	111.610	7.336	117.171	8.096	5.561	<0.001*	0.720
Western Comprehension	114.062	8.949	117.890	9.796	3.828	0.001	0.408

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

7.2 PAT Results – by Demographic (Scale Scores) 2019

Demographic	Pre-Intervention		Post-Intervention				
	Mean	SD	Mean	SD	Gain	p	Effect size
All Schools Vocabulary – *QuickSmart* Group	**114.061**	**8.882**	**120.849**	**9.152**	**6.788**	**<0.001***	**0.753**
All Schools Vocabulary – Comparison Group	**121.443**	**9.833**	**124.838**	**10.450**	**3.395**	**<0.001***	**0.335**
All Schools Comprehension – *QuickSmart* Group	**115.687**	**9.021**	**121.685**	**9.451**	**5.998**	**<0.001***	**0.649**
All Schools Comprehension – Comparison Group	**121.654**	**9.102**	**125.302**	**9.502**	**3.648**	**<0.001***	**0.392**
Vocabulary – *QuickSmart* Indigenous	112.171	9.458	122.067	9.759	9.896	<0.001*	1.030
Comprehension – *QuickSmart* Indigenous	114.891	8.829	120.468	8.423	5.577	<0.001*	0.646
Vocabulary – *QuickSmart* Male	114.377	8.743	121.355	8.789	6.978	<0.001*	0.796
Vocabulary – Comparison Male	121.301	9.691	125.671	9.556	4.370	<0.001*	0.454
Vocabulary – *QuickSmart* Female	113.657	9.058	120.202	9.576	6.545	<0.001*	0.702
Vocabulary – Comparison Female	121.620	10.098	123.789	11.483	2.169	0.005	0.201
Comprehension – *QuickSmart* Male	115.221	9.394	121.585	9.301	6.364	<0.001*	0.681
Comprehension – Comparison Male	121.232	9.307	124.941	8.732	3.709	<0.001*	0.411
Comprehension – *QuickSmart* Female	116.260	8.518	121.809	9.644	5.549	<0.001*	0.610
Comprehension – Comparison Female	122.186	8.868	125.756	10.432	3.570	0.001	0.369

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

7.3 PAT Results – by State (Scale Scores) 2019

Demographic	Pre-Intervention		Post-Intervention				
	Mean	SD	Mean	SD	Gain	p	Effect size
NSW Vocabulary - *QuickSmart* Group	113.379	9.716	120.975	9.802	7.596	<0.001*	0.778
NSW Vocabulary - Comparison Group	117.848	12.580	122.407	12.978	4.559	<0.001*	0.357
NSW Comprehension - *QuickSmart* Group	114.895	9.434	121.637	10.037	6.742	<0.001*	0.692
NSW Comprehension - Comparison Group	116.006	11.574	122.869	10.901	6.863	<0.001*	0.610
Qld Vocabulary - *QuickSmart* Group	113.067	6.029	124.170	6.152	11.103	<0.001*	1.823
Qld Vocabulary - Comparison Group	125.944	4.735	127.811	6.166	1.867	0.448	0.340
Qld Comprehension - *QuickSmart* Group	115.835	8.566	117.981	8.059	2.146	0.001	0.258
Qld Comprehension - Comparison Group	124.091	6.477	123.879	8.134	-0.212	0.821	No improvement
Vic Vocabulary - *QuickSmart* Group	115.001	8.063	120.249	8.607	5.248	<0.001*	0.629
Vic Vocabulary - Comparison Group	123.306	7.168	126.107	8.590	2.801	<0.001*	0.354
Vic Comprehension - *QuickSmart* Group	116.618	8.505	124.080	8.418	7.462	<0.001*	0.882
Vic Comprehension - Comparison Group	123.297	6.980	128.111	8.055	4.814	<0.001*	0.639
WA Comprehension - *QuickSmart* Group	119.156	9.461	124.525	11.026	5.369	0.143	0.523
WA Comprehension - Comparison Group	127.718	3.167	126.064	12.507	-1.654	0.673	No improvement

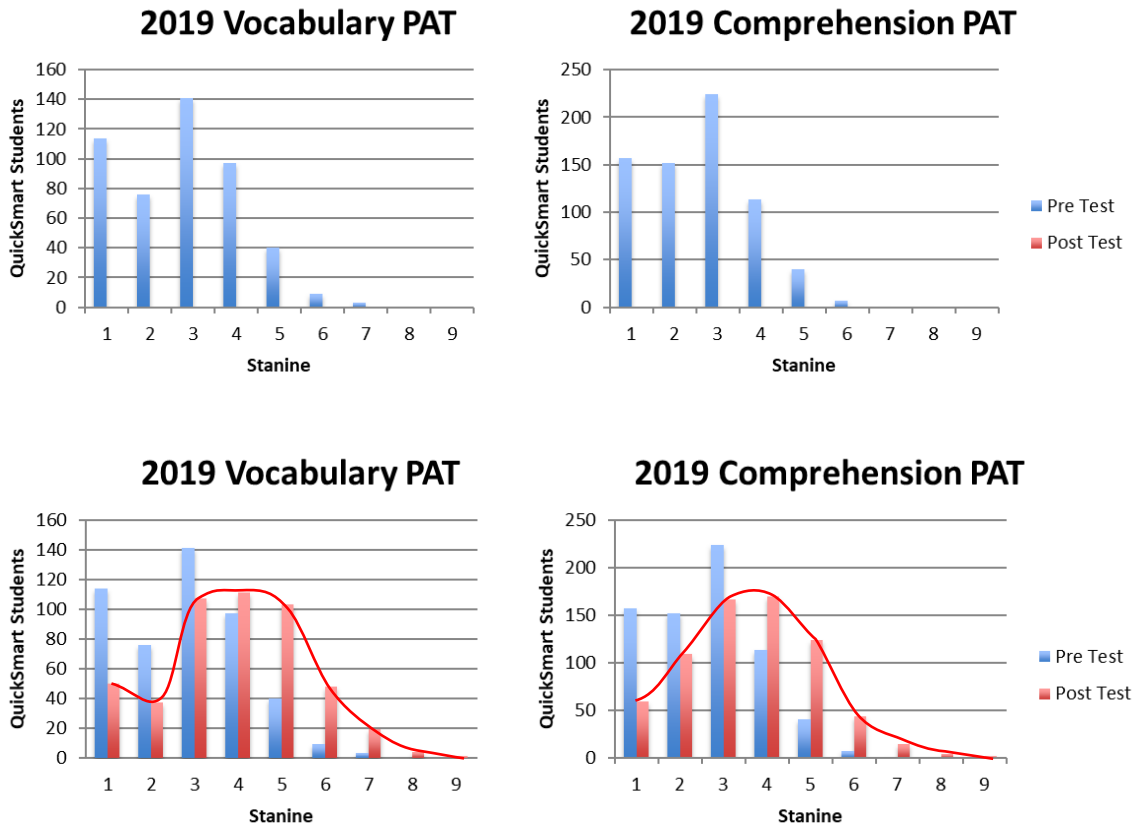
Note: only students who did both 'pre' and 'post' test are included in the table.

7.4 PAT Results – by Year (Scale Scores) 2019

Year	Pre-Intervention		Post-Intervention				
	Mean	SD	Mean	SD	Gain	p	Effect size
Year 4 Vocabulary – *QuickSmart* Group	101.965	6.592	114.488	7.871	12.523	<0.001*	1.725
Year 4 Vocabulary – Comparison Group							
Year 4 Comprehension – *QuickSmart* Group	106.297	9.849	114.103	9.535	7.806	<0.001*	0.805
Year 4 Comprehension – Comparison Group	110.925	8.103	120.375	15.686	9.450	0.096	0.757
Year 5 Vocabulary – *QuickSmart* Group	104.645	9.077	112.200	8.617	7.555	<0.001*	0.854
Year 5 Vocabulary – Comparison Group	114.279	13.397	118.564	12.899	4.285	0.001	0.326
Year 5 Comprehension – *QuickSmart* Group	107.638	10.420	115.115	10.192	7.477	<0.001*	0.725
Year 5 Comprehension – Comparison Group	113.438	10.993	121.358	8.679	7.920	<0.001*	0.800
Year 6 Vocabulary – *QuickSmart* Group	114.911	8.257	119.128	9.799	4.217	0.009	0.465
Year 6 Vocabulary – Comparison Group	122.475	10.678	127.963	11.051	5.488	0.100	0.505
Year 6 Comprehension – *QuickSmart* Group	114.427	9.645	119.405	11.106	4.978	0.019	0.479
Year 6 Comprehension – Comparison Group	116.175	9.105	123.625	11.169	7.450	0.085	0.731
Year 7 Vocabulary – *QuickSmart* Group	114.794	7.869	121.360	8.628	6.566	<0.001*	0.795
Year 7 Vocabulary – Comparison Group	123.218	6.405	125.733	7.754	2.515	<0.001*	0.354
Year 7 Comprehension – *QuickSmart* Group	116.968	8.005	122.975	8.936	6.007	<0.001*	0.708
Year 7 Comprehension – Comparison Group	123.395	6.515	126.266	8.377	2.871	0.001	0.383
Year 8 Vocabulary – *QuickSmart* Group	117.002	8.393	123.721	8.619	6.719	<0.001*	0.790
Year 8 Vocabulary – Comparison Group	126.050	9.499	130.993	11.859	4.943	0.586	0.460
Year 8 Comprehension – *QuickSmart* Group	116.989	8.226	122.053	8.736	5.064	<0.001*	0.597
Year 8 Comprehension – Comparison Group	126.580	7.869	127.840	11.108	1.260	0.020	0.131

Other years were not included due to being outside the range targeted by the program or insufficient numbers.

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.

7.6 PAT Vocabulary Results by Percentile

Demographic	Mean Percentile		
	Pre	Post	Gain
All *QuickSmart*	20.16	37.08	16.92
All Comparison	40.15	49.65	9.5
Indigenous *QuickSmart*	20.35	43.76	23.41
QuickSmart Female	20.52	36.54	16.02
Comparison Female	40.50	46.69	6.19
QuickSmart Male	19.88	37.51	17.63
Comparison Male	39.87	52.00	12.13
Year			
QuickSmart Year 4	21.41	56.18	34.77
Comparison Year 4			
QuickSmart Year 5	17.06	31.55	14.49
Comparison Year 5	41.07	50.96	9.89
QuickSmart Year 6	24.06	35.56	11.5
Comparison Year 6	46.50	57.00	10.50
QuickSmart Year 7	19.19	36.14	16.95
Comparison Year 7	39.43	47.60	8.17
QuickSmart Year 8	23.28	39.41	16.13
Comparison Year 8	38.36	53.36	15.00
Lessons attended			
<=20	36.23	42.77	6.54
21-40	24.32	44.21	19.89
41-60	19.91	37.06	17.15
61-80	18.29	34.78	16.49
80+	11.37	23.22	11.85

7.7 PAT Comprehension Results by Percentile

Demographic	Mean Percentile		
	Pre	Post	Gain
All *QuickSmart*	15.36	27.55	12.19
All Comparison	26.80	36.34	9.54
Indigenous *QuickSmart*	12.96	23.38	10.42
QuickSmart Female	16.16	28.19	12.03
Comparison Female	27.43	37.84	10.41
QuickSmart Male	14.71	27.03	12.32
Comparison Male	26.30	35.14	8.84
Year			
QuickSmart Year 4	21.27	34.60	13.33
Comparison Year 4	29.75	55	25.25
QuickSmart Year 5	14.67	27.33	12.66
Comparison Year 5	24.65	42.54	17.89
QuickSmart Year 6	18.59	30.14	11.55
Comparison Year 6	23.88	38.13	14.25
QuickSmart Year 7	16.04	29.01	12.97
Comparison Year 7	27.70	35.95	8.25
QuickSmart Year 8	11.62	20.43	8.81
Comparison Year 8	27.32	32.08	4.76
Lessons attended			
<=20	10.61	21.22	10.61
21-40	18.39	27.13	8.74
41-60	15.15	28.55	13.4
61-80	14.58	27.52	12.94
80+	12.75	24.31	11.56