quicksmart

Annual Literacy Program Report

2018

The SiMERR National Research Centre
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Acknowledgements

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1 *QuickSmart* Executive Summary in 2018

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 2018, the *QuickSmart* team at the University of New England received matched data from 1,129 students who participated in *QuickSmart* Literacy lessons and 245 average-achieving comparison peers. These students were drawn from schools from 20 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 for Vocabulary and Comprehension indicate a strong to substantial improvement for the *QuickSmart* students in terms of accuracy and response time. The evidence provided illustrates that *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. 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 3.0 seconds, with accuracy results above 77%. In Level 2 Words, the average response rates were below 3.5 seconds, with average accuracy above 73%.

In Sentence Understanding Level 1, the average response rates were below 5.6 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 3.9 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 substantial improvement for *QuickSmart* students in Vocabulary and a strong improvement in 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 female *QuickSmart* students improved more than male *QuickSmart* students in both vocabulary and comprehension. The results of independent sample *t*-tests of *QuickSmart* students show that in comprehension the differences are not statistically significant at the 0.01 significance level ($p = 0.364$) but they are significant in vocabulary ($p = 0.006$). However, the small effect size for vocabulary (Cohen's $d = 0.265$) indicates that this statistical finding is not meaningful for practical purposes.

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.

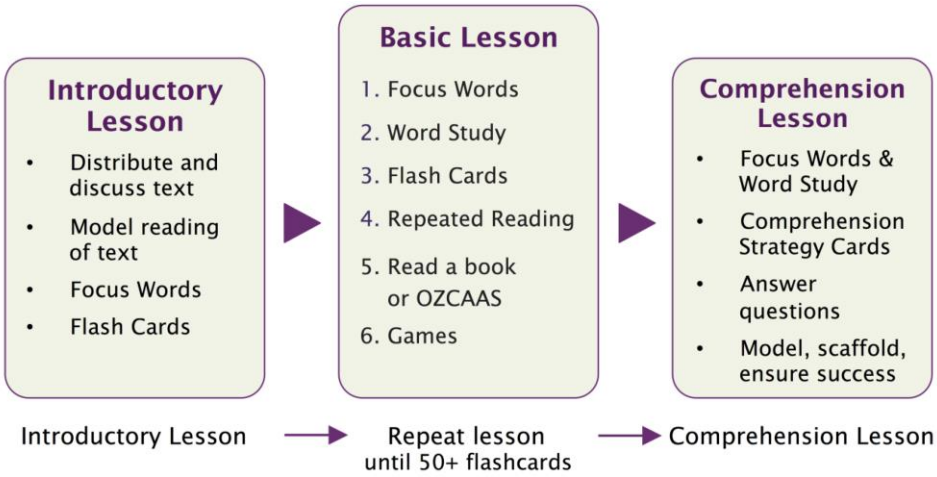


Figure 1: *QuickSmart* Literacy lesson structures

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 – 2018

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 2018, the *QuickSmart* team at the University of New England received data from 1,129 students who participated in *QuickSmart* Literacy lessons and 245 'average-achieving' comparison peers. These students were drawn from schools from 20 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.

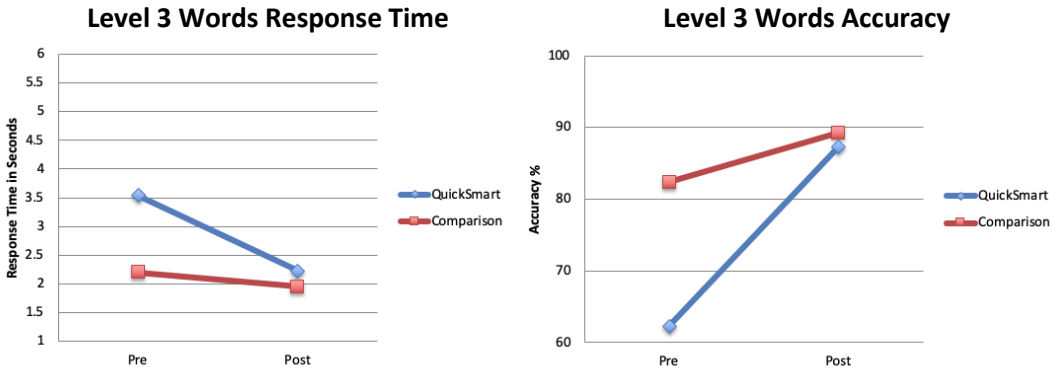
4.2 Combined OZCAAS Analysis

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 2018

Level 3 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	3.541	2.236	2.221	1.681	-1.320	<0.001*	0.667
Res Time (secs) Comp	2.195	1.405	1.947	1.244	-0.248	0.003	0.187
Accuracy (%) QS	62.298	23.553	87.413	18.094	25.115	<0.001*	1.196
Accuracy (%) Comp	82.414	17.221	89.300	11.637	6.886	<0.001*	0.469



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 1.320 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 0.667, 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 25 percentage points, which is a very strong result. The effect size of 1.196, 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.

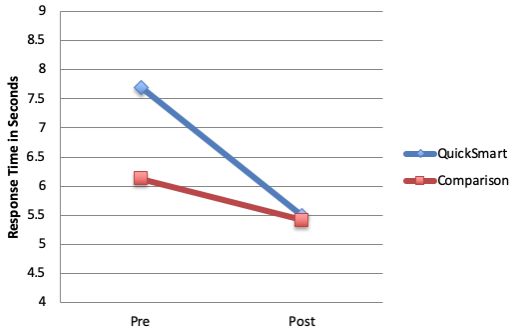
4.2.2 Sentence Understanding Level 2

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

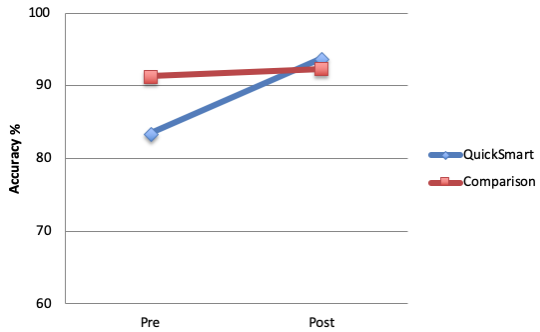
Table 2: OZCAAS Sentence Understanding Level 2 – all students 2018

Sentence Understanding Level 2	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	7.698	3.032	5.487	2.488	-2.211	<0.001*	0.797
Res Time (secs) Comp	6.124	2.462	5.416	2.001	-0.708	<0.001*	0.316
Accuracy (%) QS	83.513	14.393	93.766	9.814	10.253	<0.001*	0.832
Accuracy (%) Comp	91.321	9.077	92.351	8.632	1.030	0.087	0.116

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 2.211 seconds, which is a strong result. The effect size for this result is 0.797, which indicates very strong improvement.

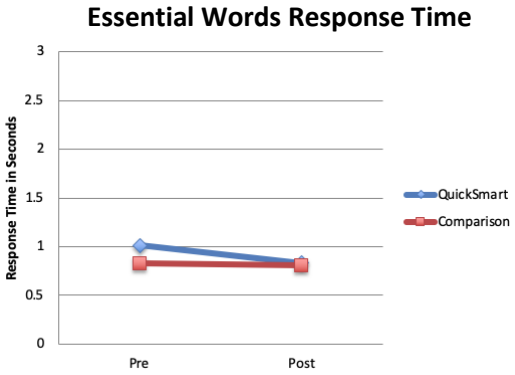
In terms of accuracy, the *QuickSmart* students' average scores have improved by more than 10 percentage points, which is a strong result. The effect size is 0.832, which indicates substantial improvement for the *QuickSmart* group.

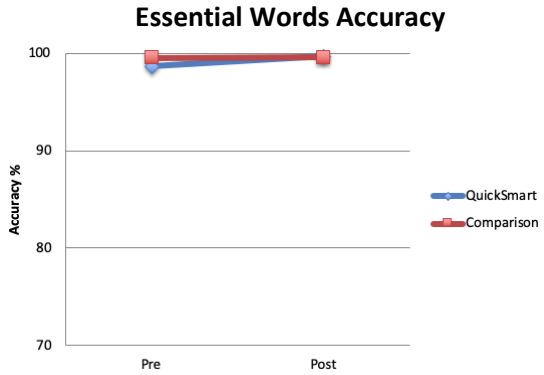
In summary, Table 2 shows that when compared to the scores of the comparison students, *QuickSmart* students' scores indicate greater improvement in terms of response time and accuracy in comprehension. The diagrams illustrate that as a result of the *QuickSmart* intervention, the *QuickSmart* students 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 2018

Essential Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	p	Effect size
Res Time (secs) QS	1.011	0.375	0.833	0.313	-0.178	<0.001*	0.515
Res Time (secs) Comp	0.828	0.260	0.805	0.301	-0.023	0.243	0.080
Accuracy (%) QS	98.716	4.329	99.725	1.566	1.009	<0.001*	0.310
Accuracy (%) Comp	99.624	2.346	99.642	2.652	0.018	0.841	0.007



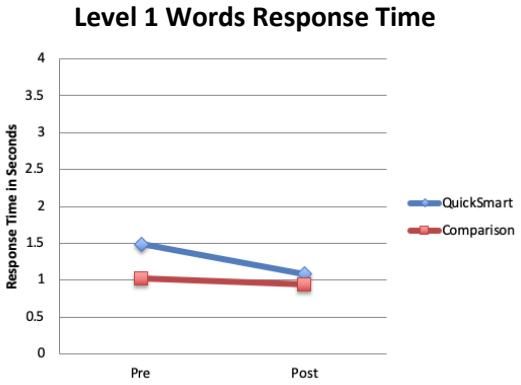


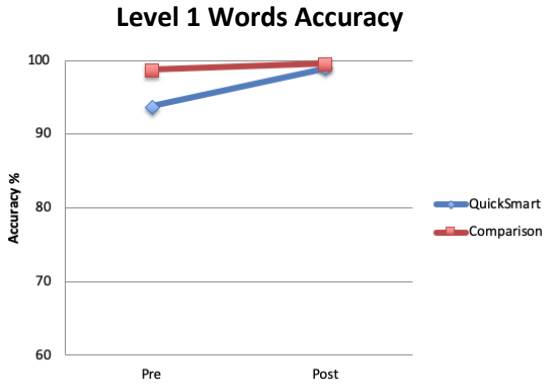
In summary, the results for Essential Words, the most commonly used words that should be known by middle school students, indicate a stronger improvement for the *QuickSmart* students than for the comparison students. However, both the response time and accuracy results show a strong ceiling effect as 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 2018

Level 1 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	1.489	1.015	1.082	0.508	-0.407	<0.001*	0.507
Res Time (secs) Comp	1.023	0.420	0.936	0.307	-0.087	<0.001*	0.236
Accuracy (%) QS	93.825	10.569	98.924	3.968	5.099	<0.001*	0.639
Accuracy (%) Comp	98.725	3.131	99.547	1.493	0.822	<0.001*	0.335



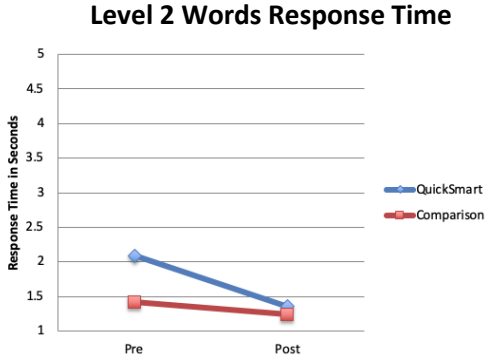


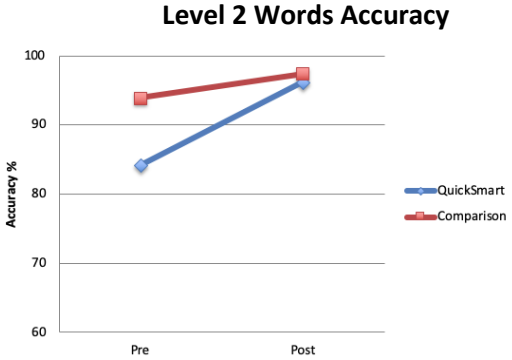
In summary, the results for Level 1 Words indicate a strong improvement for the *QuickSmart* students in response time and a very strong improvement in accuracy. The diagrams illustrate that as a result of the *QuickSmart* intervention, the *QuickSmart* students narrowed the gap to the comparison students 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 2018

Level 2 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	2.092	1.401	1.354	0.809	-0.738	<0.001*	0.645
Res Time (secs) Comp	1.414	0.930	1.235	0.738	-0.179	<0.001*	0.213
Accuracy (%) QS	84.253	16.099	96.260	8.803	12.007	<0.001*	0.925
Accuracy (%) Comp	93.961	8.272	97.394	4.491	3.433	<0.001*	0.516





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

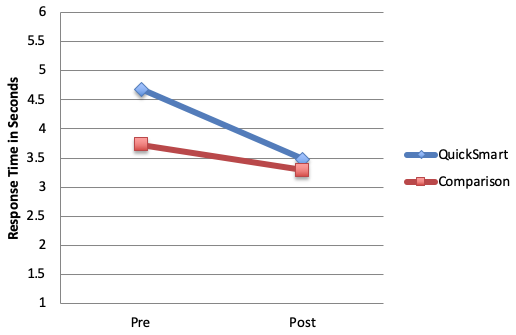
QuickSmart students narrowed the gap to the comparison students in both response time and accuracy.

4.2.6 Sentence Understanding Level 1

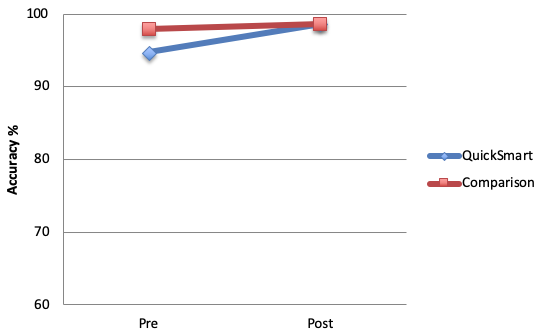
Table 6: OZCAAS Sentence Understanding Level 1 – all students 2018

Sentence Understanding Level 1	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Res Time (secs) QS	4.680	2.111	3.478	1.391	-1.202	<0.001*	0.673
Res Time (secs) Comp	3.728	1.562	3.290	1.189	-0.438	<0.001*	0.315
Accuracy (%) QS	94.756	8.678	98.645	3.979	3.889	<0.001*	0.576
Accuracy (%) Comp	97.989	4.201	98.651	3.554	0.662	0.027	0.170

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 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 2018

Essential Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	1.027	0.390	0.850	0.334	-0.177	<0.001*	0.487
Male Comparison	0.820	0.267	0.787	0.333	-0.033	0.301	0.107
Female *QuickSmart*	0.991	0.353	0.813	0.282	-0.178	<0.001*	0.560
Female Comparison	0.834	0.254	0.820	0.271	-0.014	0.555	0.054
Accuracy (%)							
Male *QuickSmart*	98.436	5.148	99.695	1.628	1.259	<0.001*	0.330
Male Comparison	99.334	3.333	99.431	3.768	0.097	0.577	0.027
Female *QuickSmart*	99.077	2.919	99.763	1.483	0.686	<0.001*	0.296
Female Comparison	99.870	0.816	99.821	0.969	-0.049		no improvement

In summary, the results of *QuickSmart* students show that in response time there is no difference between the females and 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 very strong ceiling effect.

4.3.2 Level 1 Words by Gender

Table 8: OZCAAS Level 1 Words results – all students by gender 2018

Level 1 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	1.515	1.049	1.098	0.499	-0.417	<0.001*	0.507
Male Comparison	1.043	0.514	0.913	0.323	-0.130	0.001	0.304
Female *QuickSmart*	1.456	0.971	1.062	0.518	-0.394	<0.001*	0.507
Female Comparison	1.005	0.318	0.956	0.293	-0.049	0.030	0.161
Accuracy (%)							
Male *QuickSmart*	93.065	11.661	98.729	4.474	5.664	<0.001*	0.641
Male Comparison	98.518	3.489	99.513	1.549	0.995	0.002	0.369
Female *QuickSmart*	94.797	8.899	99.172	3.195	4.375	<0.001*	0.654
Female Comparison	98.906	2.783	99.577	1.448	0.671	0.016	0.303

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 2018

Level 2 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	2.137	1.475	1.372	0.867	-0.765	<0.001*	0.633
Male Comparison	1.392	0.995	1.171	0.701	-0.221	0.002	0.257
Female *QuickSmart*	2.036	1.302	1.332	0.729	-0.704	<0.001*	0.667
Female Comparison	1.434	0.872	1.292	0.769	-0.142	0.001	0.172
Accuracy (%)							
Male *QuickSmart*	83.988	16.506	95.928	9.693	11.940	<0.001*	0.882
Male Comparison	94.463	8.927	97.154	4.918	2.691	<0.001*	0.373
Female *QuickSmart*	84.586	15.582	96.677	7.526	12.091	<0.001*	0.988
Female Comparison	93.513	7.651	97.608	4.083	4.095	<0.001*	0.668

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 = 0.400 for response time and 0.853 for accuracy).

4.3.4 Level 3 Words by Gender

Table 10: OZCAAS Level 3 Words results – all students by gender 2018

Level 3 Words	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	3.520	2.230	2.178	1.636	-1.342	<0.001*	0.686
Male Comparison	2.130	1.494	1.782	1.170	-0.348	0.006	0.259
Female *QuickSmart*	3.567	2.245	2.274	1.735	-1.293	<0.001*	0.644
Female Comparison	2.253	1.326	2.093	1.293	-0.160	0.138	0.122
Accuracy (%)							
Male *QuickSmart*	62.587	23.242	87.928	17.871	25.341	<0.001*	1.222
Male Comparison	82.523	17.256	90.624	11.534	8.101	<0.001*	0.552
Female *QuickSmart*	61.946	23.946	86.788	18.361	24.842	<0.001*	1.164
Female Comparison	82.318	17.259	88.124	11.648	5.806	<0.001*	0.394

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. The Independent sample *t*-tests showed that these differences are not statistically significant at the 0.01 significance level (p = 0.703 for response time and 0.679 for accuracy).

4.3.5 Sentence Understanding Level 1 by Gender

Table 11: OZCAAS Sentence Understanding Level 1 results – all students by gender 2018

Sentence Understanding Level 1	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	4.843	2.202	3.595	1.475	-1.248	<0.001*	0.666
Male Comparison	3.737	1.563	3.344	1.177	-0.393	<0.001*	0.284
Female *QuickSmart*	4.471	1.970	3.328	1.261	-1.143	<0.001*	0.691
Female Comparison	3.719	1.567	3.242	1.202	-0.477	<0.001*	0.342
Accuracy (%)							
Male *QuickSmart*	94.528	9.057	98.423	4.619	3.895	<0.001*	0.542
Male Comparison	97.850	4.114	98.380	4.016	0.530	0.234	0.130
Female *QuickSmart*	95.050	8.165	98.930	2.938	3.880	<0.001*	0.632
Female Comparison	98.112	4.290	98.891	3.083	0.779	0.055	0.209

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 = 0.319 for response time and 0.975 for accuracy).

4.3.6 Sentence Understanding Level 2 by Gender

Table 12: OZCAAS Sentence Understanding Level 2 results – all students by gender 2018

Sentence Understanding Level 2	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Response Time (seconds)							
Male *QuickSmart*	7.873	3.134	5.599	2.580	-2.274	<0.001*	0.792
Male Comparison	6.227	2.744	5.535	2.190	-0.692	<0.001*	0.279
Female *QuickSmart*	7.476	2.885	5.345	2.361	-2.131	<0.001*	0.808
Female Comparison	6.033	2.188	5.311	1.818	-0.722	<0.001*	0.359
Accuracy (%)							
Male *QuickSmart*	82.790	15.103	93.264	10.440	10.474	<0.001*	0.807
Male Comparison	90.570	8.628	91.378	9.294	0.808	0.380	0.090
Female *QuickSmart*	84.431	13.400	94.404	8.928	9.973	<0.001*	0.876
Female Comparison	91.988	9.442	93.216	7.936	1.228	0.124	0.141

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 = 0.435 for response time and 0.573 for accuracy).

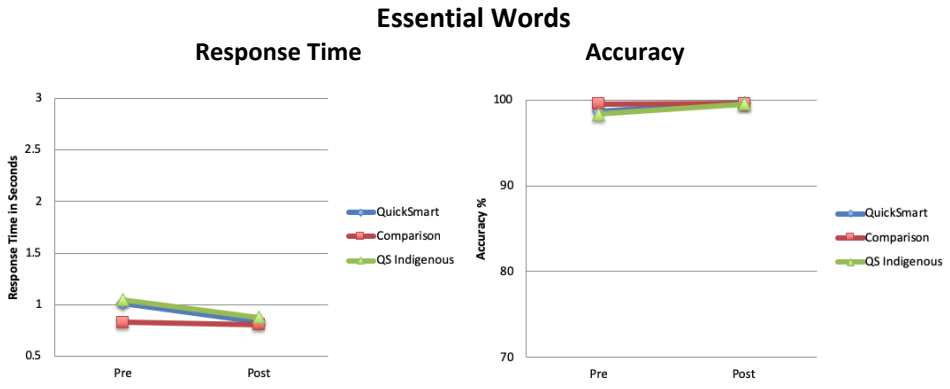
4.3.7 Indigenous Students

Table 13: OZCAAS results – Indigenous *QuickSmart* students 2018

Test	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Gain	*p*	Effect size
Essential Words							
Response time (seconds)	1.047	0.506	0.874	0.294	-0.173	0.002	0.418
Accuracy (%)	98.360	6.332	99.522	2.208	1.162	0.050	0.245
Level 1 Words							
Response time (seconds)	1.310	0.435	1.049	0.401	-0.261	<0.001*	0.625
Accuracy (%)	95.163	7.553	99.181	3.080	4.018	<0.001*	0.697
Level 2 Words							
Response time (seconds)	2.011	1.217	1.440	0.917	-0.571	<0.001*	0.530
Accuracy (%)	85.238	15.846	95.953	8.338	10.715	<0.001*	0.846
Level 3 Words							
Response time (seconds)	3.298	1.784	2.203	1.400	-1.095	<0.001*	0.683
Accuracy (%)	64.292	20.139	88.384	18.024	24.092	<0.001*	1.261
Sentence Understanding Level 1							
Response time (seconds)	4.318	1.652	3.359	1.276	-0.959	<0.001*	0.650
Accuracy (%)	95.674	8.313	99.138	2.318	3.464	0.001	0.568
Sentence Understanding Level 2							
Response time (seconds)	7.673	3.419	5.105	2.662	-2.568	<0.001*	0.838
Accuracy (%)	85.444	11.218	93.268	10.049	7.824	<0.001*	0.735

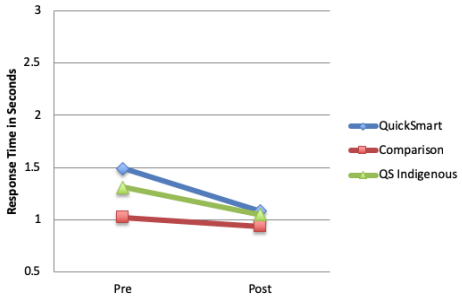
These results indicate that the Indigenous students' gains are comparable to those of the overall *QuickSmart* group. For Essential Words and Level 1 Words, both the response time and accuracy results are impacted by the ceiling effect (the pre-intervention scores were so high that the students did not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

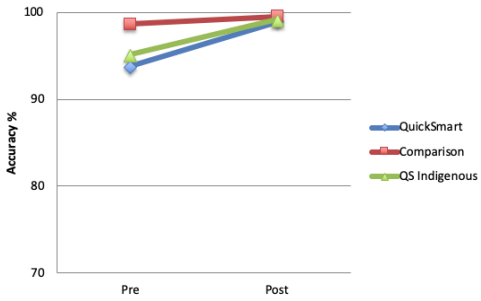


Level 1 Words

Response Time

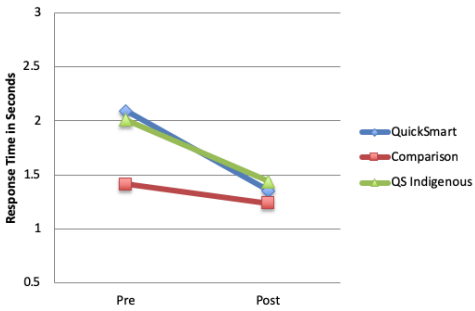


Accuracy

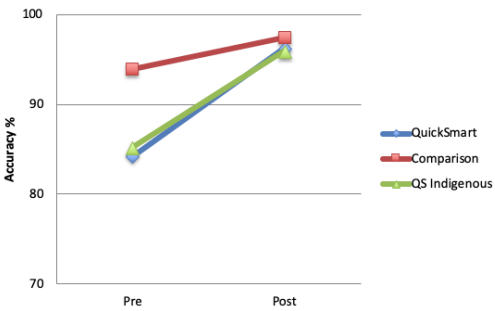


Level 2 Words

Response Time

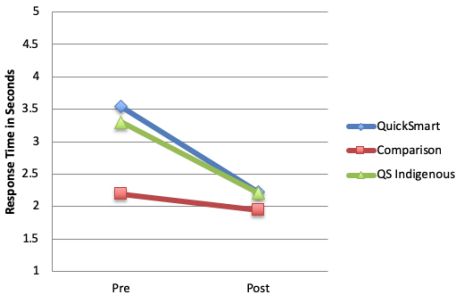


Accuracy

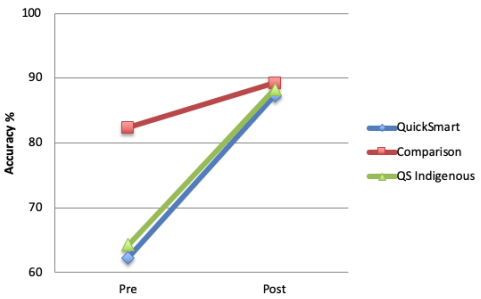


Level 3 Words

Response Time

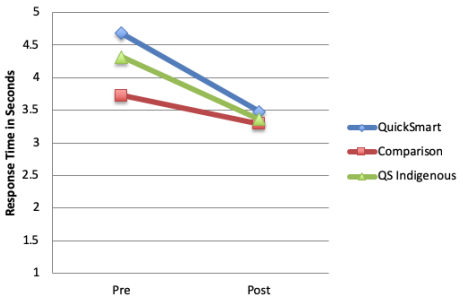


Accuracy

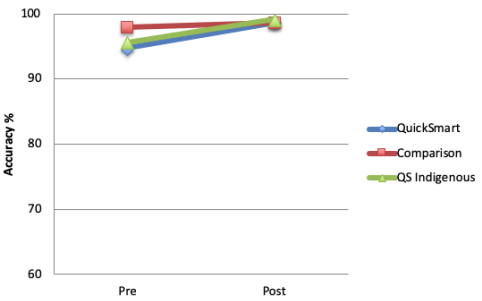


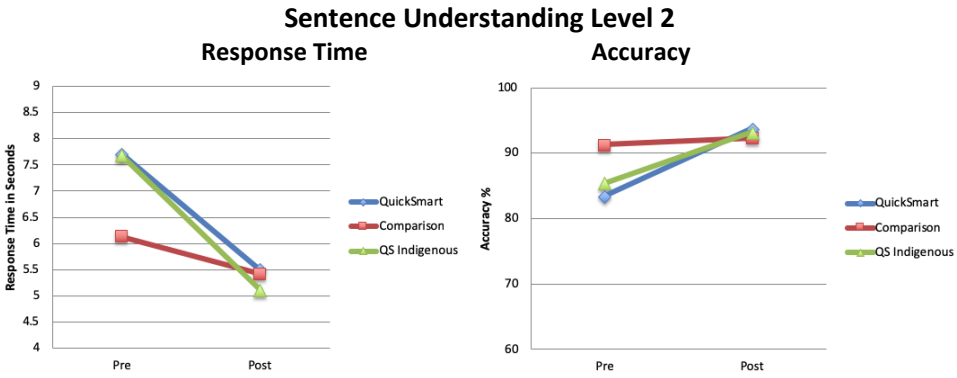
Sentence Understanding Level 1

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 – 2018

	Mean	Std. Deviation
Essential Words		
Response time (seconds)	0.993	0.180
Accuracy (%)	97.520	3.926
Level 1 Words		
Response time (seconds)	2.946	2.830
Accuracy (%)	77.357	32.203
Level 2 Words		
Response time (seconds)	3.437	2.630
Accuracy (%)	73.850	18.398
Level 3 Words		
Response time (seconds)	3.802	2.538
Accuracy (%)	63.355	24.011
Sentence Understanding Level 1		
Response time (seconds)	5.533	2.176
Accuracy (%)	94.427	9.815
Sentence Understanding Level 2		
Response time (seconds)	8.068	3.950
Accuracy (%)	83.584	16.301

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 3.0 seconds, with accuracy results above 77%. In Level 2 Words, the average response rates were below 3.5 seconds, with average accuracy above 73%.

In Sentence Understanding Level 1, the average response rates were below 5.6 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 3.9

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 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) 2018

Group	Average Gain score	Significance	Effect size
Vocabulary			
All *QuickSmart*	7.930	<0.001*	0.835
All Comparison	4.410	<0.001*	0.556
Comprehension			
All *QuickSmart*	6.159	<0.001*	0.527
All Comparison	1.780	0.023	0.155

The results indicate a substantial improvement for *QuickSmart* students in Vocabulary and a 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) 2018

Gender	Average Gain score	Significance	Effect size
Vocabulary			
QuickSmart Male	6.908	<0.001*	0.714
Comparison Male	4.964	<0.001*	0.762
QuickSmart Female	9.227	<0.001*	1.004
Comparison Female	3.942	<0.001*	0.454
Comprehension			
QuickSmart Male	5.900	<0.001*	0.519
Comparison Male	1.746	0.164	0.160
QuickSmart Female	6.478	<0.001*	0.539
Comparison Female	1.804	0.074	0.152

In terms of Scale scores, the results indicate that female *QuickSmart* students improved more than male *QuickSmart* students in both vocabulary and comprehension. The results of independent sample *t*-tests of *QuickSmart* students show that in comprehension the differences are not statistically significant at the 0.01 significance level ($p = 0.364$) but they are significant in vocabulary ($p = 0.006$). However, the small effect size for vocabulary (Cohen's $d = 0.265$) indicates that this statistical finding is not meaningful for practical purposes.

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) 2018

Group	Average Gain score	Significance	Effect size
Vocabulary			
Indigenous *QuickSmart*	8.179	<0.001*	1.059
All Comparison	4.410	<0.001*	0.556
Comprehension			
Indigenous *QuickSmart*	5.235	<0.001*	0.488
All Comparison	1.780	0.023	0.155

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 also show a 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 9. 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.

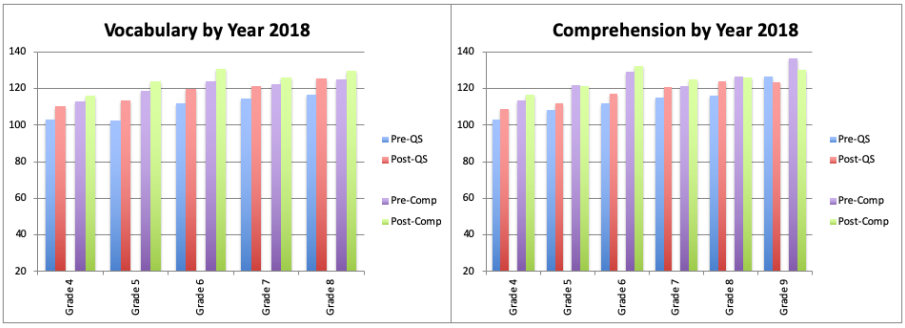


Figure 2: PAT-V and PAT-C by Year

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	Percentage with Gain
Vocabulary	
QuickSmart	82.9
Comparison	77.6
Comprehension	
QuickSmart	76.3
Comparison	58.3

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) 6773 5065.

Professor John Pegg

7 APPENDIX A: Independent Assessment Results

7.1 PAT Results by Region – (Scale Scores) 2018

Cluster of Schools	Pre-Intervention		Post-Intervention				
	Mean	SD	Mean	SD	Gain	p	Effect size
Adelaide Comprehension - QuickSmart Group	111.307	15.709	115.279	10.737	3.972	0.036	0.295
Ballarat Comprehension - QuickSmart Group	112.894	4.725	121.656	5.131	8.762	<0.001*	1.777
Geelong Vocab - QuickSmart Group	110.927	8.190	119.097	7.858	8.170	<0.001*	1.018
Geelong Comprehension - QuickSmart Group	110.177	6.267	115.754	5.844	5.577	<0.001*	0.920
Gippsland Vocab - QuickSmart Group	114.735	5.757	119.571	6.950	4.836	<0.001*	0.758
Gippsland Comprehension - QuickSmart Group	119.114	7.554	126.351	5.990	7.237	<0.001*	1.062
Horsham Vocab - QuickSmart Group	117.750	6.409	121.050	7.837	3.300	<0.001*	0.461
Horsham Comprehension - QuickSmart Group	108.509	7.982	121.645	7.812	13.136	0.319	1.663
Hunter Comprehension - QuickSmart Group	112.558	4.980	119.725	7.174	7.167	0.018	1.161
Limestone Comprehension - QuickSmart Group	117.525	3.229	126.600	9.820	9.075	0.239	1.242
Melbourne Vocab - QuickSmart Group	115.317	6.563	122.281	8.845	6.964	<0.001*	0.894
Melbourne Comprehension - QuickSmart Group	116.482	6.515	124.470	9.066	7.988	<0.001*	1.012
Mid-West Vocab - QuickSmart Group	106.883	6.622	113.150	9.802	6.267	0.018	0.749
Mid-West Comprehension - QuickSmart Group	108.817	8.808	116.317	9.867	7.500	0.004	0.802
Mornington Vocab - QuickSmart Group	114.767	6.147	121.489	6.897	6.722	0.001	1.029
Mornington Comprehension - QuickSmart Group	111.410	7.509	118.750	5.465	7.340	0.015	1.118
North Coast Vocab - QuickSmart Group	106.652	10.443	114.981	7.768	8.329	<0.001*	0.905
North Coast Comprehension - QuickSmart Group	113.131	10.282	120.335	8.544	7.204	<0.001*	0.762
North West Vocab - QuickSmart Group	116.186	9.605	127.281	10.748	11.095	<0.001*	1.089
North West Comprehension - QuickSmart Group	117.081	10.236	127.986	11.682	10.905	<0.001*	0.993
Perth Comprehension - QuickSmart Group	124.458	4.638	123.583	5.015	-0.875		no improvement
Queensland Vocab - QuickSmart Group	115.386	5.496	126.957	7.869	11.571	<0.001*	1.705

Queensland Comprehension - QuickSmart Group	108.468	15.015	110.756	15.343	2.288	<0.001*	0.151
Riverina Vocab - QuickSmart Group	112.733	10.684	120.804	9.209	8.071	<0.001*	0.809
Riverina Comprehension - QuickSmart Group	112.365	9.527	119.200	12.346	6.835	<0.001*	0.620
Southern Sydney Vocab - QuickSmart Group	115.393	11.192	119.071	9.988	3.678	0.080	0.347
Southern Sydney Comprehension - QuickSmart Group	116.507	10.849	123.736	13.988	7.229	0.001	0.578
Sydney Vocab - QuickSmart Group	112.837	9.502	121.798	8.802	8.961	<0.001*	0.978
Sydney Comprehension - QuickSmart Group	115.904	11.699	119.531	13.607	3.627	<0.001*	0.286
Western Syd Vocab - QuickSmart Group	107.250	7.080	110.936	9.403	3.686	0.088	0.443
Western Syd Comprehension - QuickSmart Group	114.279	7.161	118.557	9.663	4.278	0.033	0.503

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

7.2 PAT Results – by Demographic (Scale Scores) 2018

Demographic	Pre-Intervention		Post-Intervention				
	Mean	SD	Mean	SD	Gain	p	Effect size
All Schools Vocabulary – *QuickSmart* Group	113.156	9.195	121.086	9.780	7.930	<0.001*	0.835
All Schools Vocabulary – Comparison Group	121.565	7.667	125.975	8.199	4.410	<0.001*	0.556
All Schools Comprehension – *QuickSmart* Group	114.022	10.996	120.181	12.336	6.159	<0.001*	0.527
All Schools Comprehension – Comparison Group	122.903	11.231	124.683	11.682	1.780	0.023	0.155
Vocabulary – *QuickSmart* Indigenous	112.130	7.510	120.309	7.926	8.179	<0.001*	1.059
Comprehension – *QuickSmart* Indigenous	112.243	9.700	117.478	11.648	5.235	<0.001*	0.488
Vocabulary – *QuickSmart* Male	113.136	9.558	120.044	9.798	6.908	<0.001*	0.714
Vocabulary – Comparison Male	123.272	6.291	128.236	6.731	4.964	<0.001*	0.762
Vocabulary – *QuickSmart* Female	113.182	8.736	122.409	9.619	9.227	<0.001*	1.004
Vocabulary – Comparison Female	120.117	8.464	124.059	8.891	3.942	<0.001*	0.454
Comprehension – *QuickSmart* Male	113.526	10.850	119.426	11.878	5.900	<0.001*	0.519
Comprehension – Comparison Male	123.754	10.069	125.500	11.673	1.746	0.164	0.160
Comprehension – *QuickSmart* Female	114.635	11.161	121.113	12.837	6.478	<0.001*	0.539
Comprehension – Comparison Female	122.278	12.035	124.082	11.723	1.804	0.074	0.152

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

7.3 PAT Results – by State (Scale Scores) 2018

Demographic	Pre-Intervention		Post-Intervention				
	Mean	SD	Mean	SD	Gain	p	Effect size
NSW Vocabulary – *QuickSmart* Group	112.183	10.460	120.808	10.622	8.625	<0.001*	0.818
NSW Vocabulary – Comparison Group	121.675	7.7348	127.242	9.336	5.567	<0.001*	0.649
NSW Comprehension – *QuickSmart* Group	114.880	10.509	121.608	12.082	6.728	<0.001*	0.594
NSW Comprehension – Comparison Group	121.435	10.472	123.460	14.078	2.025	0.277	0.163
Qld Vocabulary – *QuickSmart* Group	115.386	5.496	126.957	7.869	11.571	<0.001*	1.705
Qld Vocabulary – Comparison Group	125.213	5.3619	127.625	3.9253	2.412	0.447	0.513
Qld Comprehension – *QuickSmart* Group	108.468	15.015	110.756	15.343	2.288	<0.001*	0.151
Qld Comprehension – Comparison Group	116.930	12.944	118.304	13.238	1.374	0.389	0.105
SA Comprehension – *QuickSmart* Group	112.084	14.843	116.694	11.145	4.610	0.013	0.351
SA Comprehension – Comparison Group	114.175	10.2451	124.550	9.0176	10.375	0.184	1.075
Vic Vocabulary – *QuickSmart* Group	114.502	6.832	121.171	8.281	6.669	<0.001*	0.879
Vic Vocabulary – Comparison Group	120.756	7.9187	124.541	7.6238	3.785	<0.001*	0.487
Vic Comprehension – *QuickSmart* Group	115.362	7.242	123.240	8.485	7.878	<0.001*	0.999
Vic Comprehension – Comparison Group	123.278	8.5307	126.956	8.9137	3.678	<0.001*	0.422
WA Comprehension – *QuickSmart* Group	124.458	4.638	123.583	5.015	-0.875		no improvement
WA Comprehension – Comparison Group	135.922	6.6223	130.050	6.5649	-5.872		no improvement

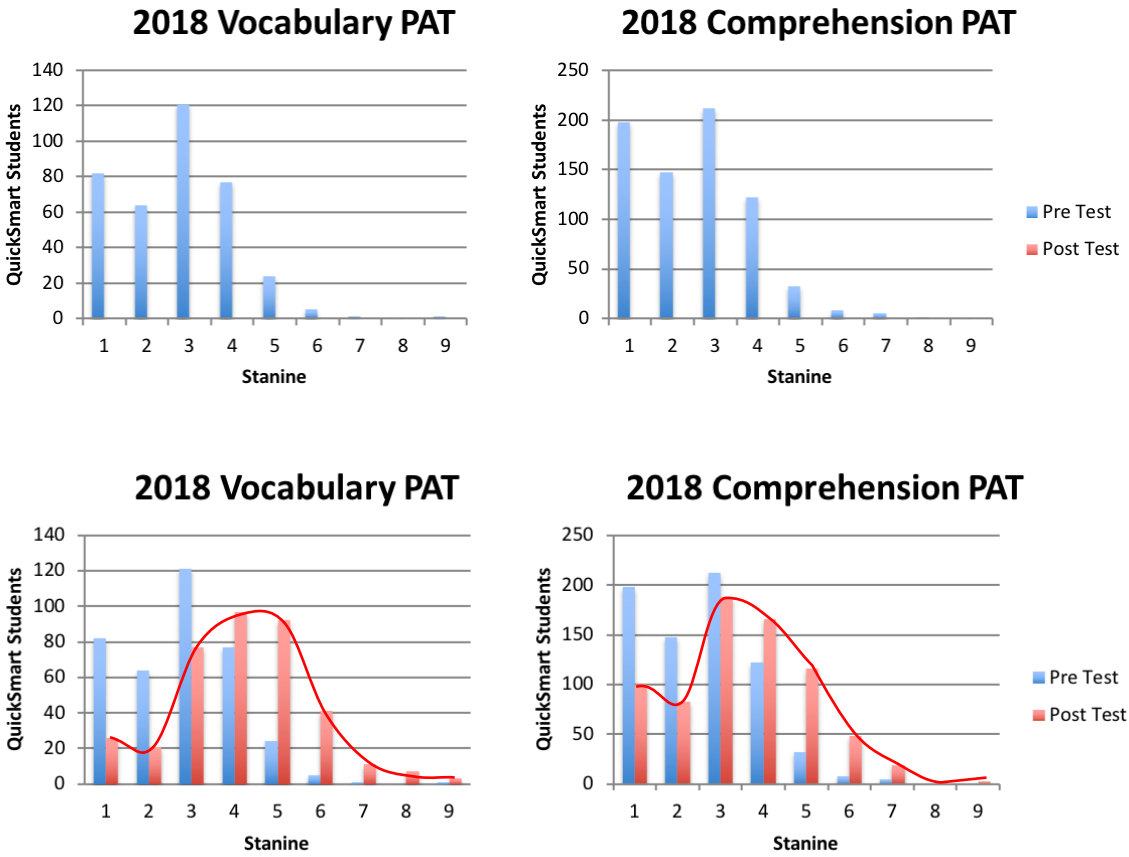
Note: only students who did both 'pre' and 'post' test are included in the table.

7.4 PAT Results – by Year (Scale Scores) 2018

Year	Pre-Intervention		Post-Intervention				
	Mean	SD	Mean	SD	Gain	p	Effect size
Year 4 Vocabulary – *QuickSmart* Group	102.794	8.072	110.278	7.544	7.484	0.003	0.958
Year 4 Vocabulary – Comparison Group	112.880	4.290	116.080	5.009	3.200	0.070	0.686
Year 4 Comprehension – *QuickSmart* Group	103.215	9.693	108.558	9.619	5.343	0.001	0.553
Year 4 Comprehension – Comparison Group	113.420	5.684	116.570	12.095	3.150	0.532	0.333
Year 5 Vocabulary – *QuickSmart* Group	102.574	10.471	113.556	7.737	10.982	<0.001*	1.193
Year 5 Vocabulary – Comparison Group	118.679	5.551	124.057	8.335	5.378	0.007	0.759
Year 5 Comprehension – *QuickSmart* Group	108.012	12.834	111.985	11.250	3.973	0.007	0.329
Year 5 Comprehension – Comparison Group	122.068	7.355	121.505	11.315	-0.563		no improvement
Year 6 Vocabulary – *QuickSmart* Group	112.056	7.354	119.970	9.483	7.914	<0.001*	0.933
Year 6 Vocabulary – Comparison Group	123.833	5.311	130.800	5.897	6.967	0.017	1.242
Year 6 Comprehension – *QuickSmart* Group	111.887	10.522	116.941	12.722	5.054	0.005	0.433
Year 6 Comprehension – Comparison Group	129.238	8.710	132.125	11.417	2.887	0.359	0.284
Year 7 Vocabulary – *QuickSmart* Group	114.346	7.506	121.302	8.582	6.956	<0.001*	0.863
Year 7 Vocabulary – Comparison Group	122.331	7.844	126.065	7.835	3.734	<0.001*	0.476
Year 7 Comprehension – *QuickSmart* Group	114.899	10.125	121.029	11.512	6.130	<0.001*	0.565
Year 7 Comprehension – Comparison Group	121.433	11.139	124.973	12.146	3.540	<0.001*	0.304
Year 8 Vocabulary – *QuickSmart* Group	116.527	8.618	125.472	10.346	8.945	<0.001*	0.940
Year 8 Vocabulary – Comparison Group	124.800	9.499	129.538	8.994	4.738	0.088	0.512
Year 8 Comprehension – *QuickSmart* Group	116.187	10.874	123.701	12.967	7.514	<0.001*	0.628
Year 8 Comprehension – Comparison Group	126.385	10.488	125.962	9.337	-0.423		no improvement
Year 9 Comprehension – *QuickSmart* Group	126.314	5.003	123.386	5.388	-2.928		no improvement
Year 9 Comprehension – Comparison Group	136.515	6.455	130.046	6.205	-6.469		no improvement

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

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.