Final Report

Building Capacity for Quality Teacher Rounds – Victoria

Vaughan, T., Richardson, S., Carslake, T., Reimers, T., Macaskill, G., Newton, T., Zoanetti, N., Mannion, A., and Murphy, M.

ACER

Prepared for:

Teachers and Teaching Research Centre
- The University of Newcastle

29 March 2023

COMPANY INFORMATION

COMPANY	The Australian Council for Educational Research Limited (ACER)
ABN	19 004 398 145
COMPANY ADDRESS	19 Prospect Hill Road Camberwell, Victoria 3124 Australia
WEBSITE	www.acer.org
TELEPHONE	+61 3 9277 5555
FAX	+61 3 9277 5500
CONTACT PERSON	Dr Sarah Richardson
EMAIL ADDRESS	sarah.richardson@acer.org
DIRECT TELEPHONE	+61 3 9277 5763

ISBN: 978-0-7259-0963-6

List of Acronyms

ACER	Australian Council for Educational Research
COVID-19	The name of the disease caused by the novel coronavirus. CO for corona, VI for virus, D for Disease, and 19 for the year the outbreak was first recognised in late 2019
ICSEA	Index of Community Socio-educational Advantage
NAPLAN	National Assessment Program – Literacy and Numeracy
OARS	Online Assessment and Reporting (OARS)
PAT	Progressive Achievement Test
PAT-M	Progressive Achievement Test Mathematics
PAT-R	Progressive Achievement Test Reading
PL	Professional Learning
PLC	Professional Learning Community
TTRC	Teachers and Teaching Research Centre
QT	Quality Teaching
QTR	Quality Teaching Rounds
RCT	Randomised Controlled Trial

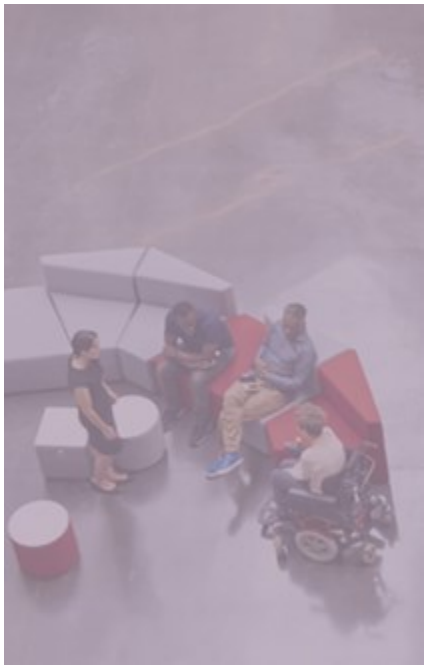
This Final Report should be cited as: Vaughan, T., Richardson, S., Carslake, T., Reimers, T., Macaskill, G., Newton, T., Zoanetti, N., Mannion, A., and Murphy, M. (2023). Final Report: Building Capacity for Quality Teacher Rounds – Victoria. Australian Council for Educational Research.

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY



The Australian Council for Educational Research (ACER) was commissioned by the Teachers and Teaching Research Centre (TTRC) at the University of Newcastle to conduct an independent randomised controlled trial (RCT), with the goal of examining effects of Quality Teaching Rounds (QTR) on student outcomes and teachers' practice in Victorian high schools.

TTRC recruited a total of 40 schools and obtained informed consent for 791 students and 160 teachers to participate in the study. There was minor reduction of the participants during the RCT, resulting in a final total of 147 teachers (92%), 786 students (99%) and 39 schools (98%) taking part in the study. Considering the pressures faced within schools in Victoria, with the ongoing impact of the COVID-19 pandemic and extensive flooding, these attritions were not unexpected.

ACER randomised the sample accounting for:

- location (major cities/inner regional/outer regional);
- school gender (co-educational/female/male);
- school type (combined/primary/ secondary);
- Index of Community Socio-educational Advantage (ICSEA) score (four equal sized groups based on the ICSEA values of the 40 schools);
- Year 7 National Assessment Program – Literacy and Numeracy (NAPLAN) reading score (four equal sized groups);
- school authority (government/non-government); and
- enrolment size (sum of enrolments from Years 7 to 12).

A total of 19 schools participated in Quality Teaching Rounds in 2022, with 20 schools in the waitlist control.

Data were gathered in an ongoing manner during the evaluation with:

- Progressive Assessment Tests in Mathematics (PAT-M) and reading (PAT-R) – baseline and follow up;
- student self-efficacy and aspiration surveys – baseline and

follow up;
- teacher surveys – one questionnaire administered every term;
- implementation fidelity check surveys for teachers to complete for each QT Round; and
- implementation fidelity checks with onsite visits from ACER staff for 33% of the treatment schools.

A power calculation determined there was 75% power at p=0.05 to detect a difference between the control and treatment groups for Progressive Achievement Test Reading (PAT-R) and Progressive Achievement Test Mathematics (PAT-M). No significant increases were detected within the treatment group in the PAT results, this was unsurprising given the insufficient power in the population.

There was no statistically significant difference in student achievement between intervention and control groups across the eight month intervention period. There was an additional gain of 0.55 scale points for the control group in PAT-R in comparison to the treatment group. Similarly, students within the control group gained an additional 2.17 within PAT-M above the growth of the treatment students. This is in contrast to a Randomised Controlled Trial of QTR conducted in New South Wales primary schools that showed a significant increase in PAT-M (Gore et al., 2021).

Mixed model analysis showed that treatment was not a significant predictor of PAT outcomes. This was not an unexpected result for this study, as made clear by the power analysis, reflecting the constraints in sample sizes, the duration of the treatment and the reasonably high baseline performance observed. Gender, specifically male gender, was seen to negatively impact the outcomes in reading. Similar impacts of gender have been noted in research literature (Lietz, 2006; Thomas et al., 2022).

As part of the evaluation four teacher surveys were administered, one per term. The completion rates of the teacher surveys were: Term 1, 86% (n=138); Term 2, 73% (n=110); Term 3, 77% (n=113); and Term 4, 69% (n=99).

For the statistical analysis the teacher data were paired. There was a period of eight months (April-December 2022) from the first questionnaire to the final questionnaire. For the treatment group teacher student support decreased. Within the control group there

was significantly improved teacher efficacy.

To examine the results from the student questionnaires, the student questionnaire data were paired. There were no statistically significant differences between the control and treatment groups for demographic variables. Students in the control group reported a significant increase in the level of education that they aspired to complete ($p = 0.037$).

ACER completed seven implementation fidelity checks (representing 33% of participating schools). These schools were selected to include variability according to their sector/system, size, ICSEA and geolocation. An analysis has been conducted on the fidelity check questionnaires by ACER staff. Some observations identified from the analysis of the fidelity checks are 1) teacher stress caused by high rates of student absenteeism due to illness (COVID-19 and influenza) and school refusal, 2) varied use of the Classroom Practice Guide, 3) analytical conversations about some elements and terms and 4) lack of clarity around particular terms such as 'occasionally' and 'most'.

Findings

Key findings include:

- The mixed model analysis showed that treatment was not a significant predictor of PAT-R and PAT-M outcomes.
- Differences in student responses to the self-efficacy and aspiration surveys were identified. The control group showed a significant increase in the level of education that they aspired to complete ($p = 0.037$).
- Teachers in the control group had statistically significant growth in teacher efficacy, while those in the treatment group showed statistically significant lower teacher student support.
- Within the QTR process, the longest time was spent on discussing the coding and the individual coding process.

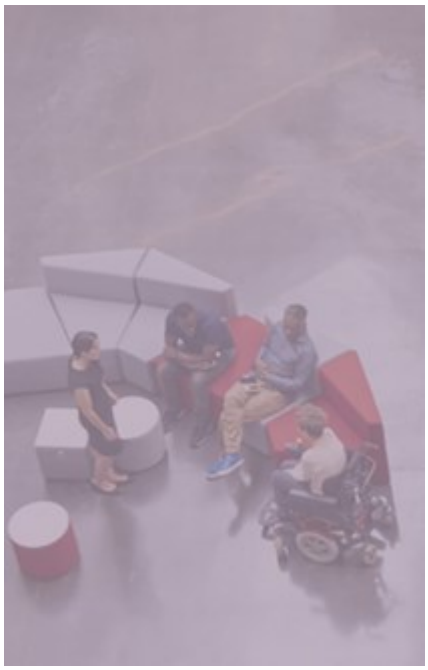
Key observations identified from analysis of the fidelity check data are:

- teacher stress due to high rates of absenteeism;
- varied use of the Classroom Practice Guide; and
- analytical conversations about some elements and terms.

INTRODUCTION

CONTEXT

High quality educational provision is essential to future-proofing Australia. Teachers' classroom practice accounts for the largest in-school impact on student learning, with an estimated overall effect size of 0.49 (Hattie, 2009, 2012). Teachers are of key importance in helping learners gain the competencies and attributes they will need to thrive in their future lives.



Unfortunately, numerous studies have raised concerns about teaching quality, and teachers themselves also raise concerns (Bahr & Mellor, 2016; Heffernan et al., 2019), with the topic becoming highly politicised (Barnes & Cross, 2020).

Endeavors to enhance teaching quality have largely focused on the entry requirements for new recruits and improving ITE (Fitzgerald & Knipe, 2016; Yeigh & Lynch, 2017). For existing teachers, this effort has been focused on the provision of professional learning opportunities. Despite a profusion of professional learning approaches and large amounts of investment, there has been little evidence of a positive impact on teacher or student performance (Cordingley et al., 2015; Darling-Hammond et al., 2017; Sprott, 2019; Vaughan, 2020).

> *The key premise of professional development is that learning to teach continues throughout teachers' careers. And yet, experienced teachers are often portrayed in media and public policy as resistant to such learning and afraid of change. (Gore & Rickards, 2021, p. 335)*

Where positive outcomes are reported, these have tended to derive from methodologically weak studies that overly rely on self-reporting by teachers (Thurlings & den Brok, 2017). Positive outcomes can be particularly challenging to achieve when programmes are implemented at scale (Albers & Pattuwage, 2017; Albers et al., 2017; Lindvall et al., 2018). Poor design, inappropriate content, inadequate implementation and an overall weakness in methodology has been blamed (Cordingley et al., 2015; Darling-Hammond et al., 2017; Lindvall et al., 2018; Sharples et al., 2020). The lack of studies reporting positive effects of professional

learning, particularly in terms of the absence of evidence of enhanced student performance (ACARA, 2021; OECD, 2014), is concerning, as it undermines one of the key purposes for which teacher professional development is designed. Addressing these issues and finding ways to support teacher development that leads to measurable improvements in learner performance is a pressing concern.

The University of Newcastle's *Building Capacity for Quality Teaching in Australian Schools* program of research is focusing on just this challenge; finding an approach to teacher capacity development that yields demonstrable outcomes in the quality of teaching (Gore et al., 2017; Gore & Rosser, 2022) and student achievement (Gore et al., 2021; Miller et al., 2019) with a design that is suitable for implementation at scale (Patfield et al., 2022).

QUALITY TEACHING ROUNDS

The *Building Capacity for Quality Teaching in Victoria* project is grounded in Quality Teaching Rounds (QTR). QTR is a pedagogy-focused approach to professional development described as "being applicable to all teachers" (Patfield et al., 2022, p. 3), regardless of the year level/s or subjects they are teaching or their length of teaching experience (Gore & Rickards, 2021).

QTR is founded on evidence-based effective pedagogy (Ladwig, 2007; Newmann, 1996) and effective professional development (Cordingley et al., 2015; Darling-Hammond & McLaughlin, 1995). It is professional learning based in Professional Learning Communities (PLCs), combined with instructional rounds grounded in the pedagogical framework of the Quality Teaching (QT) Model (Gore & Rickards, 2021). The QT Model provides a structure to the observation and analysis of teaching (Gore & Rickards, 2021).

The focus of QTR is "on teaching, rather than the teacher, providing educators with a shared conceptual and linguistic base for analysing, discussing, and enhancing practice".(Patfield et al., 2022, p. 3)

The QT Model provides this shared conceptual and linguistic base and comprises the three dimensions of Intellectual Quality, Quality

learning Environment and Significance. Within each dimension there are six elements as outlined in **Table 1**.

Table 1: The three dimensions and 18 elements of the Quality Teaching Model

Dimensions	Elements
Intellectual Quality Intellectual Quality refers to pedagogy focused on a deep understanding of important, substantive concepts, skills and ideas. Such pedagogy treats knowledge as requiring active construction and engages students in higher-order thinking and communicating about what they are learning.	**Deep Knowledge** **Deep Understanding** **Problematic Knowledge** **Higher-Order Thinking** **Metalanguage** **Substantive Communication**
Quality Learning Environment Quality Learning Environment refers to pedagogy that creates classrooms where students and teachers work productively and are clearly focused on learning. Such pedagogy sets high expectations and develops positive relationships among teachers and students.	**Explicit Quality Criteria** **Engagement** **High Expectations** **Social Support** **Student Self-regulation** **Student Direction**
Significance Significance refers to pedagogy that helps make learning more meaningful to students. Such pedagogy draws clear connections with students' prior knowledge and identities, with contexts outside of the classroom, and with multiple ways of knowing or cultural perspectives.	**Background Knowledge** **Cultural Knowledge** **Knowledge Integration** **Inclusivity** **Connectedness** **Narrative**

Source: State of NSW Department of Education (2021, p. 4)

The key driver for professional development activities is encouraging ongoing learning and application to practice. The

activities in professional learning should allow for "frequent and meaningful engagement, and move away from a model of one day, one-off training" (Education Endowment Foundation, 2019, p. 5).

To encourage meaningful changes in teaching practice, professional development needs to span a minimum timeframe of two terms and ideally involves repeated practice over the space of a year (Cordingley et al., 2015). Central to effective professional learning is providing ongoing support to teachers over a prolonged period of time. This support can be provided through coaching. Coaching and supervision has been shown to have a substantial impact on student outcomes (Artman-Meeker et al., 2014; Clarke et al., 2014; Gray et al., 2015; Kam et al., 2003; Matsumura et al., 2010; Sarama et al., 2008). The closer professional development is to teachers' work, in terms of specificity of content and pedagogy, the greater the chance that this will lead to changes in teachers practice (Cordingley et al., 2015; Vaughan, 2020). In QTR, teachers' work and professional development are closely aligned. Patfield et al. (2022) described this as:

> *In QTR, rounds are used to support educators to notice, diagnose, describe and subsequently improve practice using contextually dependent knowledge of their school and students, ultimately constructing a shared knowledge base of effective teaching with colleagues who understand that context. (Patfield et al., 2022, p. 3)*

Research into QTR has successfully demonstrated a positive impact on teaching quality and morale (Gore et al., 2017). This impact has been shown to be maintained six months post the intervention (Gore et al., 2017). What is particularly noteworthy is that this impact has been evident across both primary and secondary sectors, for teachers with a range of years of experience, and across schools with diverse levels of advantage (Gore et al., 2017). Moreover, it has demonstrated a positive impact on the skills and confidence of teachers in the early stages of their careers (Gore & Bowe, 2015) as well as re-energising and re-engaging more experienced teachers (Gore & Rickards, 2021).

A previous study conducted in New South Wales investigated the impact of QTR on student outcomes in mathematics, reading and science. Across 125 primary schools, students (n=1,307) of teachers who participated in QTR gained an average growth of two months (Evidence for Learning, 2022a) in mathematics (using PAT-M) above that of a control group (g=0.12) over a period of eight months (Gore

et al., 2021, p. 8). This was a growth of 1.55 points on average higher than that of the control group. Within the previous study, no significant difference was found between students' gains in PAT-R and PAT-S (with differences of 0.37 and -0.13 for the treatment group) (Gore et al., 2021, p. 9). This difference in the growth in mathematics in comparison to reading and science was thought to be influenced by the reduced teaching time spent on reading comprehension and science. Time in mathematics was 6.7 hours per week in comparison to 3.3 hours for reading comprehension and 1.7 hours for science (Gore et al., 2021, p. 8). The study presented in this report seeks to expand on these findings in Victorian high schools.

Another cluster randomised controlled trial of 24 schools involving 192 teachers in New South Wales found that teaching quality increased for teachers involved in QTR (*d*=0.40) (Gore et al., 2017). Teaching quality was measured through the coding of lessons, with 1073 lessons coded by researchers. These were coded without the observers knowing whether the teachers had participated in QTR. The impact on teaching quality was observed at the 12-month follow up assessment (*d*=0.2-0.5) (Gore et al., 2017). Significant positive changes were identified for the intervention groups in morale (*d*=0.4, p = 0.014), and in appraisal and recognition (p=0.026) in the teacher survey, although no changes in school wide trust or teacher responsibility were identified (Gore et al., 2017).

Interviews with 96 teachers and leaders of the above-mentioned study produced three key themes:

1) fresh insights were generated about pedagogy and students through the opportunity to observe one another
2) enhanced collegiality was experienced by all PLC members
3) ongoing professional collaboration occurred in schools following the QTR intervention (Gore & Rosser, 2022).

DISRUPTIONS TO SCHOOLING

The present study took place in a context in which schooling was subject to a series of disruptions. As a result of the COVID-19 pandemic, school operations in Victoria experienced a three-day shut down in Term 1 2021, followed by another lockdown in Term 2 and a subsequent one in Term 3. As a consequence, most students

were learning from home for the first six to eight weeks of Term 2 and for the entirety of Term 3, with most students returning on site in the second week of Term 4, although teachers and secondary school students were required to wear facemasks.

In 2022, although the majority of students and teachers had been vaccinated, uncertainty remained. Schools faced continuing disruptions to teaching and learning through staff and student absences due to COVID-19, influenza and the common cold. The impact of the influenza and cold season was more extreme than normal, with 45% of all influenza cases among those aged from five to 19 in May 2022 compared to just 25 % in 2019 (Precel et al., 2022).

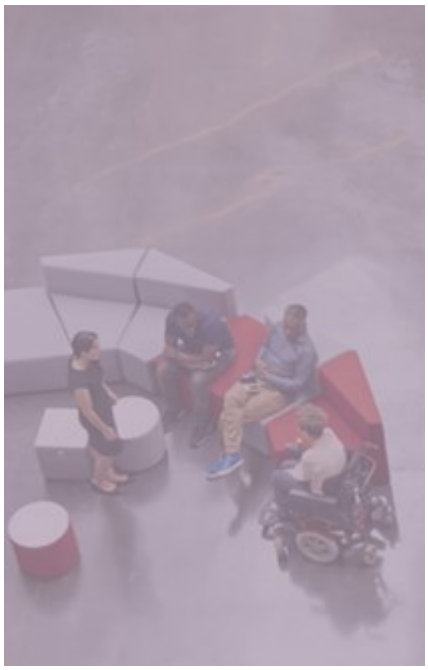
These pressures on Victorian schools resulted in a suspension of applications for research in schools. Exemptions from the suspension were considered on a case-by-case basis for projects where the evaluation activity was in partnership with, or commissioned by, the Department of Education (State of Victoria (Department of Education and Training), 2022).

Teachers have been under increasing pressure due to the ongoing impact of COVID-19 and the influenza season on their students and staffing. Prior to the COVID-19 pandemic, a survey of 2,444 teachers identified that only 41% of respondents intended to remain in the profession (Heffernan et al., 2022). Key reasons cited were heavy workloads, health and wellbeing concerns for teachers and the status of the profession (Heffernan et al., 2022). In looking at the impact on COVID-19 on teachers, surveys of New South Wales teachers (n = 362) pre and during the pandemic demonstrates a significant decline in morale and efficacy (Fray et al., 2022). Considering the teachers within the study by Fray et al. (2022) had experienced eight weeks of school closures in comparison to the 34 weeks for Victorian teachers (Sonnemann & Hunter, 2021), we would expect a more marked impact on teachers in Victorian schools. Teachers' workloads had increased and created additional complexities.

The Australian Council of State School Organisations' Chief Executive Officer, Dianne Giblin, stated "it had become difficult for children to re-engage in learning when there were constant changes in their classrooms" (Precel et al., 2022). She went on to say "this would have a profound effect on the mental health of both student and school staff" (Precel et al., 2022). A recent media piece highlighted the toll of the pandemic on teaching staff with one

teacher stating "We are burnt out … so many amazing educators are hitting a wall, and it is being ignored" (Stroud, 2022). This study took place in highly unusual circumstances and this would necessarily impact on the findings.

EVALUATION PURPOSE



ACER was contracted by the Teachers and Teaching Research Centre (TTRC) at the University of Newcastle to conduct an independent Randomised Controlled Trial (RCT) with the goal of examining effects of QTR on students and teachers in Victorian secondary schools.

The project methodology has eight main components as shown in **Appendix 1: Methodology.**

These are:

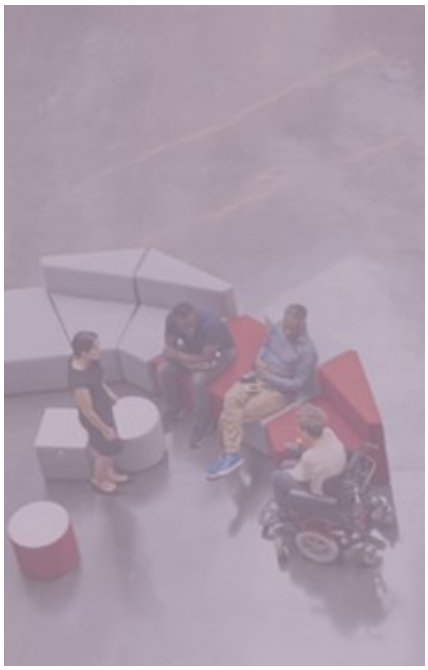
1. ethics approvals – plain language statements and consent forms;
2. informed consent from schools, teachers, and students;
3. development of teacher and student surveys;
4. implementation of pre-intervention tools;
5. allocation of selected schools to experimental and control groups;
6. implementation of fidelity checks;
7. implementation of post-intervention tools; and
8. data analysis and reporting.

University of Newcastle undertook components 1 to 3, with input from the ACER team leading to slight modifications to the teacher and student surveys. ACER then undertook components 4 to 8. The results of the study are provided in this report.

METHODOLOGY

The methodology to gather insights for this evaluation comprised five key activities:

1) administration of PAT-R and PAT-M assessments;
2) student questionnaires;
3) teacher questionnaires;
4) implementation fidelity questionnaires for teachers; and
5) implementation fidelity checks.



UNIQUE STUDENT IDENTIFIERS

Forty schools were recruited by the TTRC team for this RCT. Four teachers from each school were invited to participate in the study. This meant that the study started with 160 teachers. From the 40 schools, 791 students provided informed consent to TTRC. Over the course of the study there was minor reduction of participants, resulting in a total of 147 teachers, 786 students and 39 schools taking part in the study. Considering the pressures faced within schools in Victoria, with the ongoing impact of the COVID-19 pandemic and impact of widespread flooding, these slight attritions were not unexpected.

At the commencement of this study, ACER entered the details of all participating schools, teachers and students into a database and created unique identifiers for each individual. This allowed the linking of individuals to the QTR intervention, as well as to all data collected from teachers and students throughout the study. ACER randomised the sample of schools accounting for location, school gender (co-educational or single gender schools), school type, ICSEA, Year 7 NAPLAN reading score, school authority (government, Catholic or independent), and enrolment size. Twenty schools were assigned to the control group, with teachers from the other schools attending QTR professional learning.

An ACER data management plan was developed to ensure the privacy of the data. The data flow diagram from the data management plan is provided in **Appendix 2: Data flow diagram.**

DATA COLLECTION

When the selection and allocation of individual identifiers was completed, ACER implemented the baseline and post intervention research tools comprising ACER's PAT-M[1], PAT-R and teacher and student surveys. TTRC provided data collection protocols in the form of draft emails, which were adjusted to conform to the data management plan.

Data were collected through PeoplePulse[2] for questionnaires and ACER's Online Assessment and Reporting (OARS) platform[3] for PAT assessments. Once exported, ACER undertook a series of steps to clean the data and check for consistency. Open-response data from the implementation fidelity checks were analysed thematically.

Four teachers from each school were initially involved in the study (n=160), during the RCT, 8% of teachers (13) withdrew, leaving a total of 147 teachers. One school (2.5% of schools in the study) withdrew, leaving 39 schools involved. The reason cited for withdrawal was the workload involved in the research. This resulted in a reduction of four students from the school who withdrew and one student from another school, to result in a total withdrawal of five students from the initial 791 (0.6%).

In examining the distribution of withdrawal of participants across the RCT, it is useful to examine the differences between the groups. The school withdrawal occurred within the treatment group, resulting in a total of 19 schools (95%) within this group. There was no attrition of schools within the control group. There was a reduction of five students in the treatment group, leaving a total of 401 students (99.4%) involved in the study. Conversely, no students withdrew from the control schools, so the total number of this group was 385. Similarly, the withdrawal of teachers from the study was larger within the treatment group than the control group. Ten teachers withdrew from the treatment group, leaving 70 teachers (88%). Only three teachers left the study within the control group, resulting in 77 teachers (96%) being retained.

[1] https://www.acer.org/au/pat/assessments
[2] https://peoplepulse.com/
[3] https://www.acer.org/au/pat/assessments

POWER ANALYSIS

In describing the power analysis it useful to explore type 1 and type 2 errors. A type 1 error is also known as a false positive and occurs when a researcher incorrectly rejects a true null hypothesis. This means that findings are reported as significant when in fact they have occurred by chance. The probability of a type I error is given by alpha (α), which is the p-value below which the null hypothesis is rejected. A p-value of 0.05 or a minimum detectable effect size indicates an acceptance of a 5% chance of error when the null hypothesis is rejected. A lower value of α will reduce the type 1 error, but a true difference will less likely be detected, if it exists, (thus risking a type II error). Making a type I error means that unnecessary changes to interventions are made, which waste time and resources. Type II errors typically lead to the preservation of the status quo when change is needed.

A type II error is also known as a false negative and occurs when a researcher fails to reject a null hypothesis which is false, where a researcher concludes there is not a significant effect when one exists. The probability of making a type II error is called Beta (β), and this is related to the power of the statistical test (power = 1- β). The risk of committing a type II error can be reduced by ensuring the test has enough power by increasing the sample size.

The power calculation used the R package clusterPower to get an idea of how small a difference in the treatment group could be detected with reasonable power. In **Appendix 9: Power analysis** the smallest value where the power is at least 75% is indicated in red. The model is a difference in difference model, meaning that we are interested in the comparison of the difference between the control and treatment groups at baseline and post treatment, where both the control and treatment students are the same for both measurements. This 'repeated measures' design is a more complex version of a matched T-test, where the matching eliminates common sources of variation in both groups when a difference of a difference is considered.

Two versions for each of the mathematics and reading scales are considered, using the residual school and student variances using a linear multilevel model fitted with no regressors in R package lmer, and one fitted with both student and school regressors noted below. With the reduction in variance due to the regressors, the simulation gives better power. Although the effect is not large, we are able to detect a smaller difference, albeit of at least five scale score points, with 75% power for both mathematics and reading.

There was little difference in the variance for the control and treatment groups, so the same variances were used for the four simulated data sets in each run; that is pre and post control and treatment groups. For simplicity, a four data sections a model with 16 clusters (schools) of 13 students was used, with the relevant variances. These are shown in **Appendix 9: Power analysis.** A thousand simulations were used for each run. At worst 997 of the thousand converged. Other than for reading regression, almost all the other runs used all thousand simulated data sets.

The AOV tables for the regression models are shown in **Appendix 9: Power analysis.** The economic measure ICSEA is the most important school regressor for both mathematics and reading. For reading, the large gender effect shows the well-established result that girls show increased achievement in reading in comparison to boys (Lietz, 2006; Thomas et al., 2022). Within the PAT-M result it was identified English as an Additional Language or Dialect (EALD) student show increased gains in mathematics, this is often seen in less language-contingent subjects.(ACARA, 2022; Clarkson, 2007).

PROGRESSIVE ACHIEVEMENT TESTS

Schools implemented the PAT-M and PAT-R tests on school computers. Schools either used their own licence or licenses purchased by TTRC. The schools baseline PAT-M and PAT-R testing

dates ranged from 3 February to 13 May 2022. ACER provided the support it provides to all schools using PAT assessments.

Additionally, ACER followed up via email individually with all schools to outline their progress in the baseline data collection, and to pinpoint activities which had been completed those still to be completed (e.g., PAT-M, PAT-R and student questionnaire). This approach was determined between ACER and TTRC in light of the need to avoid placing pressure on schools that were already over-burdened by the COVID-19 pandemic.

PAT testing was completed by 13 May 2022. The PAT team exported the data from OARS, which was then de-identified with the use of the unique student identifiers and provided to the psychometrics team for initial analysis.

For the baseline PAT data collection a total of 579 students were involved, with 442 participating in PAT-M and 447 participating in PAT-R. The expected numbers of students for PAT-M were 488 and 471 for PAT-R. This represents 95% and 90% completion of the PAT-R and PAT-M assessments, respectively.

In the follow up data collection, the TTRC team advised that the PAT data from Term 3 could be included, as well as those completed in Term 4. The PAT data collection dates span from tests taken from 13 July to 29 November. The total number of tests taken were 884 involving 36 schools, with 446 PAT-M and 441 PAT-R. Three schools were unable to provide data. Data collected represents 91% of PAT-M and 93% of PAT-R of the total expected PAT-M (n=489) and PAT-R (n=471). The PAT team extracted the data and provided it de-identified to the ACER psychometrics team on 2 December 2022.

The ACER psychometrics team cleaned the data by removing any duplicate tests, and keeping the highest score where there were duplicate student cases in the post-treatment data. The baseline and follow up students were matched for the PAT-M (n=310) and PAT-R results (n=298). Descriptive analysis was undertaken on the matched control data (n=260) and treatment data (n=361). There were 20 and 29% of students lost to follow up in the PAT-M analysis for the treatment and control schools respectively. While for the PAT-R data there were 29% of students lost to follow up in the treatment group and 39% of students within the control group. These losses were thought to have been attributed to the change in the email communications to the teachers, with all teachers involved

in the initial data collection, while the follow up data collection involved only the teachers that taught students in Year 8 mathematics and/or English. The initial analysis involved a comparison of the change in mean scores for the pre and post data, and the difference between the means within the control and treatment was then calculated.

Further analysis involved a mixed-model approach. The data were paired for this analysis. Students with self-reported indeterminate or missing gender were removed from this analysis. This resulted in a total of 310 students with PAT-M data and 298 PAT-R data.

The variables used within the mixed model approach were:

- student.UID = UserID for the students (common across baseline and follow up; used for pairing);
- PATM = the scale score for PAT-M;
- PATR = the scale score for PAT-R;
- male = 1 for male students, 0 for female;
- treatment = 1 for treatment group, 0 for control;
- follow up = 1 for follow up, 0 for baseline;
- ICSEA1 = ICSEA/1000; and
- location = 1 for major cities, 0 for regional (inner and outer regional were merged as they did not have a significant effect on the model).

A mixed-model using lmer from the R package lme4 was used, using the paired ids for the random error component. The base model used for PATM (and similarly for PATR was as follows):
lmer (PATM ~ Followup*Treatment + (1|Student.UID), data=PATM_Mod2,REML=FALSE)

Maximum Likelihood (ML) was used rather than the default Restricted Maximum Likelihood (REML) to allow for comparisons of the models when extra fixed effects were added, as the REML criterion cannot be used for this. Data are available in **Appendix 7: PAT data.**

SURVEYS

ACER provided feedback on the TTRC questionnaires. Once the student and teacher questionnaires were finalised, they were uploaded to PeoplePulse and tested for functionality and alignment with the agreed content. The administration of the teacher and

student questionnaires was different in approach as direct contact could be made with teachers. Therefore, unique links were made for each teacher for each questionnaire, while teachers were provided with students' unique identifiers.

TEACHER QUESTIONNAIRE

The teacher questionnaire was sent to teachers at four time points within the study. Once per term the unique questionnaire links were emailed, on week eight for Term 1 and on week six for Terms 2, 3 and 4. For each administration of the questionnaire three personalised reminders were sent to teachers, who had not completed or not started the questionnaire. The response rate varied over time. The completion rate for the initial survey was 86% (n=138) for Term 2 it was 73% (n=110), for Term 3 it was 77% (n=113) and the last survey was 69% (n=99).

For the statistical analysis, teacher data were paired. The baseline and the follow up questionnaires (Term 4) were chosen for pairing as they had the longest time frame between measurements. This was a period of eight months (April-December 2022).

The teacher questionnaire is provided in **Appendix 3: Teacher questionnaire.** Constructs of teacher efficacy, teacher belonging, teacher feedback, teacher student support, teacher environment, teacher burnout, teacher change (negative), teacher change (positive) was developed from grouping the appropriate items as detailed in **Appendix 4: Teacher Questionnaire Data.**

Quantitative data were cleaned and subject to descriptive analysis according to control and treatment groups. Data are available in **Appendix 4: Teacher Questionnaire Data.**

STUDENT QUESTIONNAIRE

ACER provided clear instructions on how to access the students' unique identifiers which were provided in password protected

OwnCloud files. Each school was contacted by phone at least once prior to the end of Term 1 and followed up by email, to ask them to call the researcher to provide them with their unique four-word password to access their student unique identifiers.

Schools were contacted by email regarding the progress of students with the questionnaire, encouraging them to increase participation or to engage with the questionnaire for the baseline data collection. The self-efficacy and aspiration questionnaire is found in **Appendix 4: Student questionnaire.** The student questionnaire was completed by 40% of the students (n=317).

The TTRC project team advised ACER not to send out reminders for the follow up questionnaire, with the reasoning that the PAT data collection was to be prioritised over the student questionnaire. A total of 248 students (30% of the student population) completed the follow up student survey. Once the data were cleaned and matched there were 140 students.

There was a disproportionate distribution between the control and treatment schools, with two thirds less control schools (n=36) with paired student data than treatment schools (n=104). This may be attributable to control schools feeling less committed to the RCT in comparison to the treatment schools.

The quantitative data were analysed with constructs made through the grouping of items. Where it was not logical to group items the items were analysed separately, e.g. where the item referenced a specific skill rather than one that could be grouped with others. An example of this is the item "How good are you at writing persuasively?".

The grouping of items into constructs is detailed in **Appendix 6: Student questionnaire data.** These were then analysed looking for differences between the pre and post treatment groups using paired t-tests. This detailed methodology can be found in within the SPSS syntax that was provided. Data are available in **Appendix 6: Student questionnaire data.**

RANDOMISATION

Each school participating in Building Capacity for Quality Teaching was compared with all other participating schools against the

following school-level characteristics:

- location (major cities/inner regional/outer regional);
- school gender (co-educational/female/male);
- school type (secondary/combined/primary/secondary);
- ICSEA score (four equal sized groups based on the ICSEA values of the 40 schools);
- year 7 NAPLAN reading score (four equal sized groups);
- school authority (government/non-government); and
- enrolment size (sum of enrolments from Years 7 to 12).

In the first stage, an attempt was made to pair schools against characteristics that were less commonly shared in the 40 schools participating in the study, whilst monitoring the other characteristics being matched against. There were two outer regional schools, which also happened to be government secondary schools and in adjacent levels with respect to ICSEA and Reading score, so these were paired together. Similarly, four schools catering exclusively to female students were formed into two pairs, which shared similar values across most of the other characteristics.

Four of the six combined primary secondary schools were paired. Of the other combined schools, one was for female students, and the judgement was made that the school gender characteristic made for a better match than the school type characteristic. Fourteen of the 15 schools from inner regional locations were grouped into seven pairs, schools in each pair sharing most of the other characteristics. The four Catholic schools were combined into two pairs, one of which included the other single sex school (for male students) which was paired with a co-educational school.

The six independent schools were combined into three pairs which mostly matched with or were in adjacent levels across the other characteristics. The remaining schools were almost all government secondary schools, and these were matched as well as possible with the other characteristics. At the end of the process, there were two pairs that matched less well. One involved school 230, which was paired with school 240. Another was school 400, classified as inner regional, which was matched with school 320, within the major city location classification.

PROFESSIONAL LEARNING

Teachers from the 20 Victorian high schools that were allocated to the treatment group attended a two-day workshop. There were two offerings of the workshops: one in central Melbourne on 28-29 April 2022 and one at Tullamarine Airport on 2-3 May 2022.

Three ACER staff members attended the two-day workshops to prepare to conduct fidelity checks, with two attending in April and another in May. All three ACER staff involved in fidelity checks have extensive backgrounds in teaching mathematics or English in schools. The next steps for implementation of QTR are outlined (Patfield et al., 2022, p. 4).

After attending a two-day workshop to introduce QTR and guide implementation, teachers returned to their schools and formed Professional Learning Communities (PLCs) with colleagues to undertake QTR (usually four teachers per PLC). No further external input is provided as the workshop aims to prepare participants for rolling out QTR across their school, thus enhancing scalability.

It is expected that each round takes place over a single day as follows:

- discussion of a professional reading selected by a different member of the PLC each Round (approximately 1 hour);
- observation of one teacher's regular classroom practice, wherein all PLC members observe the host teacher's entire lesson (typically 40 minutes to 1 hour duration);
- individual coding of the lesson, where all PLC members (including the host) code the observed lesson using the 18 elements of the QT Model (approximately 30 minutes); and
- coding discussion, in which PLC members discuss the observed lesson, and pedagogy more broadly, drawing on the language, concepts and structure of the QT model (approximately 2 hours).

While the aim is to reach agreement, as a group, about the code for each element (see **Table 1**), the codes are a means to an end, and the underlying intent is to foster in-depth professional conversation and fresh insights about teaching and learning.

The link for the scheduling of QTR that ACER had set up on PeoplePulse was sent to schools from TTRC and in a follow up email from ACER.

FIDELITY OF IMPLEMENTATION

ACER staff involved in fidelity checks attended the implementation fidelity checks training session and the two-day workshops facilitated by TTRC. They then conducted implementation fidelity checks according to the guidelines provided by the TTRC staff with 33% of the intervention schools.

The schools were selected to include a range according to their sector, size, ICSEA and geolocation. Some schools were unable to participate due to staffing shortages, the ongoing demands on the COVID-19 pandemic on schools and reported stress from staff that they would be observed in this process. The demands of the other elements of data collection were also cited as reasons that this was not possible for some schools. These schools were replaced by like schools. Some of the implementation fidelity checks were re-scheduled due to illness and lack of casual relief teachers.

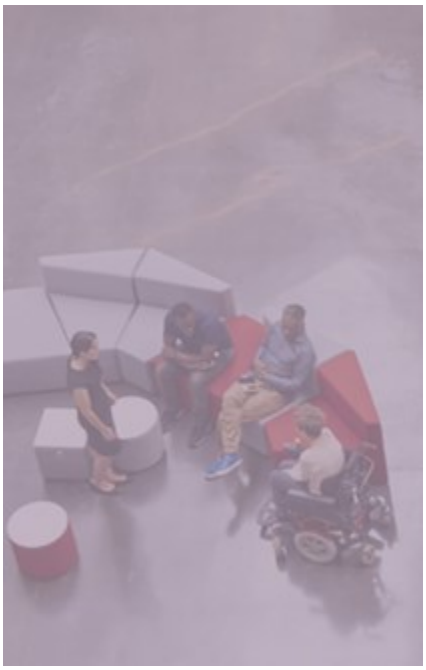
During the implementation fidelity checks, ACER staff took notes in hard copy versions of the TTRC implementation fidelity check questionnaire. Data were entered into the online version of fidelity check questionnaire by the next day. All seven implementation fidelity checks were undertaken by 16 June 2022 as detailed in **Appendix 8: Implementation fidelity checks.**

Schools in the experimental group were advised to complete one implementation fidelity survey for each QTR. ACER tracked the completion of surveys and schools were sent multiple customised reminders to complete the questionnaires. Schools completed one to four surveys.

Over 65% of the treatment schools (68%) completed at least one implementation fidelity check questionnaire. Once the data were cleaned, the number of implementation fidelity checks completed was 38, representing an average of three surveys per school.

FINDINGS

PROGRESSIVE ACHIEVEMENT TESTS



There was a fairly even number of students from control schools and treatment schools that participated in the PAT-M testing. Of the 310 students that participating in PAT-M, 141 were from the control schools while 169 were from the treatment schools, this is 45% and 55% respectively. The mean PAT-M score of the treatment students (mean = 136.27) was slightly higher than the control students (mean 135.26) at baseline. The reverse pattern was observed for the PAT-R results with a mean of 136.58 for the control students in comparison to the treatment baseline of 134.96.

The distribution of students who sat the PAT-R testing was similar to those in the PAT-M testing, although there were slightly more students sitting the PAT-R in treatment schools. There were 60 % of students in the treatment schools in comparison to 40 % control schools for PAT-R. As the students are matched and a mixed model approach has also been employed any minor differences within the populations should not impact the final analysis.

The numbers of students who identified as female, male or other varied slightly across the control and treatment schools. There were 63 % of females in the control group while in the treatment group there were 50 % for PAT-M. Similarly, the percentage of males in the control and treatment group were different with 37% males in the control group and 50% males in the treatment group.

A similar distribution of gender was seen in the PAT-R students with a higher percentage of females in the control group (65) in comparison to the treatment group (53). These distributions of students across the demographic data are reported above and presented in **Appendix 7: PAT data**

There was no statistically significant difference in student achievement between intervention and control groups across the eight month intervention period. In looking at the overall means for the control and

treatment groups, the control group had a change of 1.34 while the treatment group had a change of PAT-R of 0.79, so this is a difference of -0.55 (See Table 2). For the PAT-M results the control group had a difference of 2.4 in comparison to the treatment group of 0.22, so this is a difference of -2.2.

When looking at PAT gains in the wider Australian population, we typically see:

- reading: for groups starting with an average score near 135, we usually observe 0-1 scale score point of average gain in a post-test taken 6-12 months later
- mathematics: for groups starting with an average score near 135, we normally observe 1-2 scale score point of average gain in a post-test taken 6-12 months later

Table 2: Analysis of PAT reading and PAT mathematics for paired samples

PAT		Control (n=260)	Treatment (n=348)
Reading (n=298)	Cases	119	179
	Pre	136.58	134.96
	Post	137.92	135.75
	Difference	1.34	0.79
Maths (n=310)	Cases	141	169
	Pre	135.26	136.27
	Post	137.65	136.49
	Difference	2.39	0.22

The differences between the populations were adjusted for using a mixed model approach. In Table 19 parameter estimates, deviances, and degrees of freedom (df) are given for the models fitted. The analysis determined that gender, specifically males were significantly related to lower PAT-R results, although they did not impact the PAT-M results. This aligns with other literature showing that male students have significantly lower performance in reading (Lietz, 2006; Thomas et al., 2022). Other significant parameters are presented in bold within the table: ICESA and location.

STUDENT SURVEYS

As with the PAT testing numbers, the number of students who participated in the student questionnaire was higher in the treatment group in comparison with the control group as presented in **Appendix 6: Student**

questionnaire data. This was 26 % of students (n=36) from the control group and 74 % from the treatment group (n=104).

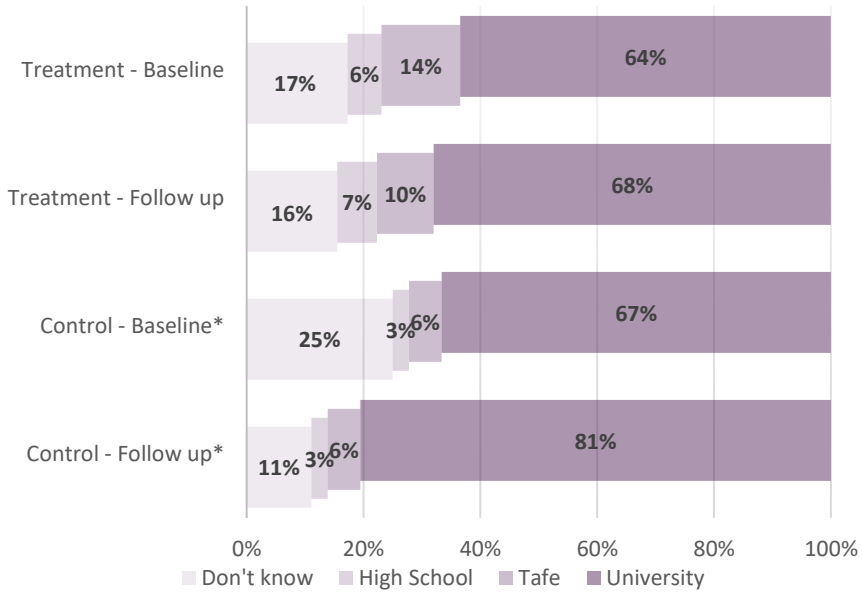
There were no statistically significant differences in the distribution of females and males, or ICSEA between the two groups. The percentage of females within the control (51.4%) and treatment (51.9%) groups were well matched. Relatedly there was a similar percentage age of males in the control group (48.6%) in comparison to the treatment group (48.1). Chi-square analyses determined that there were no statistically significant differences between the groups for gender.

The mean ICSEA for the treatment group was slightly lower than that of the control group (see **Table 10).** An independent samples t-test determined that this difference was not statistically significant. The mean ICSEA for the control group was 1051 while for the treatment group it was 1044, this is a difference of 7. This places both the treatment and control group with an ICSEA that is slightly above the median of 1,000.

The majority of the constructs or individual items did not show statistically significant differences when the baseline data were compared to the post implementation data (see **Table 12** and **Table 13**). There were statistically significantly differences identified for:

- the control group (n=37) with an increase in agreement for the item "What is the highest level of education you plan to complete" (p=0.037); and
- the treatment group (n=101) with a decrease in agreement for the item "How many books do you read each year?" (p=0.004)

The changes in these items can be seen in **Figure 1** and **Figure 2**.



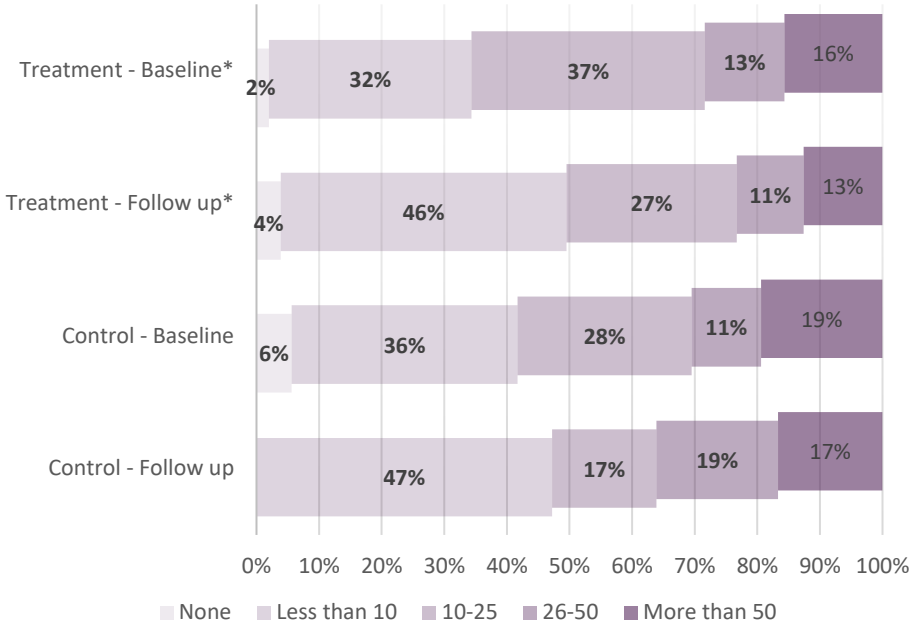
Note: *p≥0.05

Figure 1: Students' responses to "What is the highest level of education you plan to complete?" by group (Treatment n=104, Control n=36)

Both the control and treatment groups showed an increase in the percentage of students that wanted to complete a higher level of education (see **Figure 1**). The increase seen within the control group was statistically significant as detected by a paired t-test. This difference was predominately driven by the increase in students who wanted to complete a university degree with the following changes:

- increased 14 % of students in the control group; and
- increased 4 % of students in the treatment group.

There is mixed evidence that aspirations lead to improved student outcomes (Evidence for Learning, 2022b). Although not a lot of robust evidence has been identified within K-12 settings (Evidence for Learning, 2022b).



Note: *p≥0.005

Figure 2: Students' responses to "How many books would you read each year?" by group (Treatment n=101, Control n=36)

The number of books that students reported that they read decreased for both the treatment and control groups. The number of books read by students in the treatment group was lower in the follow up survey in comparison to the baseline survey (p=0.004). The percentage changes observed within the treatment group were:

- 18 more % of students reported that they read fewer than 10 books;
- the %age of students who read 10-25 books decreased by 10 %;
- there was a 2 % decrease in students who read 26-50 books; and
- there was a 3 % decrease in students who read more than 50 books.

These findings indicate that students within the treatment and control group read a lower number of books at the end of the year in comparison to the beginning of the year. There was a larger reduction in book reading in the treatment group in comparison to the control group. Increased book reading has been shown to be associated with improvements in reading comprehension (Kim et al., 2016; Kim & Quinn, 2013).

TEACHER SURVEYS

Unlike the student surveys and PAT-M and PAT-R data, there was a more equal distribution of teachers from control and treatment schools involved as shown in **Appendix 5: Teacher Questionnaire Data.**

The survey was completed by 42 % of teachers from control schools (n=28) and 58 % from treatment schools (n=39). The completion rate was the highest for first questionnaire with 86 % of teachers completing the questionnaire. The difference in distribution methods, with teachers being directly contacted via email, in comparison to working with teachers to encourage their students to participate in the various elements of the research has impacted student participation. The ability to send targeted reminder emails greatly enhanced the completion rate of the teacher questionnaire in comparison with the student questionnaire.

The demographic information for the teachers shows a fairly even spread of gender, age and qualifications. No significant differences were detected in within these demographics, indicating that the groups are able to be compared.

There was a higher proportion of female to male teachers in both the control and treatment groups. With 86% in the control and 77% in the treatment group.

In relation to age, there were a few differences, between the control and treatment groups. The control group had a higher proportion of teachers younger than 25 (10.7%) in comparison to the treatment group (5%); the next age bracket of 25-29 there was a higher percentage of teachers in the treatment group (30%) in comparison to the control group (11%). In the other age groups, there were smaller differences.

The majority of the participants were currently within the role of a classroom teacher in both the control and treatment groups, with over 85% of teachers reporting they were in a teaching role.

In both the control (61 %) and treatment groups (72%) the majority of teachers had three to ten years' experience.

There were significant differences identified within the control and treatment groups in teacher efficacy and teacher student support (see **Figure 3**, **Figure 4**, **Figure 5**, **Figure 6** and **Figure 7**).

The key findings were:

- teacher efficacy significantly improved in the control group (p=0.03); and

- teacher student support significantly decreased in the treatment group (p=0.01).

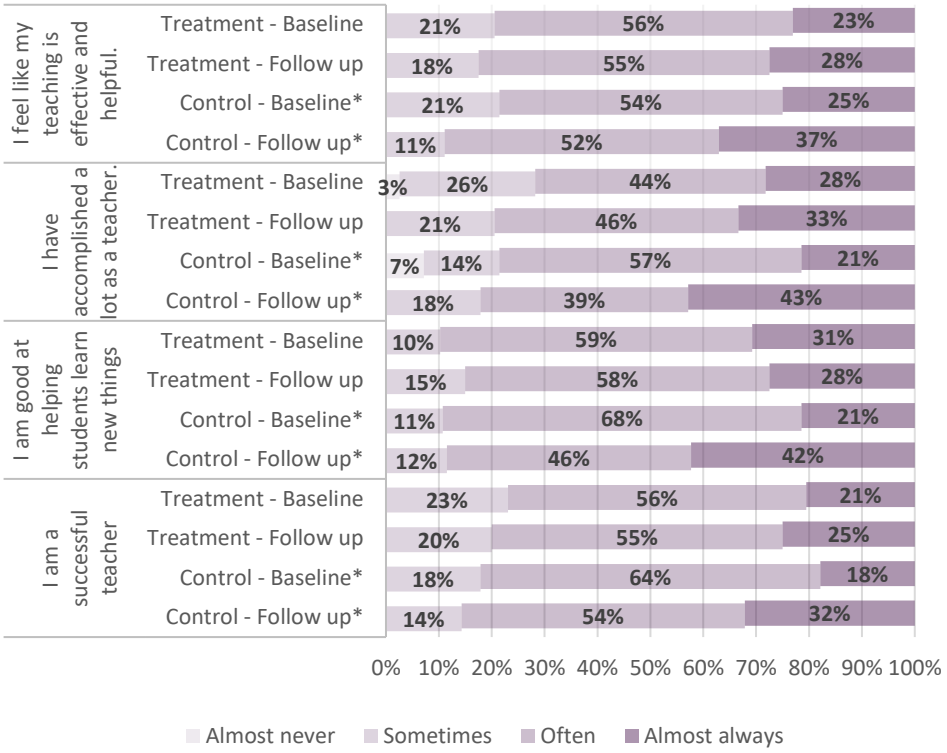


Figure 3: Teacher efficacy by group [T n=39, C n=28]

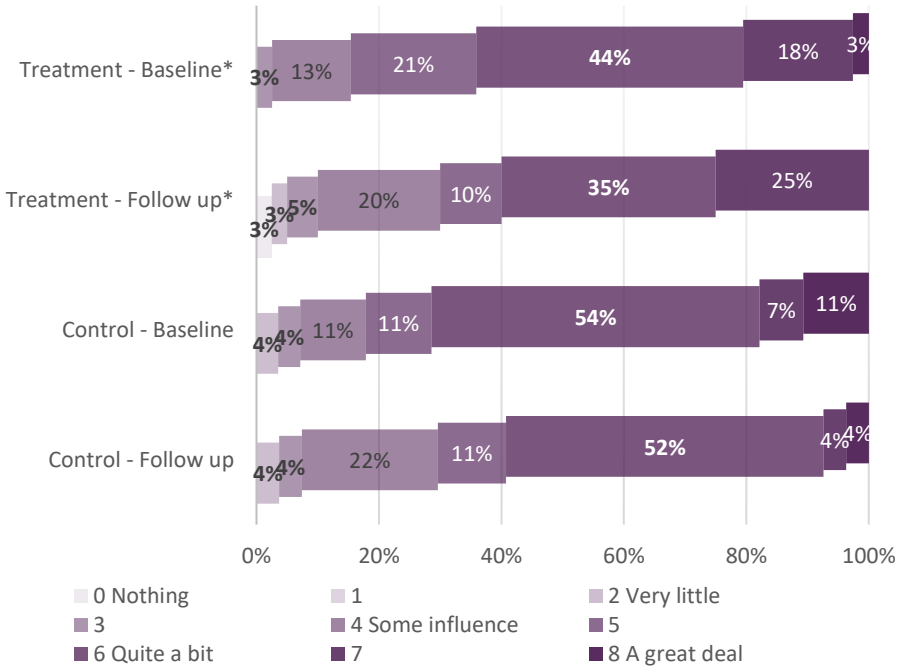


Figure 4: Teachers' responses to "How much can you do to motivate students who show low interest in school work?" by group [T n = 39, C n = 28]

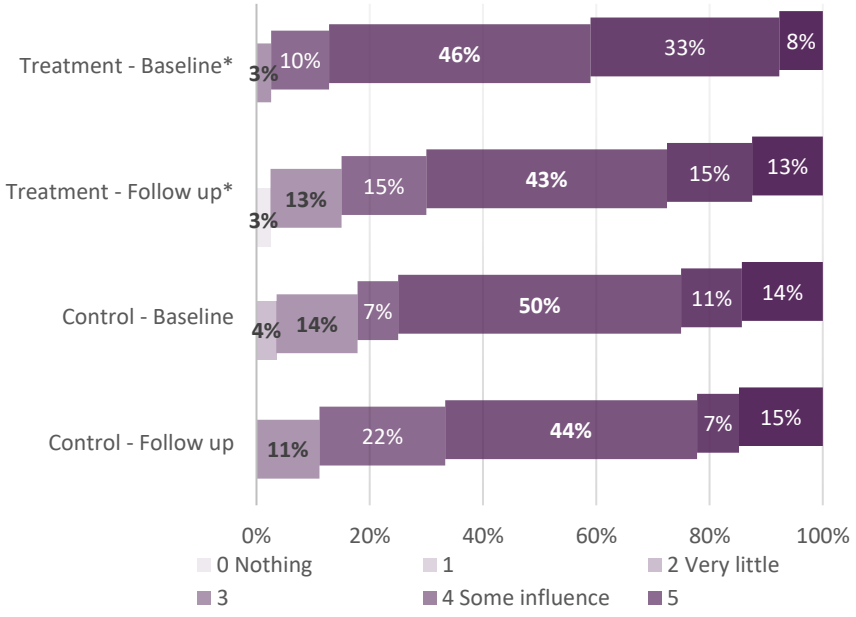


Figure 5: Teachers' responses to "How much can you do to get students to believe they can do well in school work?" by group [T n = 39, C n = 28]

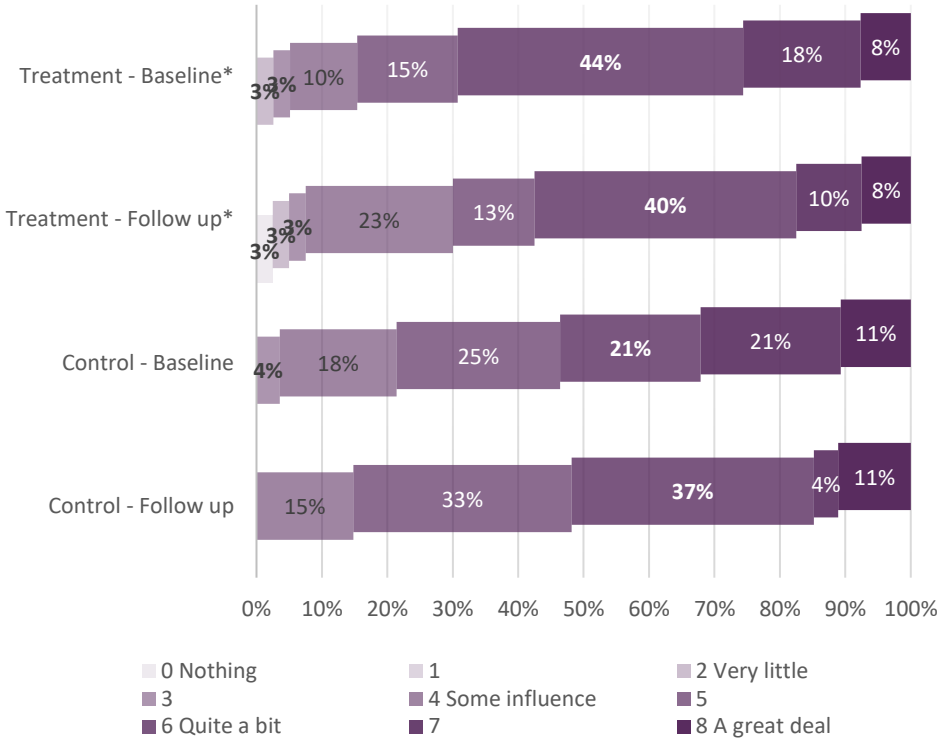


Figure 6: Teachers' responses to "How much can you do to help your students value learning?" by group [T n = 39, C n = 28]

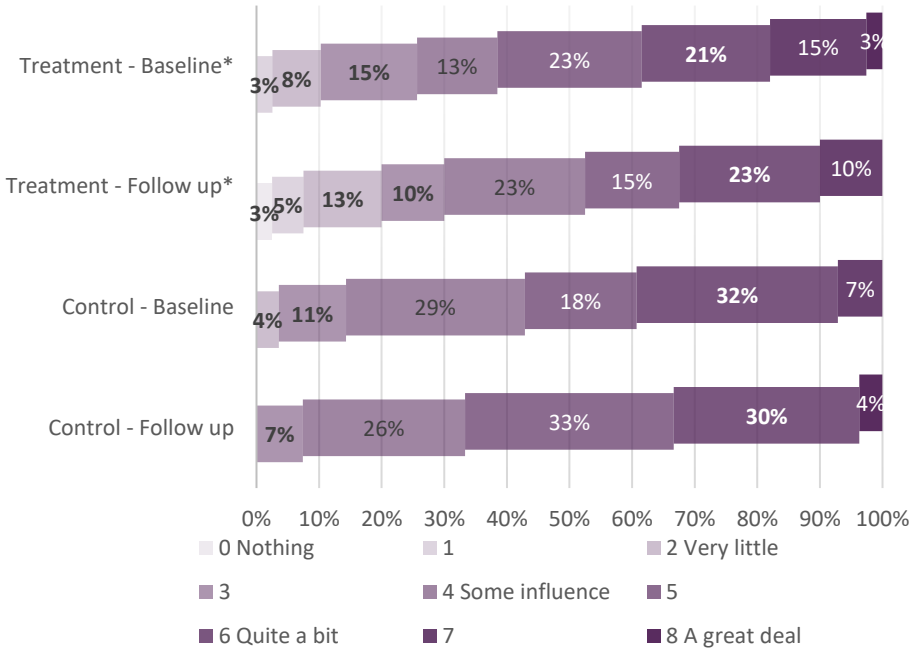


Figure 7: Teachers' responses to "How much can you do to assist families in helping their children do well in school?" by group [T n = 39, C n = 28]

FIDELITY CHECKS

The timing of the fidelity checks have been outlined in **Appendix 8: Implementation fidelity checks,** this section focuses on the seven implementation fidelity checks and highlights some observations.

Almost 70% of the treatment schools (n = 13) completed at least one implementation fidelity check questionnaire. There were 38 teachers who completed a survey. Data from these surveys have not been included at the request of the TTRC team.

The commentary provided below provides some school based context for the implementation of QTR in Victoria in 2022. It should be noted that these comments were based more heavily on visits to three of the seven schools, as a greater amount of detail about the functioning of QTR was available for these schools. In this way it provides observations from a particular time frame for Victorian schools, that is not generalisable to potential future studies, although is useful to frame the findings within the specific context of some of the schools involved.

1) Teacher stress was a recurring theme in informal discussions with teachers, who were dealing with high rates of absenteeism and the resultant pressures that put on them to support students. Teachers discussed weeks of essentially preparing two lessons for each lesson – one for the students present, and one for those at home. In one class (School 2: 3188), a teacher ran his class with a student connecting in from home, and he had done that for several lessons.

   Absenteeism was stated to be a result mostly of illness (COVID-19 and influenza), and, to a lesser extent, students for whom illness had meant a disconnection from school, students who were expected/required to care for sick family members, and students who found no reason to attend school if they could complete the work satisfactorily from home.

2) Groups varied greatly in their level of reference to the Guide and the information in it. Some groups (notably, those where at least two of the group had attended the QTR two-day workshop) were a lot more focussed on close consideration of the Description, Coding Scale, Notes and Suggestions within the Guide.

   School 1 (3175) was most notable for this, where the school as a whole had been supportive of the process, rescheduling other meetings, and allowing participating teachers the whole day off to undertake the

teaching rounds. Providing teachers with the whole day to conduct the teaching round is the recommended approach to QTR. For School 6 (3280), this had not been possible, and teachers were required to attend other meetings and teach classes in the middle of their coding discussions.

School based resourcing issues and the impacts of activities and circumstances in specific schools vary. These types of issues that occur for schools would also be present for other professional learning programs.

3) There was more analytical conversation about some elements than others across schools. In some cases, there was no shared understanding of key concepts and terminology. 'Inclusivity', for example, was often confused with 'Social Support', 'Connectedness' and sometimes 'Engagement'.

'Background knowledge' also involved analytical conversation for several groups, who found it difficult to distinguish between school-based knowledge and out of school background knowledge. Several teachers thought this should be differentiated; that referring to/building on school-based knowledge was of a fundamentally different quality from out-of-school knowledge.

4) The degree to which future practice would be impacted by this process is unclear, of course, but discussions indicated it would vary considerably between schools.

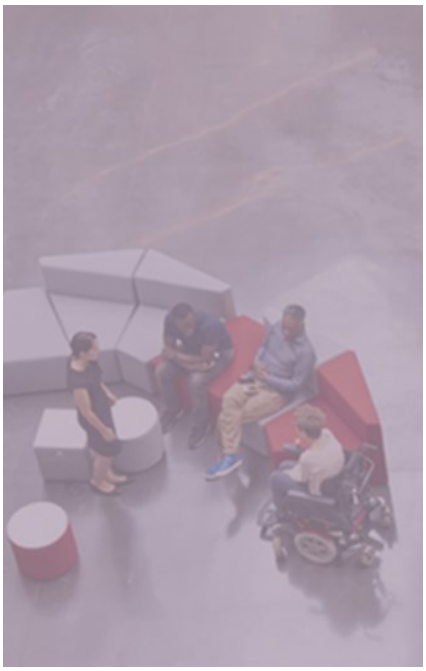
For some schools, the QTR discussions clearly served as the basis for sharing of resources and ideas about classroom practice between teachers. Teachers in these schools were more likely to make comments like, 'I will have to try that', or 'How do you think that could work with a senior Psychology class?' (and then discussion would follow).

In other schools, this was less evident or not evident at all. As only one round was observed, it is impossible to rule out that these discussions were happening more generally, but they were more of a feature within some groups than others.

5) There was a tendency at some schools to use the process to reassure or support teachers. At School 2 (3188), most of the participating teachers were quite experienced, and one was a graduate teacher. This teacher was somewhat nervous about his overall performance and was not entirely sure of the QTR process.

6) Particular terms were confusing or unclear to many participants. The definition of terms such as 'occasionally', 'most' or 'major activity' was not clear enough for many participants and made coding more difficult. This was again more noticeable for groups where none or only one of the participants had attended the workshop.

CONCLUSION



Quality teaching is the largest in-school factor known to improve student learning outcomes (Hattie, 2009, 2012). Students in Australian schools have not shown consistent improvement in academic outcomes overtime as evidenced through international (OECD, 2014) and national testing (ACARA, 2021), with disparities remaining disappointingly consistent for disadvantaged students (OECD, 2016). Professional development that leads to improved student outcomes in all settings is rarely evidenced (Albers et al., 2017; Cordingley et al., 2015).

Previous research has highlighted a significant impact of QTR on teaching quality in a range of schools in New South Wales and students' mathematics achievement in primary settings and other positive outcomes, such as improved teacher morale in both primary and secondary schools (Gore et al., 2017; Gore & Rickards, 2021; Gore & Rosser, 2022; Gore & Bowe, 2015; Gore et al., 2021; Miller et al., 2019).

ACER was commissioned to independently evaluate the impact of QTR on student and teacher outcomes (academic, self-efficacy and aspirations) in 40 high schools recruited by TTRC in Victoria. ACER randomised the sample of schools accounting for location, school gender, school type, ICSEA, Year 7 NAPLAN reading score, school authority, and enrolment size. Twenty schools were assigned to the control group with the other 20 attending the QTR professional learning and undertaking QTR. There was minor attrition within the study population, resulting in a total of 20 control schools, 19 treatment schools, with 147 teachers and 786 students.

Unlike a previous study undertaken in New South Wales Government primary schools (n = 5478) (Gore et al., 2021), no significant improvement was identified for students with teachers in the treatment group for mathematics (PAT-M) in comparison to the control group. Mixed-model analysis identified that treatment was not significantly related to outcomes in reading or mathematics. Within this group of Victorian high schools, the students in the control group had an additional although non-significant gain in their mathematics achievement score of 2.17 in comparison to the treatment group. Similarly, the control group had an additional gain in reading achievement score of 0.55.

The non-significant outcome for the treatment group was not an unexpected result for this study, as elucidated in the Power analysis, the particular circumstances in which the study was conducted (COVID-19 pandemic and flooding), reflecting the constraints in sample sizes, the

length of the treatment and the reasonably high baseline performance observed. Gender was related to outcomes in reading, with male students performing at a lower level, a finding common to other studies (Lietz, 2006; Thomas et al., 2022).

The student survey results showed statistically significant differences for different items in the control and treatment groups. The students in the control group had significantly increased aspirations regarding the highest level of education they planned to complete. Surprisingly, the number of books that students with teachers who participated in QTR reported they read each year was significantly lower in the follow up questionnaire. Increased book reading has been shown to be associated with improvements in reading comprehension (Kim et al., 2016; Kim & Quinn, 2013).

Similarly to the student survey results, the teacher survey showed significantly increased teacher efficacy in the control group, while the treatment group had significantly decreased teacher-student support. These findings are in contrast to a previously reported study (Gore et al., 2021).

Observations made during fidelity checks were 1) teacher stress due to high rates of absenteeism, 2) varied use of the Classroom Practice Guide and 3) analytical conversation about some elements and terms.

In conclusion, there would be value in considering a replication study. Also given the impact of COVID-19 pandemic and flooding in Victoria there would be merit in repeating the study in more "normal" circumstances. This study would be undertaken with the following characteristics of 1) a larger sample of schools and students involved to increase the power to find statistical significance and provide stronger randomisation and 2) a study population that is likely to exhibit larger average gains within one calendar year. The replication study could involve primary aged students, as younger aged students generally exhibit larger gains in learning, and a cohort that is not higher ability than average.

REFERENCES

ACARA. (2021). *NAPLAN achievement in reading, Writing, language conventions and numeracy: National report for 2021*. https://reports.acara.edu.au/

ACARA. (2022). *NAPLAN Results*. https://www.acara.edu.au/reporting/national-report-on-schooling-in-australia/national-report-on-schooling-in-australia-data-portal/naplan-national-report

Albers, B., & Pattuwage, L. (2017). Implementation in Education: Findings from a Scoping Review. http://www.evidenceforlearning.org.au/evidence-informed-educators/implementation-in-education

Albers, B., Pattuwage, L., & Vaughan, T. (2017). Summary of key findings of a scoping review of Implementation in Education. Retrieved 30 October 2018, from http://www.evidenceforlearning.org.au/evidence-informed-educators/implementation-in-education/

Artman-Meeker, K., Hemmeter, M. L., & Snyder, P. (2014). Effects of Distance Coaching on Teachers' Use of Pyramid Model Practices: A Pilot Study. *Infants & Young Children*, *27*(4), 325-344.

Bahr, N., & Mellor, S. (2016). Building quality in teaching and teacher education.

Barnes, M., & Cross, R. (2020). Teacher education policy to improve teacher quality: Substantive reform or just another hurdle? *Teachers and teaching*, *26*(3-4), 307-325.

Clarke, A. M., Bunting, B., & Barry, M. M. (2014). Evaluating the implementation of a school-based emotional well-being programme: a cluster randomized controlled trial of Zippy's Friends for children in disadvantaged primary schools. *Health education research*, *29*(5), 786-798.

Clarkson, P. C. (2007). Australian Vietnamese students learning mathematics: High ability bilinguals and their use of their languages. *Educational studies in mathematics*, *64*(2), 191-215.

Cordingley, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., Saunders, L., & Coe, R. (2015). Developing great teaching: lessons from the international reviews into effective professional development. http://dro.dur.ac.uk/15834/1/15834.pdf?DDD45+DDD29+DDO128+hsmz78+d7ootmt

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. *Learning Policy Institute*.

Darling-Hammond, L., & McLaughlin, M. W. (1995). Policies that support professional development in an era of reform. *Phi Delta Kappan*, *76*(8), 597-604.

Education Endowment Foundation. (2019). Putting evidence to work: A school's guide to implementation. Implementation theme - Professional development. https://educationendowmentfoundation.org.uk/public/files/Publications/Implementation/Professional-Development-Summary.pdf

Evidence for Learning. (2022a). *About the Toolkits*. https://evidenceforlearning.org.au/the-toolkits/about/

Evidence for Learning. (2022b). *The Teaching & Learning Toolkit*. Retrieved 29 October from https://evidenceforlearning.org.au/education-evidence/teaching-learning-toolkit

Fitzgerald, T., & Knipe, S. (2016). Policy reform: Testing times for teacher education in Australia. *Journal of Educational Administration and History*, *48*(4), 358-369.

Fray, L., Jaremus, F., Gore, J., Miller, A., & Harris, J. (2022). Under pressure and overlooked: the impact of COVID-19 on teachers in NSW public schools. *The Australian Educational Researcher*, 1-27.

Gore, J., Lloyd, A., Smith, M., Bowe, J., Ellis, H., & Lubans, D. (2017). Effects of professional development on the quality of teaching: Results from a randomised controlled trial of Quality Teaching Rounds. *Teaching and Teacher education*, *68*, 99-113.

Gore, J., & Rickards, B. (2021). Rejuvenating experienced teachers through Quality Teaching Rounds professional development. *Journal of Educational Change*, *22*(3), 335-354.

Gore, J., & Rosser, B. (2022). Beyond content-focused professional development: powerful professional learning through genuine learning communities across grades and subjects. *Professional Development in Education*, *48*(2), 218-232.

Gore, J. M., & Bowe, J. M. (2015). Interrupting attrition? Re-shaping the transition from preservice to inservice teaching through Quality Teaching Rounds. *International Journal of Educational Research*, *73*, 77-88.

Gore, J. M., Miller, A., Fray, L., Harris, J., & Prieto, E. (2021). Improving student achievement through professional development: Results from a randomised controlled trial of Quality Teaching Rounds. *Teaching and Teacher education*, *101*, 103297.

Gray, H. L., Contento, I. R., & Koch, P. A. (2015). Linking implementation process to intervention outcomes in a middle school obesity prevention curriculum,'Choice, Control and Change'. *Health education research*, *30*(2), 248-261.

Hattie, J. (2009). *Visible Learning: A synthesis of over 800 meta-analysis relating to achievement*. Routledge.

Hattie, J. (2012). *Visible Learning for Teachers*. Routledge.

Heffernan, A., Bright, D., Kim, M., Longmuir, F., & Magyar, B. (2022). 'I cannot sustain the workload and the emotional toll': Reasons behind Australian teachers' intentions to leave the profession. *Australian Journal of Education*, *0*(0), 00049441221086654. https://doi.org/10.1177/00049441221086654

Heffernan, A., Longmuir, F., Bright, D., & Kim, M. (2019). Perceptions of teachers and teaching in Australia. *Monash University. Available at: https://www. monash. edu/thank-your-teacher/docs/Perceptions-of-Teachers-and-Teaching-in-Australia-report-Nov-2019. pdf*.

Kam, C.-M., Greenberg, M. T., & Walls, C. T. (2003). Examining the role of implementation quality in school-based prevention using the PATHS curriculum. *Prevention Science*, *4*(1), 55-63.

Kim, J. S., Guryan, J., White, T. G., Quinn, D. M., Capotosto, L., & Kingston, H. C. (2016). Delayed effects of a low-cost and large-scale summer reading intervention on elementary school children's reading comprehension. *Journal of Research on Educational Effectiveness*, *9*(sup1), 1-22.

Kim, J. S., & Quinn, D. M. (2013). The effects of summer reading on low-income children's literacy achievement from kindergarten to grade 8: A meta-analysis of classroom and home interventions. *Review of educational research*, *83*(3), 386-431.

Ladwig, J. G. (2007). Modelling pedagogy in Australian school reform. *Pedagogies: An International Journal*, *2*(2), 57-76.

Lietz, P. (2006). A meta-analysis of gender differences in reading achievement at the secondary school level. *Studies in Educational Evaluation*, *32*(4), 317-344.

Lindvall, J., Helenius, O., & Wiberg, M. (2018). Critical features of professional development programs: Comparing content focus and impact of two large-scale programs. *Teaching and Teacher education*, *70*, 121-131.

Matsumura, L. C., Garnier, H. E., & Resnick, L. B. (2010). Implementing Literacy Coaching The Role of School Social Resources. *Educational Evaluation and Policy Analysis*, *32*(2), 249-272.

Miller, A., Gore, J., Wallington, C., Harris, J., Prieto-Rodriguez, E., & Smith, M. (2019). Improving student outcomes through professional development: Protocol for a cluster randomised controlled trial of quality teaching rounds. *International Journal of Educational Research*, *98*, 146-158.

Newmann, F. M. (1996). *Authentic achievement: Restructuring schools for intellectual quality*. Jossey-Bass.

OECD. (2014). PISA 2012 Results: What Students Know and Can Do – Student Performance in Mathematics, Reading and Science. https://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-I.pdf

OECD. (2016). Low-Performing Students: Why They Fall Behind and How to Help Them Succeed. Country Note Australia. https://www.oecd.org/australia/PISA-2012-low-performers-Australia-ENG.pdf

Patfield, S., Gore, J., & Harris, J. (2022). Scaling up effective professional development: Toward successful adaptation through attention to underlying mechanisms. *Teaching and Teacher education*, *116*, 103756.

Precel, N., Carey, A., & Jaenicke, C. (2022). Students sent home, teachers under pressure as flu rips through schools. https://www.theage.com.au/national/victoria/students-sent-home-teachers-under-pressure-as-flu-rips-through-schools-20220518-p5amc2.html

Sarama, J., Clements, D. H., Starkey, P., Klein, A., & Wakeley, A. (2008). Scaling up the implementation of a pre-kindergarten mathematics curriculum: Teaching for understanding with trajectories and technologies. *Journal of Research on Educational Effectiveness*, *1*(2), 89-119.

Sharples, J., Albers, B., & Fraser, S. (2020). Implementation Themes - Professional Development. https://educationendowmentfoundation.org.uk/tools/guidance-reports/a-schools-guide-to-implementation/

Sonnemann, J., & Hunter, J. (2021). Lessons learned from many months of interrupted schooling. *The Age*. https://www.theage.com.au/national/victoria/lessons-learned-from-many-months-of-interrupted-schooling-20211004-p58x3h.html

Sprott, R. A. (2019). Factors that foster and deter advanced teachers' professional development. *Teaching and Teacher education*, *77*, 321-331.

State of NSW Department of Education. (2021). *Quality Teaching Assessment Practice Guide 3rd edn.*

State of Victoria (Department of Education and Training). (2022). *Conduct research with the Department of Education and Training*. https://www.vic.gov.au/conduct-research-department-education-and-training

Stroud, G. (2022). 'I can't stay. It's not enough': why are teachers leaving Australian schools? *The Guardian*. https://www.theguardian.com/australia-news/2022/jun/27/i-cant-stay-its-not-enough-why-are-teachers-leaving-australian-schools?CMP=share_btn_tw

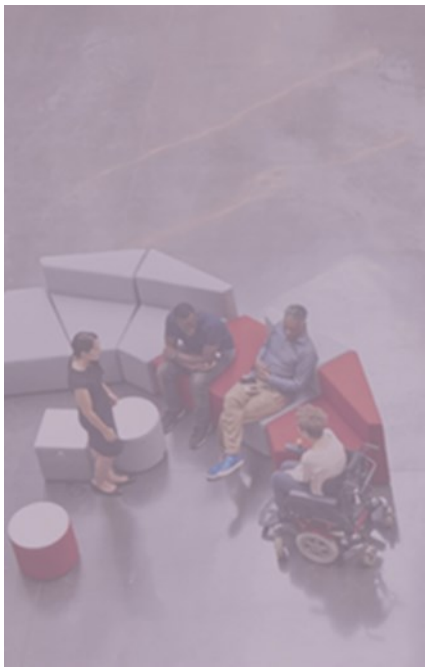
Thomas, D. P., Hopwood, B., Hatisaru, V., & Hicks, D. (2022). Gender differences in reading and numeracy achievement across the school years. *The Australian Educational Researcher*, 1-26.

Thurlings, M., & den Brok, P. (2017). Learning outcomes of teacher professional development activities: a meta-study. *Educational review*, *69*(5), 554-576.

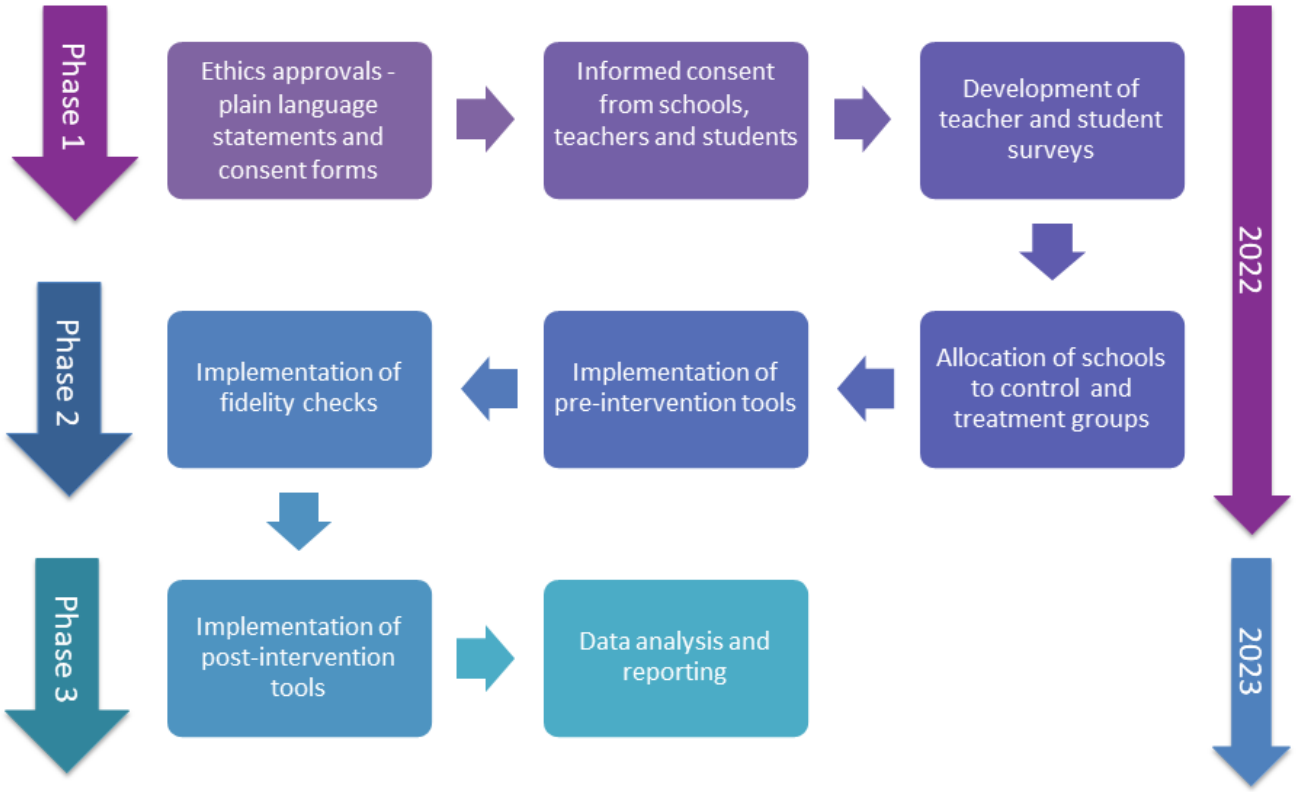
Vaughan, T. (2020). Leading effective professional learning. *Resources in Action - Leadership in Action*(8). https://www.acel.org.au/ACEL/ACELWEB/Publications/Resources_In_Action/Past_Issues.aspx

Yeigh, T., & Lynch, D. (2017). Reforming initial teacher education: a call for innovation. *Australian Journal of Teacher Education*, *42*(12), 112-127.

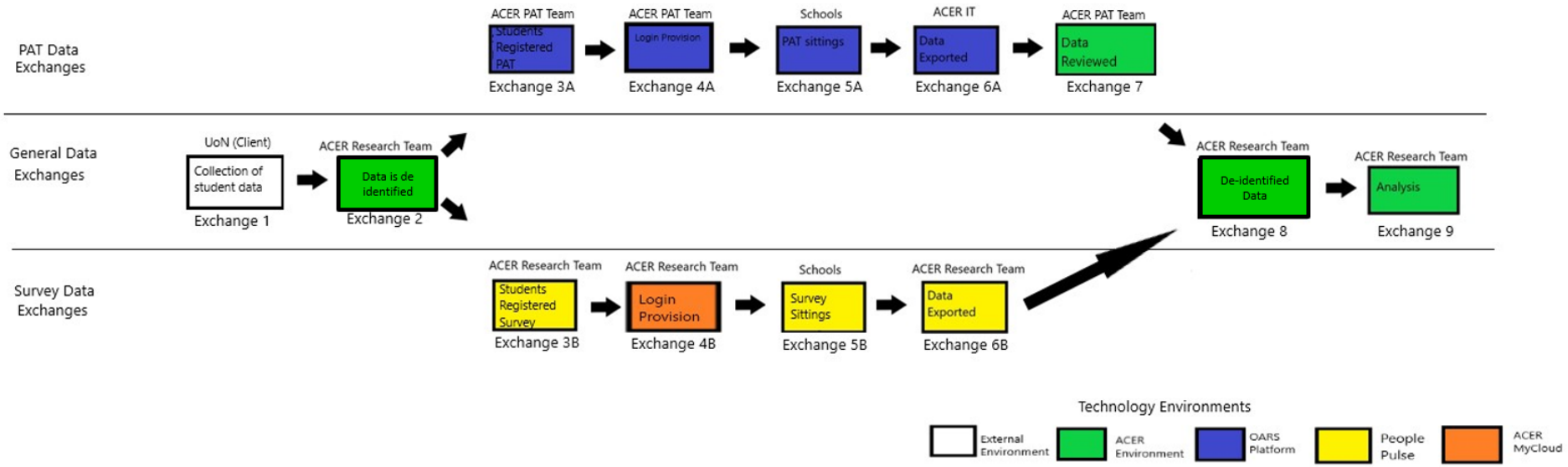
APPENDICES



Appendix 1: Methodology



Appendix 2: Data flow diagram



Appendix 3: Teacher questionnaire

<REV> indicates reversed scored

Please complete the survey below. The survey will take approximately 10-15 minutes to complete. When you have completed the survey, please click 'Done' to submit your responses. Your responses are confidential and you will not be named or identified within the research outcomes.

<Show only for baseline - START>

Gender:

- ○ Female (1)
- ○ Male (2)
- ○ Transgender (3)
- ○ Non-binary (4)
- ○ Other (5)
- ○ Prefer not to say (6)

What is your age?

- ○ Younger than 25 (1)
- ○ 25-29 (2)
- ○ 30-39 (3)
- ○ 40-49 (4)
- ○ 50-59 (5)
- ○ 60 years or older (6)

What is the highest teaching qualification you have completed?

- ○ Diploma or Associate Diploma (1)
- ○ Bachelor Degree (with or without Honours) (2)
- ○ Graduate Diploma or Graduate Certificate (3)
- ○ Teach for Australia (4)
- ○ Master's Degree (5)
- ○ Doctoral degree (6)
- ○ Other (please specify) (7)

Which of the following best describes your current role?

- ○ Classroom teacher (1)
- ○ Instructional teacher (2)
- ○ Other non-teaching/support role (e.g., interventionist, wellbeing) (3)

Do you hold any additional postgraduate education/teaching qualification? *(e.g., Master of Educational Leadership, Master of Education Studies)*

- ○ Yes (please specify)_____ (1)
- ○ No (2)

How many years of teaching experience do you have?

- ○ Less than one year (1)
- ○ 1 to 2 years (2)
- ○ 3 to 5 years (3)
- ○ 6 to 10 years (4)
- ○ 11 to 15 years (5)
- ○ 16 to 20 years (6)
- ○ More than 20 years (7)

How many years of teaching experience do you have at this school?

- ○ Less than one year (1)
- ○ 1 to 2 years (2)
- ○ 3 to 5 years (3)
- ○ 6 to 10 years (4)
- ○ 11 to 15 years (5)
- ○ 16 to 20 years (6)
- ○ More than 20 years (7)

<Show only for baseline - END>

Teacher efficacy

Below are some questions about your experiences as a teacher. Read each sentence and choose the one response that best describes how you felt in the last month.

	Almost never (1)	Sometimes (2)	Often (3)	Almost always (4)
I am a successful teacher.	○	○	○	○
I am good at helping students learn new things.	○	○	○	○
I have accomplished a lot as a teacher.	○	○	○	○
I feel like my teaching is effective and helpful.	○	○	○	○

Teacher belonging

Below are some questions about your experiences as a teacher. Read each sentence and choose the one response that best describes how you felt in the last month.

	Almost never (1)	Sometimes (2)	Often (3)	Almost always (4)
I feel like I belong at this school.	○	○	○	○
I can really be myself at this school.	○	○	○	○

I feel like people at this school care about me.	○	○	○	○
I am treated with respect at this school.	○	○	○	○

Teacher feedback

Please mark the extent to which you agree with the following statements:

	Strongly disagree (1)	Slightly disagree (2)	Neutral (3)	Slightly agree (4)	Strongly agree (5)
I am encouraged in my work by praise, thanks or other recognition.	○	○	○	○	○
I have the opportunity to discuss and receive feedback on my work performance.	○	○	○	○	○
I am regularly given feedback on how I am performing my role.	○	○	○	○	○
There is a structure and process that provides feedback on my work performance.	○	○	○	○	○
I receive regular feedback from a range of sources about my performance in this school.	○	○	○	○	○
I am happy with the quality of feedback I receive on my work performance.	○	○	○	○	○

Teacher student support and family engagement

Please indicate your opinion on each of the statements below:

	Nothing 0	1	Very little 2	3	Some influence 4	5	Quite a bit 6	7	A Great Deal 8
How much can you do to motivate students who show low interest in school work?	○	○	○	○	○	○	○	○	○
How much can you do to get students to believe they can do well in school work?	○	○	○	○	○	○	○	○	○
How much can you do to help your students value learning?	○	○	○	○	○	○	○	○	○
How much can you do to assist families in helping their children do well in school?	○	○	○	○	○	○	○	○	○

School community

Please mark the extent to which you agree with the following statements:

	Strongly disagree (1)	Slightly disagree (2)	Neutral (3)	Slightly agree (4)	Strongly agree (5)
There is good team spirit in this school.	○	○	○	○	○
The morale in this school is high.	○	○	○	○	○
Teachers go about their work with enthusiasm.	○	○	○	○	○
Teachers take pride in this school.	○	○	○	○	○
There is a lot of energy in this school.	○	○	○	○	○

Job stress

<REV>

	Not at all 0	1	2	3	4	5	6	7	8	9	Extremely stressful 10
How stressful is your job?	○	○	○	○	○	○	○	○	○	○	○

Coping with job stress

	Not at all 0	1	2	3	4	5	6	7	8	9	Extremely well 10
How well are you coping with the stress of your job right now?	○	○	○	○	○	○	○	○	○	○	○

Burn out

<REV> Please mark the extent to which you agree with the following statements:

	Never 0	1	2	3	4	5	Every day 6
I feel emotionally drained from my work.	○	○	○	○	○	○	○
I feel used up at the end of the work day.	○	○	○	○	○	○	○
I feel fatigued when I get up in the morning and have to face another day on the job.	○	○	○	○	○	○	○
I feel burned out from my work.	○	○	○	○	○	○	○

Intent to leave teaching profession

<REV>

	Not at all likely 0	1	2	3	4	5	6	7	8	9	Extremely likely 10
	○	○	○	○	○	○	○	○	○	○	○
How likely are you to leave the teaching profession within the next 6 months?	○	○	○	○	○	○	○	○	○	○	○

Teacher autonomy

Please mark the extent to which you agree with the following statements:

	Strongly disagree (1)	Slightly disagree (2)	Neutral (3)	Slightly agree (4)	Strongly agree (5)
I am given enough time to do my job well.	○	○	○	○	○
I feel in control and on top of things at work.	○	○	○	○	○
I feel emotionally well at work.	○	○	○	○	○

<Show if baseline - start>

Quality Teaching Rounds Baseline

Please indicate your level of knowledge with regard to Quality Teaching Rounds (choose one):

- ○ This is the first I'm hearing of it (1)
- ○ I've heard of Quality Teaching Rounds but have not participated (2) **<QTR>**
- ○ I have participated in Quality Teaching Rounds - but it was over a year ago (3) **<QTR>**
- ○ I have participated in Quality Teaching Rounds in the past year (4) **<QTR>**

IF **<QTR>** **show**

Involvement in Quality Teaching Rounds Baseline

From your knowledge of Quality Teaching Rounds, please respond to the following:

Involvement in Quality Teaching Rounds will have a positive impact on:

	Not at all 0	1	2	3	4	5	6	7	8	9	A great deal 10
Teaching practice	○	○	○	○	○	○	○	○	○	○	○
Student outcomes	○	○	○	○	○	○	○	○	○	○	○
Staff morale	○	○	○	○	○	○	○	○	○	○	○
School culture	○	○	○	○	○	○	○	○	○	○	○
My professional identity	○	○	○	○	○	○	○	○	○	○	○

<Show if baseline - end>

<Show if interim1,interim2,followup - Start>

QTR Intro Interim and Followup

Quality Teaching Rounds

A standard set of Quality Teaching Rounds involves 4 teachers in a Professional Learning Community, with each teacher hosting one Round. Each Round involves:

- a professional reading discussion,
- whole lesson observation,
- individual coding using the Quality Teaching model, and
- post-lesson discussion in which codes are shared and explained, the group tries to reach consensus and pedagogy is discussed more broadly.

Have you been participating in Quality Teaching Rounds this year?

- ○ Yes (1) **<QTR Yes>**
- ○ No (2) **<QTR No>**

<show if QTR Yes>

Involvement in Quality Teaching Rounds Interim and Followup

From your involvement of Quality Teaching Rounds, please respond to the following:

Involvement in Quality Teaching Rounds has had a positive impact on:

	Not at all 0	1	2	3	4	5	6	7	8	9	A great deal 10
Teaching practice	○	○	○	○	○	○	○	○	○	○	○
Student outcomes	○	○	○	○	○	○	○	○	○	○	○
Staff morale	○	○	○	○	○	○	○	○	○	○	○
School culture	○	○	○	○	○	○	○	○	○	○	○
My professional identity	○	○	○	○	○	○	○	○	○	○	○

<show if QTR Yes OR QTR No>

PD Impact Interim and Followup

Did the professional development activities you participated in during the last 6 months cover the following topics? If so, what positive impact did these have on your teaching?

Note: If you have not undertaken any PD in a listed activity, please select Not Applicable.

	No Impact (1)	Small Impact (2)	Moderate Impact (3)	Large Impact (4)	Not Applicable (5)
Knowledge and understanding of my subject field(s)	○	○	○	○	○
Knowledge of the curriculum	○	○	○	○	○
Student evaluation and assessment practices	○	○	○	○	○
Quality Teaching Rounds (QTR)	○	○	○	○	○

Peer observation (non- QTR)	○	○	○	○	○

<Show if interim1,interim2,followup - End>

<SHOW IF baseline - Start>

Attitudes to change baseline questions

This part contains questions about people's attitudes to change.

Attitudes to change negatively worded

<REV> Please mark the extent to which you agree with the following statements:

	Strongly disagree (1)	Slightly disagree (2)	Neutral (3)	Slightly agree (4)	Strongly agree (5)
I think that most changes will have a negative effect on the students we teach.	○	○	○	○	○
Plans for future improvement will not come to much.	○	○	○	○	○
Most projects that are supposed to solve problems around here will not do much good.	○	○	○	○	○

Attitudes to change

Please mark the extent to which you agree with the following statements in regards to Quality Teaching Rounds:

	Strongly disagree (1)	Slightly disagree (2)	Neutral (3)	Slightly agree (4)	Strongly agree (5)
I have a good feeling about this project.	○	○	○	○	○
I experience change as a positive process.	○	○	○	○	○
I find change refreshing.	○	○	○	○	○

<SHOW IF baseline - End>

[SUBMIT]

Thank you for sharing your important views

Collection statement: Your submission has been collected by ACER, on behalf of the University of Newcastle. Your responses will remain confidential and anonymous.

Appendix 4: Student questionnaire

All questions are the same for baseline and followup.

<REV> indicates reversed scored

Baseline Link:

We would like to know about how you feel about your life at school for some research we are doing with the University of Newcastle.
This is not a test, and there are no right or wrong answers.

If you do not understand a question, please ask a teacher for help.

The survey should take about 15 minutes to complete. Please click 'Done' when you are finished.

***What is your username?**

(This is the username that your Teacher has provided you with)

***Please select your school from the list below:**

<dropdown> *40 schools listed*

Please read the following statements and mark the extent to which you agree with them:

	Definitely disagree 1 (1)	2 (2)	3 (3)	Definitely agree 4 (4)
I am a success as a student.	○	○	○	○
I know how to cope with the work.	○	○	○	○
I am good at school work.	○	○	○	○
I know I can keep up with the work.	○	○	○	○
I achieve a satisfactory standard.	○	○	○	○

What is the highest level of education you plan to complete?

- ○ High school
- ○ TAFE e.g., plumber, hair dresser, electrician
- ○ University e.g., nurse, teacher, engineer
- ○ I don’t know

What type of work would you like to do when you are grown up?

Do you think you will get this type of work?

- ○ Yes
- ○ No
- ○ Don't know

Have any of the following people studied at university?

	Yes	No	Don't know
Parents/Guardians	○	○	○

	Not at all 0	1	2	3	4	5	6	7	8	9	Very important 10
How important is reading for getting a job?	○	○	○	○	○	○	○	○	○	○	○
How important is reading for being successful at school?	○	○	○	○	○	○	○	○	○	○	○

How many books would you read each year?

- ○ None
- ○ Less than 10
- ○ 11-25
- ○ 26-50
- ○ More than 50

	Not good at all 0	1	2	3	4	5	6	7	8	9	Really good 10
How good are you at reading?	○	○	○	○	○	○	○	○	○	○	○

	Not at all 0	1	2	3	4	5	6	7	8	9	Very much 10
How much do you enjoy reading?	○	○	○	○	○	○	○	○	○	○	○

	Not easily										Very easily
	0	1	2	3	4	5	6	7	8	9	10
How easily do you understand what you are reading?	○	○	○	○	○	○	○	○	○	○	○

	Not good at all										Really good
	0	1	2	3	4	5	6	7	8	9	10
How good are you at figuring out key points in what you read?	○	○	○	○	○	○	○	○	○	○	○
How good are you at understanding the hidden meaning in texts?	○	○	○	○	○	○	○	○	○	○	○
How good are you at writing persuasively?	○	○	○	○	○	○	○	○	○	○	○

Please read the following statements and mark the extent to which you agree with them:

	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
Family members/carers help me with homework.	○	○	○	○
Family members/carers reward me if I do well at school.	○	○	○	○
Family members/carers often ask me how I'm doing at school.	○	○	○	○
I have a quiet place in which to do schoolwork.	○	○	○	○
Family members/carers usually come to parent/teacher evenings.	○	○	○	○

How confident do you feel about having to do the following mathematics tasks:

	1- Not at all confident	2 - Not very confident	3 - Confident	4 - Very confident
Adding two numbers in the hundreds.	○	○	○	○
Subtracting two numbers in the hundreds.	○	○	○	○
Multiplying any number by 2.	○	○	○	○
Multiplying any number by 7.	○	○	○	○
Understanding graphs presented in newspapers.	○	○	○	○
Changing measuring units from centimetres to metres.	○	○	○	○
Identifying shapes by the number of sides they have (for example a triangle or a hexagon).	○	○	○	○
Calculating the decimal value of a simple fraction like 3/4.	○	○	○	○

<REV>

Please read the following statements and mark the extent to which you agree with them:

	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
I often worry that it will be difficult for me in Mathematics classes.	○	○	○	○
I get very stressed when I have to do Mathematics homework.	○	○	○	○
I get very nervous doing Mathematics problems.	○	○	○	○
I feel helpless when doing a Mathematics problem.	○	○	○	○
I worry that I will get poor marks in Mathematics.	○	○	○	○

Please read the following statements and mark the extent to which you agree with them:

	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
I get good marks in Mathematics.	○	○	○	○
I learn Mathematics quickly.	○	○	○	○
I have always believed that Mathematics is one of my best subjects.	○	○	○	○
In my Mathematics class, I understand even the most difficult work.	○	○	○	○

Please read the following statements and mark the extent to which you agree with them:

	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
I look forward to my Mathematics lessons.	○	○	○	○
I do Mathematics because I enjoy it.	○	○	○	○
I am interested in the things I learn in Mathematics.	○	○	○	○

[SUBMIT]

Thank you for sharing your important views

Collection statement: Your submission has been collected by ACER, on behalf of the University of Newcastle. Your responses will remain confidential and anonymous.

Appendix 5: Teacher questionnaire data

Table 3: Demographic information for teacher questionnaire for matched pre and post intervention

Demographic question	*Categories*	*Control (n=28)*		*Treatment (n=39)*	
		Count	*Percentage*	*Count*	*Percentage*
Gender	Female	24	85.7%	30	76.9%
	Male	4	14.3%	9	23.1%
Age	Younger than 25	3	10.7%	2	5.0%
	25-29	3	10.7%	12	30.0%
	30-39	9	32.1%	14	35.0%
	40-49	4	14.3%	4	10.0%
	50-59	7	25.0%	7	17.5%
	60 years or older	2	7.1%	1	2.5%
Highest teaching qualification	Bachelor Degree	10	35.7%	15	37.5%
	Graduate Diploma or Certificate	9	32.1%	11	27.5%
	Masters Degree	8	28.6%	11	27.5%
	Other	1	3.6%	3	7.5%
Current role	Classroom teacher	25	89.3%	34	87.2%
	Instructional teacher	2	7.1%	5	12.8%
	Other	1	3.6%	0	0.0%
Additional postgraduate education/teaching qualification	Yes	9	32.1%	3	7.9%
	No	19	67.9%	35	92.1%
How many years of teaching experience do you have?	1 to 2 years	5	17.9%	5	12.5%
	3 to 5 years	3	10.7%	12	30.0%
	6 to 10 years	6	21.4%	10	25.0%
	11 to 15 years	3	10.7%	4	10.0%
	16 to 20 years	1	3.6%	3	7.5%
	More than 20 years	10	35.7%	6	15.0%

Table 4: Demographic information for teacher questionnaire for matched pre and post intervention related to years of teaching at current school

Demographic question	*Categories*	*Control*		*Treatment*	
		Count	*Percentage*	*Count*	*Percentage*
How many years of teaching experience have you had at this school?	1 to 2 years	5	17.9%	2	5.0%
	3 to 5 years	8	28.6%	13	32.5%
	6 to 10 years	9	32.1%	16	40.0%
	11 to 15 years	3	10.7%	5	12.5%
	16 to 20 years	2	7.1%	0	0.0%
	More than 20 years	1	3.6%	2	5.0%

Table 5: Do you hold any additional postgraduate education/teaching qualification

Qualifications	Control		Treatment	
	Count	*Percentage*	Count	*Percentage*
No	19	67.9	35	92.1
BSC of Mechanical Engineering	1	3.6		
Graduate Certificate of Mathematics			1	2.6
Graduate Certificate in Teaching English to Students of Other Languages TESOL	1	3.6		
MA Applied Linguistics	1	3.6		
Master of Education -Secondary	1	3.6		
Master of Education Studies			1	2.6
Master of Education	1	3.6	1	2.6
Master of Educational Leadership, Graduate Certificate in Religious Studies	1	3.6		
Master of TESOL	1	3.6		
Master of Teaching	1	3.6		
Post Graduate Diploma in Educational Studies Student Welfare	1	3.6		
Valid Total	28	100	38	100
Not Applicable			2	

Table 6: Constructs from the teacher questionnaire

Construct	*Construct items*	Description
Teacher Efficacy (TCH_EFF)	TQ8	I am a successful teacher.
	TQ9	I am good at helping students learn new things.
	TQ10	I have accomplished a lot as a teacher.
	TQ11	I feel like my teaching is effective and helpful.
Teacher Belonging (TCH_BLG)	TQ12	I feel like I belong at this school.
	TQ13	I can really be myself at this school.
	TQ14	I feel like people at this school care about me.
	TQ15	I am treated with respect at this school.
Teacher Feedback (TCH_FEEDBK)	TQ16	I am encouraged in my work by praise, thanks or other recognition.
	TQ17	I have the opportunity to discuss and receive feedback on my work performance.
	TQ18	I am regularly given feedback on how I am performing my role.
	TQ19	There is a structure and process that provides feedback on my work performance.
	TQ20	I receive regular feedback from a range of sources about my performance in this school.
	TQ21	I am happy with the quality of feedback I receive on my work performance.
Teacher Student Support (TCH_HLP1)	TQ22	How much can you do to motivate students who show low interest in school work?
	TQ23	How much can you do to get students to believe they can do well in school work?
	TQ24	How much can you do to help your students value learning?
	TQ25	How much can you do to assist families in helping their children do well in school?
Teacher Environment (TCH_ENV)	TQ26	There is good team spirit in this school.
	TQ27	The morale in this school is high.
	TQ28	Teachers go about their work with enthusiasm.
	TQ29	Teachers take pride in this school.
	TQ30	There is a lot of energy in this school.
Teacher Burnout (TCH_BURNOUT)	TQ33	I feel emotionally drained from my work.
	TQ34	I feel used up at the end of the work day.

	TQ35	I feel fatigued when I get up in the morning and have to face another day on the job.
	TQ36	I feel burned out from my work.
Teacher Change (Negative)	TQ58	I think that most changes will have a negative effect on the students we teach.
	TQ59	Plans for future improvement will not come to much.
	TQ60	Most projects that are supposed to solve problems around here will not do much good.
Teacher Change (Positive)	TQ61	I have a good feeling about this project.
	TQ62	I experience change as a positive process.
	TQ63	I find change refreshing.

Table 7: Descriptive statistics for the teachers' questionnaire responses for the control group

Item/construct						Confidence interval			
	Mean baseline	Mean follow up	Change in mean (follow up-baseline)	Std. Deviation	Std. Error Mean	Lower	Upper	df	Sig. (2-tailed)
Teacher Efficacy (TCH_EFF)	3.02	3.23	0.21	0.49	0.09	0.02	0.41	27	0.03*
Teacher Belonging (TCH_BLG)	3.31	3.23	-0.08	0.52	0.11	-0.30	0.14	23	0.44
Teacher Feedback (TCH_FEEDBK)	3.52	3.33	-0.20	0.74	0.14	-0.48	0.09	27	0.17
Teacher Student Support (TCH_HLP1)	5.53	5.46	-0.06	0.85	0.16	-0.40	0.27	26	0.70
Teacher Environment (TCH_ENV)	4.16	3.93	-0.23	0.62	0.12	-0.20	0.12	26	0.07
Teacher Burnout (TCH_BURNOUT)	3.24	3.61	0.37	1.06	0.20	-0.47	0.02	26	0.08
Teacher Change (Positive)	4.14	N/A	N/A	0.64	0.12	N/A	N/A	28	N/A
Teacher Change (Negative)	1.72	N/A	N/A	0.64	0.12	N/A	N/A	28	N/A

*$p \geq 0.05$

Note: The Std. Error mean relates to the paired samples t-test

Table 8: Descriptive statistics for the teachers' questionnaire responses for the treatment group

Item/construct						Confidence interval			
	Mean baseline	Mean treatment	Change in mean (follow up-baseline)	Std. Deviation	Std. Error Mean	Lower	Upper	df	Sig. (2-tailed)
Teacher Efficacy (TCH_EFF)	3.04	3.10	0.05	0.54	0.09	-0.12	0.22	38	0.55
Teacher Belonging (TCH_BLG)	3.38	3.27	-0.11	0.57	0.09	-0.29	0.07	38	0.24
Teacher Feedback (TCH_FEEDBK)	3.45	3.29	-0.16	0.85	0.14	-0.43	0.12	38	0.25
Teacher Student Support (TCH_HLP1)	5.66	5.16	-0.50	1.21	0.19	-0.89	-0.11	38	0.01*
Teacher Environment (TCH_ENV)	4.05	3.93	-0.12	0.64	0.10	-0.30	-0.02	38	0.25
Teacher Burnout (TCH_BURNOUT)	3.47	3.37	-0.10	1.18	0.19	-0.33	0.09	38	0.62
Teacher Change (Positive)	4.05	N/A	N/A	0.58	0.09	N/A	N/A	39	N/A
Teacher Change (Negative)	1.77	N/A	N/A	0.83	0.13	N/A	N/A	39	N/A

*$p \geq 0.05$

Note: The Std. Error mean relates to the paired samples t-test

Appendix 6: Student questionnaire data

Table 9: Distribution of gender for the matched student questionnaires

Demographic question	*Categories*	*Control (n=35)*		*Treatment (n=104)*	
		Count	*Percentage*	*Count*	*Percentage*
Gender	Female	18	51.4%	54	51.9%
	Male	17	48.6%	50	48.1%

Table 10: Descriptive statistics for ICSEA of the matched student questions

	Control (n=36)		*Treatment (n=104)*	
	Mean	*Std. Deviation*	*Mean*	*Std. Deviation*
ICSEA	1051.9	41.8	1044.5	76.0

Table 11: Constructs from the student questionnaire

Construct	*Construct items*	Description
Teacher Efficacy (TCH_EFF)	Q14	How good are you at reading?
	Q15	How much do you enjoy reading?
	Q16	How easily do you understand what you are reading?
	Q17	How good are you at figuring out key points in what you read?
	Q18	How good are you at writing persuasively?
Mathematics Arithmetic (MATHS_1)	Q25	Adding two numbers in the hundreds.
	Q26	Subtracting two numbers in the hundreds.
	Q27	Multiplying any number by 2.
	Q28	Multiplying any number by 7.
Mathematics Comprehension (MATHS_2)	Q29	Understanding graphs presented in newspapers.
	Q30	Changing measuring units from centimetres to metres.

	Q31	Identifying shapes by the number of sides they have (for example a triangle or a hexagon).
	Q32	Calculating the decimal value of a simple fraction like 3/4.
	Q29	Understanding graphs presented in newspapers.
	Q30	Changing measuring units from centimetres to metres.
Mathematics Anxiety (MATHS_ANX)	Q33	I often worry that it will be difficult for me in Mathematics classes.
	Q34	I get very stressed when I have to do Mathematics homework.
	Q35	I get very nervous doing Mathematics problems.
	Q36	I feel helpless when doing a Mathematics problem.
	Q37	I worry that I will get poor marks in Mathematics.
Mathematics Efficacy (MATHS_EFF)	Q38	I get good marks in Mathematics.
	Q39	I learn Mathematics quickly.
	Q40	I have always believed that Mathematics is one of my best subjects.
	Q41	In my Mathematics class, I understand even the most difficult work.
Mathematics Enjoy (MATHS_JOY)	Q42	I look forward to my Mathematics lessons.
	Q43	I do Mathematics because I enjoy it.
	Q44	I am interested in the things I learn in Mathematics.
School Work (SCH_WORK)	Q2	I am a success as a student.
	Q3	I know how to cope with the work.
	Q4	I am good at school work.
	Q5	I know I can keep up with the work.
	Q6	I achieve a satisfactory standard.
Home Help (HOMEHELP)	Q20	Family members/carers help me with homework.
	Q21	Family members/carers reward me if I do well at school.
	Q22	Family members/carers often ask me how I'm doing at school.
	Q23	I have a quiet place in which to do schoolwork.
	Q24	Family members/carers usually come to parent/teacher evenings.
	Q20	Family members/carers help me with homework.

Table 12: Descriptive statistics for the students' questionnaire responses for the control group

Item/construct						Confidence interval			
	Mean baseline	Mean treatment	Change in mean	Std. Deviation	Std. Error Mean	Lower	Upper	df	Sig. (2-tailed)
What is the highest level of education you plan to complete?	*3.14*	*3.56*	*0.42*	*1.16*	*0.19*	*0.03*	*0.81*	*35*	*0.04**
Do you think you will get this type of work?	*2.58*	*2.47*	*-0.11*	*0.67*	*0.11*	*-0.34*	*0.11*	*35*	*0.32*
Have any of the following people studied at university? (guardians and parents)	*2.06*	*2.03*	*-0.03*	*0.29*	*0.05*	*-0.13*	*0.07*	*35*	*0.57*
How important is reading for getting a job?	*8.25*	*8.03*	*-0.22*	*1.55*	*0.26*	*-0.75*	*0.30*	*35*	*0.40*
How important is reading for being successful at school?	*8.67*	*9.08*	*0.42*	*1.42*	*0.24*	*-0.06*	*0.90*	*35*	*0.09*
How many books would you read each year?	*3.03*	*3.06*	*0.03*	*0.61*	*0.10*	*-0.18*	*0.23*	*35*	*0.79*
How good are you at writing persuasively?	*6.83*	*7.47*	*0.64*	*1.96*	*0.33*	*-0.02*	*1.30*	*35*	*0.06*
Reading efficiency	*7.73*	*7.90*	*0.17*	*0.93*	*0.15*	*-0.15*	*0.48*	*35*	*0.29*
Mathematics 1	*3.70*	*3.74*	*0.03*	*0.35*	*0.06*	*-0.08*	*0.15*	*35*	*0.55*
Mathematics 2	*3.49*	*3.58*	*0.09*	*0.34*	*0.06*	*-0.02*	*0.20*	*35*	*0.12*
Mathematics anxiety	*2.04*	*2.19*	*0.15*	*0.59*	*0.10*	*-0.05*	*0.36*	*35*	*0.13*
Mathematics efficiency	*2.99*	*2.99*	*0.00*	*0.50*	*0.08*	*-0.17*	*0.17*	*35*	*1.00*
Mathematics enjoyment	*2.81*	*2.61*	*-0.20*	*0.69*	*0.12*	*-0.44*	*0.04*	*34*	*0.09*
School work	*3.24*	*3.28*	*0.00*	*0.54*	*0.09*	*-0.22*	*0.21*	*35*	*0.66*
Home help	*3.08*	*3.02*	*-0.06*	*0.48*	*0.08*	*-0.22*	*0.10*	*35*	*0.47*

*$p \geq 0.05$

Table 13: Descriptive statistics for the students' questionnaire responses for the treatment group

Item/construct						Confidence interval			
	Mean baseline	Mean treatment	Change in mean	Std. Deviation	Std. Error Mean	Lower	Upper	df	Sig. (2-tailed)
What is the highest level of education you plan to complete?	3.25	3.30	0.05	1.16	0.11	-0.18	0.28	102	0.67
Do you think you will get this type of work?	2.51	2.45	-0.06	0.71	0.07	-0.20	0.08	99.00	0.40
Have any of the following people studied at university? (guardians and parents)	2.01	1.97	-0.04	0.59	0.06	-0.15	0.08	103.00	0.51
How important is reading for getting a job?	8.60	8.30	-0.30	2.12	0.21	-0.71	0.12	103	0.16
How important is reading for being successful at school?	8.85	8.68	-0.16	1.81	0.18	-0.52	0.19	103	0.36
How many books would you read each year?	3.08	2.81	-0.27	0.92	0.09	-0.45	-0.09	100	0.004**
How good are you at writing persuasively?	6.56	6.52	-0.04	1.86	0.18	-0.40	0.32	103	0.83
Reading efficiency	7.13	6.96	-0.17	1.24	0.12	-0.41	0.07	103	0.16
Mathematics 1	3.67	3.66	-0.01	0.38	0.04	-0.08	0.07	103	0.83
Mathematics 2	3.30	3.35	0.05	0.43	0.04	-0.03	0.14	103	0.21
Mathematics anxiety	2.13	2.19	0.05	0.60	0.06	-0.06	0.17	102	0.36
Mathematics efficiency	2.87	2.84	-0.04	0.60	0.06	-0.13	0.05	102	0.41
Mathematics enjoyment	2.63	2.61	-0.02	0.45	0.04	-0.13	0.09	103	0.70
School work	3.18	3.12	-0.07	0.55	0.05	-0.19	0.05	103	0.31
Home help	3.11	3.04	-0.07	0.58	0.06	-0.15	0.00	103	0.07

$^{**}p \geq 0.005$

Table 14: Frequencies for the students' questionnaire responses for statistically significant items

Item	*Categories*	*Frequency Control (n=28)*		*Frequency Treatment (n=39)*	
		Baseline	*Follow up*	*Baseline*	*Follow up*
What is the highest level of education you plan to complete	Don't know	25.0%	11.1%	17.3%	15.5%
	High School	2.8%	2.8%	5.8%	6.8%
	Tafe	5.6%	5.6%	13.5%	9.7%
	University	66.7%	80.6%	63.5%	68.0%
How many books would you read each year?	None	5.6%	0.0%	2.0%	3.9%
	Less than 10	36.1%	47.2%	32.4%	45.6%
	10-25	27.8%	16.7%	37.3%	27.2%
	26-50	11.1%	19.4%	12.7%	10.7%
	More than 50	19.4%	16.7%	15.7%	12.6%

Appendix 7: PAT data

Table 15: Descriptive statistics for PAT Baseline Matched Reading

	PAT Reading Scale								
	Baseline			Control Baseline			Treatment Baseline		
	Mean	St Dev	Count	Mean	St Dev	Count	Mean	St Dev	Count
All	135.61	12.64	298	136.58	12.18	119	134.96	12.93	179
Gender									
Female	137.70	11.38	167	139.52	11.26	77	136.13	11.30	90
Male	132.94	13.66	131	131.18	12.05	42	133.77	14.35	89
Location									
Major Cities	138.78	11.73	172	138.24	13.08	68	139.13	10.80	104
Inner Regional	131.47	12.97	98	133.64	10.81	34	130.32	13.92	64
Outer Regional	130.59	11.36	28	135.81	10.27	17	122.53	7.87	11
ICSEA									
Quartile 1	133.23	14.22	73	133.44	12.70	30	133.09	15.34	43
Quartile 2	131.50	10.31	70	132.92	10.56	18	131.00	10.29	52
Quartile 3	140.58	11.31	57	140.58	11.31	57			
Quartile 4	137.41	12.45	98	131.72	12.33	14	138.36	12.28	84

Table 16: Descriptive statistics for PAT Baseline Matched Mathematics

	PAT Mathematics Scale								
	Baseline			Control Baseline			Treatment Baseline		
	Mean	St Dev	Count	Mean	St Dev	Count	Mean	St Dev	Count
All	135.81	13.57	310	135.26	13.71	141	136.27	13.48	169
Gender									
Female	135.13	12.37	174	134.81	13.49	89	135.46	11.15	85
Male	136.69	14.97	136	136.03	14.16	52	137.09	15.52	84
Location									
Major Cities	139.26	14.45	189	138.94	16.23	72	139.45	13.31	117
Inner Regional	131.42	9.50	89	131.34	8.91	49	131.51	10.29	40
Outer Regional	127.69	10.89	32	131.63	9.75	20	121.13	9.74	12
ICSEA									
Quartile 1	130.99	10.42	68	131.50	11.05	36	130.42	9.81	32
Quartile 2	131.39	11.91	82	127.22	7.74	14	132.25	12.47	68
Quartile 3	134.92	11.82	79	135.80	12.27	61	131.96	9.92	18
Quartile 4	145.20	14.52	81	142.44	17.86	30	146.83	12.05	51

Table 17: Descriptive statistics for PAT Follow-up Matched Reading

	PAT Reading Scale								
	Follow-up			Control Follow-up			Treatment Follow-up		
	Mean	St Dev	Count	Mean	St Dev	Count	Mean	St Dev	Count
All	136.61	13.43	298	137.92	13.01	119	135.75	13.66	179
Gender									
Female	139.57	12.05	167	141.50	11.76	77	137.93	12.12	90
Male	132.84	14.17	131	131.35	12.75	42	133.54	14.80	89
Location									
Major Cities	140.18	12.20	172	139.90	12.69	68	140.35	11.93	104
Inner Regional	131.65	13.03	98	132.69	14.06	34	131.10	12.52	64
Outer Regional	132.10	15.47	28	140.42	9.26	17	119.23	14.45	11
ICSEA									
Quartile 1	135.01	14.76	73	135.37	13.74	30	134.76	15.59	43
Quartile 2	130.11	12.17	70	131.10	13.47	18	129.76	11.81	52
Quartile 3	143.00	11.63	57	143.00	11.63	57			
Quartile 4	138.74	12.07	98	131.43	7.60	14	139.96	12.27	84

Table 18: Descriptive statistics for PAT Follow-up Matched Mathematics

	PAT Mathematics Scale								
	Follow-up			Control Follow-up			Treatment Follow-up		
	Mean	St Dev	Count	Mean	St Dev	Count	Mean	St Dev	Count
All	137.02	13.45	310	137.65	11.51	141	136.49	14.90	169
Gender									
Female	136.04	12.02	174	137.06	11.44	89	134.97	12.58	85
Male	138.28	15.04	136	138.67	11.65	52	138.03	16.86	84
Location									
Major Cities	140.21	13.01	189	140.08	13.13	72	140.28	13.00	117
Inner Regional	131.59	13.42	89	134.67	8.47	49	127.82	17.08	40
Outer Regional	133.29	10.23	32	136.23	10.15	20	128.40	8.68	12
ICSEA									
Quartile 1	130.56	14.60	68	135.71	11.16	36	124.76	15.95	32
Quartile 2	133.93	11.43	82	131.59	9.60	14	134.41	11.78	68
Quartile 3	136.53	10.57	79	137.36	9.57	61	133.72	13.34	18
Quartile 4	146.05	12.30	81	143.41	14.18	30	147.60	10.89	51

Table 19: Mixed model for the analysis of PAT-M and PAT-R data

Note: Significant parameters are presented in bold font

	Fixed Effects							Random Effects			
	Intercept	Treatment	Followup	Treat*Foll	Male	ICSEA1	Location1	Student	Residual	Deviance	df
PAT-M											
Model 1	**135.26 (1.14)**	1.01 (1.54)	**2.39 (0.80)**	-2.17 (1.54)				**136.95 (11.70)**	**44.76 (6.69)**	4724.8	614
Model 2	**134.55 1.25**	0.76 (1.55)	**2.39 (0.80)**	-2.17 (1.54)	1.94 (1.45)			**136.04 (11.67)**	**44.76 (6.69)**	4723.0	613
Model 3	**46.60 10.63**	-0.13 (1.42)	**2.39 (0.80)**	-2.17 (1.54)	-0.45 (1.34)	**86.91 (10.44)**		**107.09 (10.35)**	**44.76 (6.69)**	4660.5	612
Model 4	**59.74 11.02**	-0.89 (1.41)	**2.39 (0.80)**	-2.17 (1.54)	-0.18 (1.32)	**71.36 (11.09)**	**5.19 (1.43)**	**101.84 (10.09)**	**44.76 (6.69)**	4647.0	610
PAT-R											
Model 1	**136.58 (1.19)**	-1.620 (1.54)	1.33 (0.80)	-0.55 (1.04)				**130.03 (11.40)**	**38.48 (6.20)**	4477.4	590
Model 2	**138.55 (1.26)**	-0.81 (1.51)	1.33 (0.80)	-0.55 (1.04)	**-5.59 (1.40)**			**122.48 (11.07)**	**38.48 (6.20)**	4461.9	589
Model 3	**69.63 (11.16)**	-2.38 (1.46)	1.33 (0.80)	-0.55 (1.04)	**-7.16 (1.34)**	**68.46 (11.02)**		**106.24 (10.31)**	**38.48 (6.20)**	4425.6	588
Model 4	**83.81 (11.49)**	-2.08 (1.43)	1.33 (0.80)	-0.55 (1.04)	**-6.49 (1.32)**	**51.23 (11.64)**	**5.3 (1.39)**	**100.23 (10.01)**	**38.48 (6.20)**	4411.0	587

Appendix 8: Implementation fidelity checks

Table 20: Schools, dates, rounds and attendance involved with implementation fidelity checks

School	Date	Round of QTR	Were all PLC members present for this Round?
School 1: 3175 Researcher 1	26-05-2022	2	Yes
School 2: 3188 Researcher 1	27/05/2022	2	Yes
School 3: 3217 Researcher 2	1/06/2022	2	Yes
School 4: 3222 Researcher 2	2/06/2022	1	Yes
School 5: 3271 Researcher 2	3/06/2022	2	Yes
School 6: 3280 Researcher 1	3/06/2022	3	Yes
School 7: 3431 Researcher 2	16/06/2022	1	No (one absent due to covid)

Table 21: Implementation fidelity checks timing for each part of the Quality Teaching Round

Element	Mean (minutes)	Std. Deviation	Count
Discussion of a professional reading	46.97	17.30	38
Observation of one teacher's regular classroom practice	55.39	10.16	38
Individual coding of the lesson	61.39	41.07	38
Coding discussion	100.92	32.92	38

Appendix 9: Power analysis

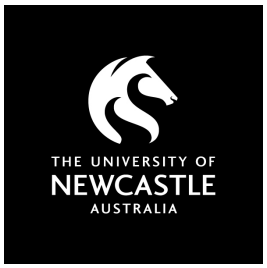
	Maths (no regression)	Maths (regression)	Reading (no regression)	Reading (regression)
Between Variance	72 (38%)	47 (29%)	31 (20%)	14 (10%)
Within Variance	116 (62%)	115 (71%)	127 (80%)	123 (90%)

Difference	Alpha (type 1)	Maths (no reg)	Maths (reg)	Reading (no reg)	Reading (reg)
3	0.05	55%	52%		
4	0.05	61%	59%	59%	62%
5	0.05	66%	69%	70%	76%
6	0.05	74%	78%	79%	87%
7	0.05	80%	84%	87%	94%
8	0.05	84%	90%	93%	97%
9	0.05	90%	94%	96%	98%
10	0.05	93%	96%	97%	100%

Regression variables used	
Student	**School**
EAL (English as second language)	Sector
Student Gender	Location
	ICSEA

	Type III Analysis of Variance Table with Satterthwaite's method- Mathematics					
	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
EAL	1031.75	1031.75	1	404.67	9.0001	0.002867**
Gender	89.25	44.62	2	430.53	0.3893	0.677801
Sector	260.81	130.40	2	25.19	1.1375	0.336534
ICSEA	960.93	960.93	1	27.70	8.3823	0.007311**
Location	99.53	49.76	2	27.29	0.4341	0.652253

	Type III Analysis of Variance Table with Satterthwaite's method- Reading					
	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
EAL	32.87	32.87	1	164.17	0.2675	0.605717
Gender	2499.34	1249.67	2	404.90	10.1705	4.9e-05***
Sector	199.81	99.90	2	22.68	0.8131	0.456007
ICSEA	1180.27	1180.27	1	24.78	9.6058	0.004782**
Location	93.15	46.57	2	26.87	0.3790	0.688119



ISBN: 978-0-7259-0963-6