



BUILDING CAPACITY FOR QUALITY TEACHING IN AUSTRALIAN SCHOOLS

**TEACHER LONGITUDINAL
SURVEY: ANALYSIS
SEPTEMBER 2023**

Executive Summary

Longitudinal monitoring via survey was undertaken to investigate the impact of Quality Teaching Rounds (QTR) on teacher outcomes when implementation occurs in a natural setting (i.e., outside of an experimental study). These data are vital in understanding changes affecting the teaching community and how they might relate to the experience, and impact, of QTR.

Participants enter the longitudinal survey through participation in a two-day QTR workshop or through an invitation via the Quality Teaching Academy (QTA) mailing list. Ongoing recruitment throughout the project period (2020–2023) meant the sample grew with each workshop and biannual mailing list invitation.

The longitudinal teacher survey (Appendix A), conducted every 6 months, used measures of:

- Teacher efficacy (instruction, engagement, and management);
- Teacher well-being (burnout, morale, and intention to leave the profession);
- Feelings of belonging to the school; and
- Perceptions of success.

Using data collected between June 2019 and June 2023, 2,078 surveys collected on up to seven occasions from 1,593 individuals were analysed for longitudinal trends among teachers and any impact of QTR across this period. The analysis method and outcomes are summarised below.

Teachers' perceptions of their work

The evaluation of changes across time provides insight into the way teachers are feeling about their work. Using data collected from June 2020 onwards, this analysis used the first survey response from each participant ($n = 1,377$) to evaluate changes across time for each group of teachers entering the study. A subsequent analysis of individual change across time for those who completed multiple surveys ($n = 322$) was used to test if outcomes were related to the cohort entering the study or were systematic trends experienced across time by those with longitudinal data.

Findings from these analyses indicate:

- Across the second half of 2022 and first half of 2023, levels of morale were significantly lower and burnout and intention-to-leave the profession significantly higher, relative to 2020 values.
- Teacher efficacy, which has held steady since 2020, declined across the 2022–23 time-period.

The negative wellbeing and efficacy results give insight into how teachers are feeling about the profession in the context of ongoing pressures on teachers and schools.

The impact of QTR

Using all available data, we examined whether participants who had engaged in QTR reported different outcomes across subsequent surveys than those who had not participated. Results displayed no significant interaction between QTR participation and outcomes.

These data provide important insights into teachers' efficacy and wellbeing perceptions over the past four years, however the use of longitudinal modelling of applied retrospective data (rather than prospective experimental data) has been unsuccessful in establishing the "in-field" effects of QTR. As data were not collected in a specified pre-post timeframe during this study, but rather as participants entered the study, it is possible that the negative trends observed across time have masked any effects of QTR (i.e., QTR participation is unable to impact on the difficult conditions teachers are experiencing). That average results by cohort changed across time, significantly in some cases, adds to the variance among these data, making any analysis less sensitive to establishing differences among specified groups.

It is recommended that ongoing longitudinal study should focus on reporting the perceptions of teachers and potential relationships among outcome variables as these data appear more suited to this type of analysis. As an independent agency for the collection and reporting of teacher perception data, the information on teacher perceptions collected through this study provides lower levels of bias than government or union-based collection and reporting.

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Introduction

Longitudinal data analysis, also known as growth modelling, has as its primary purpose the measurement of change, or trajectories. Growth trajectories refer to both the initial or starting point (intercept) and the growth, or change, over time (slope). Two general objectives are addressed by longitudinal data analysis: (a) how the outcome variable changes over time; and, (b) predicting or explaining differences in these changes (Singer & Willett, 2003).

As part of the *Building Capacity for Quality Teaching* project, the longitudinal teacher survey was designed to capture insights into the perceptions of teachers across multiple years (outcome change) and whether participation in Quality Teaching Rounds (QTR) has an impact on teacher perceptions (explaining change). Additionally, investigating relationships between outcomes using longitudinal data can provide important insights for the field of education that cannot be obtained using point-in-time (cross-sectional) data.

The purpose of this report is to outline the structure of the teacher longitudinal survey and provide results of the modelling of teacher outcomes and potential impact of involvement in QTR from data collected at six-monthly intervals between June 2020 and June 2023.

Methods

The survey was designed to capture longitudinal data on teachers' experiences with QTR. The survey was run on a biannual cycle (school terms 2 and 4) and participants could enter the survey through participation in a QTR workshop or through invitation via the Quality Teaching Academy mailing list (**Table 1**). A list of the dependent variables analysed for this report is provided in **Table 2**.

Table 1. Longitudinal questionnaire series

QTR workshop entry		
Time 1	Time 2 (~6-months)	Time 3+ (repeated 6 monthly)
Post-workshop survey: <ul style="list-style-type: none"> – Teacher outcomes – Quality assurance 	QTR survey: <ul style="list-style-type: none"> – Teacher outcomes – QTR participation – Post-workshop reflection 	Ongoing: <ul style="list-style-type: none"> – Teacher outcomes – QTR participation
Quality Teaching Academy mailing list entry		
Time 1	Time 2+ (repeated 6 monthly)	
QTR survey: <ul style="list-style-type: none"> – Teacher outcomes – QTR participation 	Ongoing: <ul style="list-style-type: none"> – Teacher outcomes – QTR participation 	

Table 2. Survey items used as dependent variables in the longitudinal analysis

Variable	Measure	Source
Classroom management (4 items)	Teacher efficacy	Tschannen-Moran, Hoy, & Hoy (1998)
Instructional strategies (4 items)		
Student engagement (4 items)		
Morale (5 items)	School climate	Hart, Wearing, Conn, Carter, & Dingle (2000)
Burnout (4 items)	Wellbeing	Denton, Chaplin, & Wall (2013)
Intention to leave in the next 6 months (1 item)	Professional intention	Custom question
Perceptions of success (1 item)	Subjective wellbeing	Mankin, von der Embse, Renshaw, & Ryan (2017)
Belonging (1 item)		

Analysis is based on data collected between June 2019 and June 2023 and involves all teachers surveyed if they provided the necessary data. Participants completed up to seven surveys across the study period. Rolling recruitment via workshops and emails between 2019 and 2023 meant that individuals entered the study at different time points and had differing opportunities to complete multiple survey time points. This provided two distinct Time variables:

- Calendar time – when a participant first entered the study by completing their first survey. This variable was grouped by Semesters (e.g., Semester 1 = Term 1 and Term 2) to evaluate teacher perceptions across the period of the study.
- Personal time – when a participant entered the study by completing their first survey, this point was labelled “Time 1”. Each subsequent survey completed was labelled sequentially to enable evaluation of individual change.

A summary of the number of surveys used in the analysis is shown in **Table 3**. A total of 2,431 surveys (from 1,825 individuals) were contained in the data but only 2,078 surveys (from 1,559 individuals) were used in the analysis because there was no information for the dependent variables for 338 surveys (198 individuals).

Table 3. Surveys included in the analysis (presented by number of surveys completed)

Personal survey number	Number of surveys	
	Within the data	Used in the analysis [†]
1	1,825	1,559
2	381	322
3	148	129
4	51	47
5	16	13
6	7	6
7	3	2

Note. [†] 338 observations have no data for the dependent variables presented below.

For the purpose of understanding the data, **Figure 1** shows scores for the *Classroom management* variable by personal survey number, presented in separate graphs by the number of surveys completed. The figure suggests that people who completed four or more surveys may have had higher scores on average at their first survey compared to those who completed fewer surveys. The number of surveys completed by individuals is related to the period when they were recruited. That is, people who were recruited earlier in the study had the opportunity to complete a greater number of surveys than those recruited later. The results of those recruited later might have been impacted by the start of the coronavirus (COVID-19) pandemic or the ongoing pressures associated with the teaching profession (e.g., changing work demands due to reduced staff numbers across many settings).

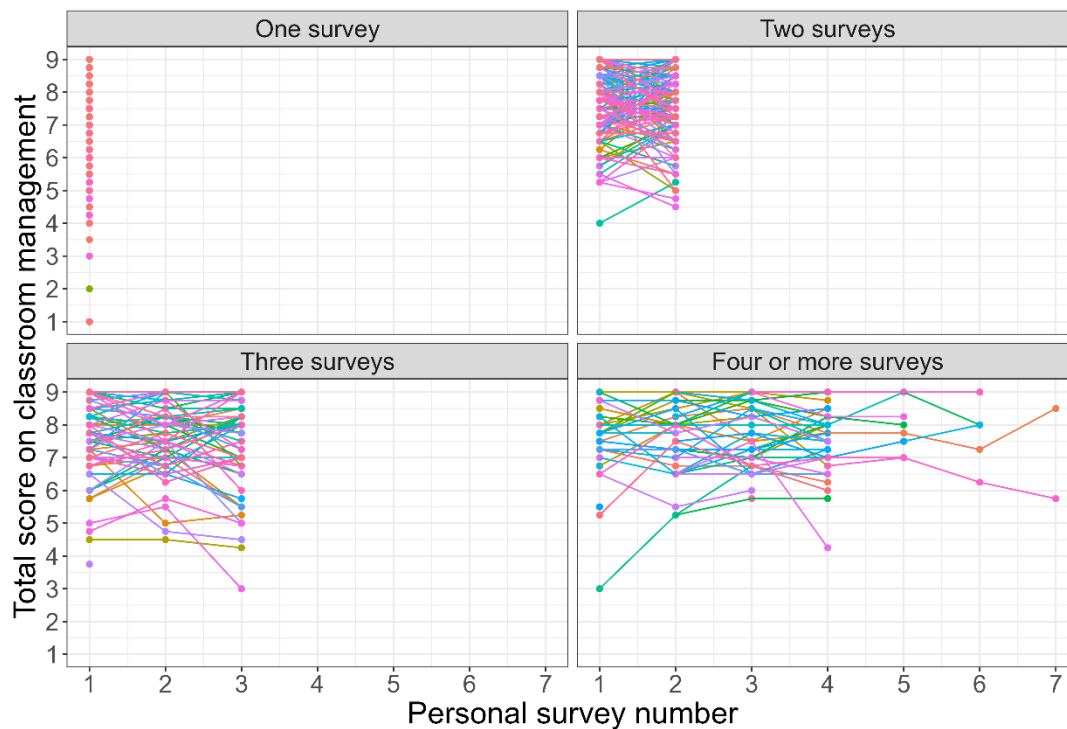


Figure 1. Scores on the Classroom management variable for teachers by the number of surveys they completed

Analysis 1. Exploring perceptions of teachers' work – change over calendar time

We explored how teachers' perceptions of their work changed over the study period using two analyses. The first analysis utilised linear regression to examine the differences in responses by period of recruitment using data collected at time point 1 (i.e., the first survey for each person). In the regression models the dependent variable was the outcome of interest and the independent variable was Calendar time. Semester 2, 2020 was used as the reference point because several outcomes were not measured prior to that time. Any difference in scores in the different periods may be due to the impact of external/ environmental factors that changed over time (including COVID-19 and its lingering effects on the teaching profession) or may be due to differences in the characteristics of the people recruited at the different time periods.

A second set of analyses was undertaken using the responses for people who completed at least two surveys. Generalised linear mixed models (GLMM), which in this case can be considered the extension of linear regression, were fitted to the data when it contained multiple measurements for the same people. The outcome of interest was included in the model as the dependent variable and Calendar time as the independent variable. The models include a random intercept for individual and assumes variation between individuals is normally distributed. Bootstrapping was used to produce confidence intervals for the estimates of change from the GLMM models. The within-person analysis provides stronger evidence of a difference in responses over time (rather than differences in the characteristics of people).

Both the linear regression models and GLMMs estimate the average change from the reference time point to each of the other time periods. Additionally, both models assume the residuals are normally distributed. The difference between the two models is that the linear regression is estimating

differences between the periods among different people (i.e., each person is measured once), whereas the GLMM is predominantly estimating differences within individuals (i.e., each person is measured more than once). The GLMMs include every outcome (for the outcomes in the model) measured for each individual and assumes that missing data are missing at random. This means individuals who only completed two surveys (for example) have missing data for the surveys they did not complete, and the missing data is assumed to be missing at random. Missing at random (as distinct from missing completely at random) assumes that their missing value is missing at random conditional on the other information about the individual in the model.

Analysis 2. Exploring the impact of QTR – change over personal time

Next, we explored the impact of QTR on outcomes at the individual level using Personal time. A GLMM was fitted to the data using Personal time (2nd survey and 3rd survey [or an average of surveys if more than 3]) as a factor and whether participants answered yes or no to QTR involvement. These models estimate the average change from baseline (each participant's first timepoint) to each of the other two timepoints and tests the interaction between responses at each time point and QTR involvement. These models also assume the residuals are normally distributed and variation between individuals is normally distributed. Bootstrapping was used to estimate confidence intervals for estimates of change from these models. Using bootstrapping to calculate confidence intervals ensures that the boundaries of the confidence intervals are within plausible data values.

GLMMs are generally considered a better method for modelling longitudinal data because they are valid under a more robust assumption in relation to missing data. Repeated measures analysis of variance is valid when the missing data are missing completely at random, whereas GLMMs are valid when the data are missing at random. One way to consider the difference in these assumptions is that repeated measures analysis of variance is valid if you assume the observed data is a random sample of the complete dataset. **Figure 2** suggests this may not be true because it appears that people with low values at the first survey are less likely to complete future surveys than those with high values on the first survey. GLMMs assume the data are missing at random, which means they are assumed to be missing at random conditional on the individuals' previous values; for example, it is assumed an individual's value is not missing because it is high or low at the time the survey is completed.

Defining the QTR variable

An individual is considered to have participated in QTR if they responded 'yes' to the question, "Have you participated in QTR in the past 6-months?" in any of the surveys they completed.

A variable based on the 'dose' of QTR was also created using responses to the prompt: "A Quality Teaching "Round" is the observation by a PLC of one lesson, with coding and discussion involving all members of the PLC. How many Rounds have you completed in the past 6-months?" with the definition and number of participants allocated to each level of the variable shown in **Table 4**.

Table 4. Values and labels of the variable identifying dose of QTR

Value	Label	Number of people
No QTR	Never responded 'yes' to QTR participation	1,379
QTR zero dose	Responded 'yes' to QTR participation at some stage but did not indicate the number of Rounds of QTR	44
QTR low dose	Responded 'yes' to QTR participation at some stage and had participated in one Round of QTR	75
QTR mod dose	Responded 'yes' to QTR participation at some stage and had participated in two or three Rounds of QTR.	72
QTR high dose	Responded 'yes' to QTR participation at some stage and had participated in four or more rounds of QTR	63

Note. Mod = moderate.

The number of individuals at each survey number is presented in **Figure 2** by whether they attended the workshop and engaged in QTR.

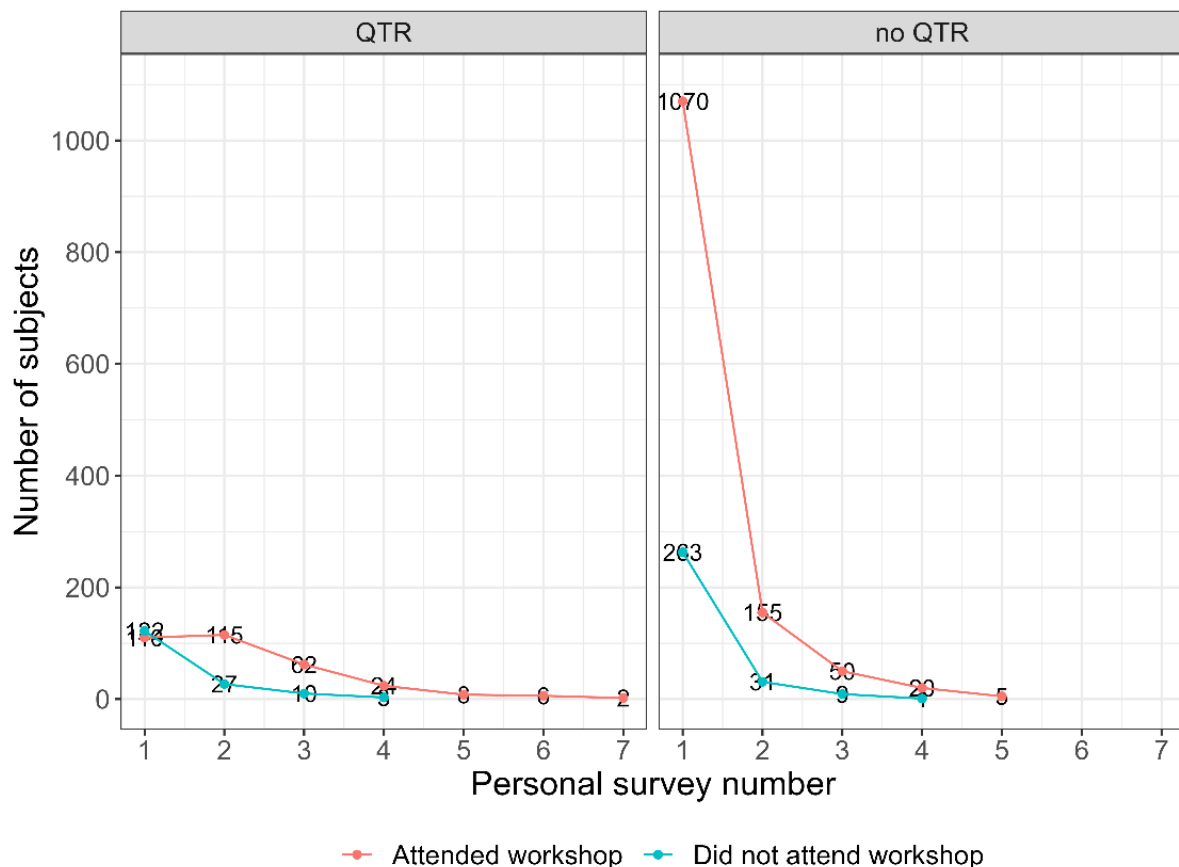


Figure 2. Number of people who responded to each survey by their number of surveys – presented by exposure to QTR and whether they attended the workshop

Results

Among the people who completed at least one survey and recorded their gender, most were female, over 60% held a Bachelor of Education or Teaching degree (**Table 5**), and the average teaching experience was 14 years (**Table 6**). On average, teachers who had, and had not, participated in QTR were very similar, with a marginally lower proportion of females and one additional year of teaching on average among the QTR group. Summary statistics for each of the outcome variables included in the analysis are shown in **Appendix B**.

Table 5. Characteristics of participants by QTR group

Question	Response	QTR	
		Yes, <i>n</i> (%) (<i>n</i> = 254)	No, <i>n</i> (%) (<i>n</i> = 1,571)
Gender	Female	137 (53.9%)	978 (62.3%)
	Male	38 (15.0%)	263 (16.7%)
	Prefer not to answer/Other [†]	79 (31.1%)	330 (21.0%)
Which of the following best describes your teacher education qualification?	Bachelor of Education/Teaching qualification	138 (61.6%)	901 (65.8%)
	Diploma of Education/Teaching	45 (20.1%)	179 (13.1%)
	Master of Education/Teaching	35 (15.6%)	256 (18.7%)
	Other	6 (2.7%)	34 (2.5%)

Note. [†] Includes people who did not provide a response to the question on gender at any survey.

Table 6. Summary of years of teaching experience by QTR group

Question	QTR	<i>n</i>	Statistic				
			mean	std	median	25th percentile	75th percentile
Years of teaching experience	QTR	254	15.5	9.8	14.0	7.0	22.2
	No QTR	1,571	14.5	10.7	13.0	7.0	20.0

Exploring perceptions of teachers' work – change over calendar time

Table 7 shows the results of the linear regression models for changes over Calendar time. For the reference period, the effect column is showing the mean value of the given outcome for people measured in Semester 2, 2020 (bolded). This was chosen as the reference period because all outcomes were available from this time point forward. For the other periods, the effect column is showing the estimated difference in the average for the outcome between that period and the reference period. The p value is testing whether the difference is statistically different from zero, with p values < 0.05 shaded and bolded. The results indicate that teachers entering the study in 2023 displayed significantly lower perceptions of success and efficacy (management, instruction, and engagement) than those entering the study in 2020. These teachers also display the concerning trend of lower morale, higher burnout, and greater intention to leave the profession than is evident for any other cohort throughout the study period.

Table 7. Differences in mean scores over time based on responses to the first survey

Question	Period	n	mean	Regression outcome		
				effect	std err	p value
Efficacy – Classroom management	Sem 2 2020	202	7.60	7.60	0.08	Reference
	Sem 1 2021	210	7.60	0.00	0.12	0.976
	Sem 2 2021	219	7.70	0.10	0.11	0.377
	Sem 1 2022	261	7.67	0.07	0.11	0.519
	Sem 2 2022	247	7.64	0.04	0.11	0.733
	Sem 1 2023	238	7.41	-0.19	0.11	0.095
Efficacy – Instructional strategies	Sem 2 2020	202	7.91	7.91	0.08	Reference
	Sem 1 2021	210	7.82	-0.09	0.11	0.417
	Sem 2 2021	219	7.80	-0.11	0.11	0.316
	Sem 1 2022	261	7.75	-0.16	0.10	0.135
	Sem 2 2022	247	7.90	0.00	0.11	0.973
	Sem 1 2023	238	7.65	-0.26	0.11	0.017
Efficacy – Student engagement	Sem 2 2020	202	7.35	7.35	0.09	Reference
	Sem 1 2021	210	7.34	-0.01	0.12	0.944
	Sem 2 2021	219	7.26	-0.09	0.12	0.439
	Sem 1 2022	261	7.33	-0.02	0.12	0.856
	Sem 2 2022	247	7.30	-0.05	0.12	0.686
	Sem 1 2023	238	6.96	-0.40	0.12	<0.001
Morale	Sem 2 2020	199	4.06	4.06	0.06	Reference
	Sem 1 2021	205	4.04	-0.02	0.09	0.820
	Sem 2 2021	218	3.99	-0.07	0.09	0.437
	Sem 1 2022	257	4.01	-0.05	0.09	0.521

Question	Period	n	mean	Regression outcome		
				effect	std err	p value
Burnout	Sem 2 2022	245	3.96	-0.10	0.09	0.246
	Sem 1 2023	238	3.85	-0.21	0.09	0.013
	Sem 2 2020	60	2.40	2.40	0.17	Reference
	Sem 1 2021	187	2.64	0.23	0.20	0.244
	Sem 2 2021	193	2.82	0.42	0.20	0.036
	Sem 1 2022	234	2.88	0.48	0.19	0.015
	Sem 2 2022	234	3.33	0.93	0.19	<0.001
Sem 1 2023	235	3.80	1.40	0.19	<0.001	
Intention to leave the teaching profession in the next 6 months	Sem 2 2020	196	1.52	1.52	0.11	Reference
	Sem 1 2021	204	1.73	0.21	0.15	0.158
	Sem 2 2021	216	1.90	0.38	0.15	0.010
	Sem 1 2022	251	2.03	0.51	0.14	<0.001
	Sem 2 2022	239	1.89	0.37	0.14	0.011
	Sem 1 2023	235	1.96	0.44	0.14	0.002
Perceptions of success	Sem 2 2020	68	6.96	6.96	0.20	Reference
	Sem 1 2021	197	6.64	-0.31	0.23	0.185
	Sem 2 2021	209	6.67	-0.29	0.23	0.213
	Sem 1 2022	251	6.51	-0.44	0.23	0.053
	Sem 2 2022	238	6.73	-0.23	0.23	0.319
	Sem 1 2023	234	6.26	-0.70	0.23	0.003
Belonging	Sem 2 2020	68	7.26	7.26	0.26	Reference
	Sem 1 2021	196	6.98	-0.28	0.31	0.360
	Sem 2 2021	208	6.85	-0.42	0.30	0.168
	Sem 1 2022	250	7.12	-0.15	0.30	0.617
	Sem 2 2022	238	6.90	-0.36	0.30	0.226
	Sem 1 2023	234	6.61	-0.66	0.30	0.028

Results for teachers with longitudinal data (more than 2 responses), representing within person change, rather than differences between people at different time points, are presented in **Table 8**. Wellbeing outcomes (morale, burnout, and intention-to-leave) display a negative trend across 2022–2023, consistent with the cohort-based analysis in **Table 7**. Morale declined and burnout and intention-to-leave increased across the 2022–23 time-period. Teacher efficacy outcomes displayed the same negative trend across 2022–2023 observed in the cohort-based analysis, however these results were not statistically significant. Perceptions of success and belonging to the profession diverge for teachers with longitudinal data in comparison to the cohort-based analysis, with significant positive trends through 2022–2023 for these two variables.

The variance in results highlights differences between evaluating perceptions of different groups of teachers across time, versus perceptions of the same teachers over time. That wellbeing and efficacy-based outcomes display the same trends across analyses is a concern given the ongoing pressures across the teaching profession associated with teacher supply.

Table 8. Differences in mean scores over calendar time for individuals with at least two surveys

Question	Period	n	mean	Regression outcome		
				effect	std err	effect (95% CI)
Efficacy – Classroom management	Sem 2 2020	96	7.75	7.73	0.09	Reference
	Sem 1 2021	109	7.71	-0.04	0.10	-0.04 (-0.23 to 0.15)
	Sem 2 2021	127	7.73	0.03	0.11	0.03 (-0.18 to 0.25)
	Sem 1 2022	114	7.70	-0.01	0.11	-0.01 (-0.24 to 0.20)
	Sem 2 2022	113	7.72	-0.09	0.11	-0.09 (-0.33 to 0.13)
	Sem 1 2023	82	7.52	-0.11	0.12	-0.11 (-0.37 to 0.14)
Efficacy – Instructional strategies	Sem 2 2020	96	7.98	7.91	0.09	Reference
	Sem 1 2021	109	7.85	-0.09	0.10	-0.09 (-0.28 to 0.11)
	Sem 2 2021	127	7.94	-0.02	0.10	-0.02 (-0.21 to 0.19)
	Sem 1 2022	114	7.81	-0.08	0.11	-0.08 (-0.28 to 0.13)
	Sem 2 2022	113	7.90	-0.02	0.11	-0.02 (-0.24 to 0.21)
	Sem 1 2023	82	7.68	-0.15	0.12	-0.15 (-0.37 to 0.08)
Efficacy – Student engagement	Sem 2 2020	96	7.38	7.37	0.10	Reference
	Sem 1 2021	109	7.34	-0.11	0.11	-0.11 (-0.33 to 0.13)
	Sem 2 2021	127	7.36	0.03	0.12	0.03 (-0.20 to 0.27)
	Sem 1 2022	114	7.26	-0.13	0.12	-0.13 (-0.39 to 0.12)
	Sem 2 2022	113	7.33	-0.12	0.13	-0.12 (-0.37 to 0.14)
	Sem 1 2023	82	7.17	-0.13	0.14	-0.13 (-0.39 to 0.16)
Morale	Sem 2 2020	96	4.03	4.11	0.08	Reference
	Sem 1 2021	109	3.91	-0.20	0.08	-0.20 (-0.37 to -0.05)
	Sem 2 2021	127	4.09	-0.08	0.09	-0.08 (-0.24 to 0.09)
	Sem 1 2022	114	4.02	-0.10	0.09	-0.10 (-0.27 to 0.09)
	Sem 2 2022	113	3.90	-0.22	0.09	-0.22 (-0.41 to -0.04)
	Sem 1 2023	82	3.98	-0.20	0.10	-0.20 (-0.40 to 0.00)
Burnout	Sem 2 2020	61	2.82	2.49	0.15	Reference
	Sem 1 2021	93	3.07	0.36	0.17	0.36 (0.02 to 0.66)
	Sem 2 2021	110	2.76	0.26	0.17	0.26 (-0.08 to 0.59)
	Sem 1 2022	106	2.92	0.49	0.17	0.49 (0.12 to 0.85)
	Sem 2 2022	113	3.90	1.55	0.17	1.55 (1.20 to 1.87)
	Sem 1 2023	78	3.80	1.41	0.19	1.41 (1.04 to 1.75)

Question	Period	n	mean	Regression outcome		
Intention to leave the teaching profession within the next 6 months	Sem 2 2020	96	1.66	1.59	0.14	Reference
	Sem 1 2021	109	1.91	0.34	0.17	0.34 (0.02 to 0.68)
	Sem 2 2021	127	1.79	0.20	0.17	0.20 (-0.11 to 0.54)
	Sem 1 2022	112	2.03	0.53	0.18	0.53 (0.19 to 0.91)
	Sem 2 2022	113	2.22	0.73	0.18	0.73 (0.36 to 1.09)
	Sem 1 2023	78	2.21	0.71	0.20	0.71 (0.34 to 1.11)
Perceptions of success	Sem 2 2020	71	6.99	6.88	0.16	Reference
	Sem 1 2021	107	6.79	-0.16	0.18	-0.16 (-0.51 to 0.19)
	Sem 2 2021	124	6.91	0.02	0.19	0.02 (-0.35 to 0.41)
	Sem 1 2022	112	6.57	-0.20	0.19	-0.20 (-0.61 to 0.19)
	Sem 2 2022	112	7.62	0.76	0.19	0.76 (0.38 to 1.13)
	Sem 1 2023	78	7.58	0.87	0.21	0.87 (0.44 to 1.26)
Belonging	Sem 2 2020	71	7.01	7.02	0.24	Reference
	Sem 1 2021	106	6.73	-0.37	0.27	-0.37 (-0.88 to 0.17)
	Sem 2 2021	123	7.15	0.08	0.28	0.08 (-0.44 to 0.65)
	Sem 1 2022	112	7.06	-0.06	0.28	-0.06 (-0.60 to 0.47)
	Sem 2 2022	112	7.60	0.66	0.28	0.66 (0.14 to 1.23)
	Sem 1 2023	78	7.18	0.15	0.31	0.15 (-0.41 to 0.75)

These analyses suggest that teacher well-being went down during the longitudinal study period and intention to leave went up. They signal disquiet, if not malaise, among teachers which might contribute to their reception of QTR and to its potential impact.

Exploring the impact of QTR – change over study time

Table 9 presents the results from analysis investigating differential change over time amongst those who had and had not engaged in QTR. Using personal survey number as the unit of time, personal survey number one 1 was considered pre and all other surveys were considered post. When interpreting the results of this analysis, the interaction terms in the last row for each outcome (QTR by Time) is the key point of information. If the coefficient of these interactions is positive (because those who did not do QTR are the reference group in this model) and significant (95% confidence intervals do not contain zero), involvement in QTR has demonstrated an impact on the outcome in question. There are no significant interactions detected from these data for those engaged in QTR.

Table 9. Coefficients and 95% confidence intervals from a generalised linear mixed model with predictors of pre-post, QTR (yes/no), and their interaction.

Output	Term	Coefficient	Standard error	Coefficient (95% CI)
Efficacy – Classroom management	(Intercept)	7.622	0.032	Intercept
	QTR	-0.070	0.081	-0.07 (-0.24 to 0.09)
	Time	0.016	0.063	0.02 (-0.11 to 0.14)
	QTR by Time	-0.002	0.094	-0.00 (-0.19 to 0.18)
Efficacy – Instructional strategies	(Intercept)	7.781	0.030	Intercept
	QTR	-0.142	0.077	-0.14 (-0.30 to 0.01)
	Time	0.098	0.061	0.10 (-0.02 to 0.21)
	QTR by Time	-0.012	0.091	-0.01 (-0.20 to 0.15)
Efficacy – Student engagement	(Intercept)	7.245	0.034	Intercept
	QTR	-0.018	0.087	-0.02 (-0.19 to 0.15)
	Time	0.053	0.067	0.05 (-0.07 to 0.19)
	QTR by Time	-0.179	0.100	-0.18 (-0.37 to 0.02)
Morale	(Intercept)	3.948	0.025	Intercept
	QTR	0.180	0.064	0.18 (0.06 to 0.31)
	Time	-0.009	0.050	-0.01 (-0.11 to 0.09)
	QTR by Time	-0.138	0.075	-0.14 (-0.30 to 0.01)
Burnout	(Intercept)	3.080	0.045	Intercept
	QTR	-0.218	0.115	-0.22 (-0.44 to 0.00)
	Time	0.472	0.098	0.47 (0.28 to 0.67)
	QTR by Time	0.026	0.155	0.03 (-0.27 to 0.35)
Intention to leave the teaching profession within the next 6 months	(Intercept)	1.852	0.044	Intercept
	QTR	-0.150	0.113	-0.15 (-0.37 to 0.07)
	Time	0.171	0.101	0.17 (-0.03 to 0.39)
	QTR by Time	0.214	0.156	0.21 (-0.10 to 0.51)
Perceptions of success	(Intercept)	6.515	0.051	Intercept
	QTR	0.344	0.130	0.34 (0.07 to 0.60)
	Time	0.634	0.113	0.63 (0.40 to 0.85)
	QTR by Time	-0.184	0.176	-0.18 (-0.54 to 0.18)
Belonging	(Intercept)	6.816	0.068	Intercept
	QTR	0.532	0.174	0.53 (0.21 to 0.90)
	Time	0.252	0.154	0.25 (-0.05 to 0.56)
	QTR by Time	-0.158	0.240	-0.16 (-0.62 to 0.32)

Conclusion

This longitudinal study was designed to evaluate the impact of QTR on teachers over time. In hindsight, we probably could not have carried out the study at a worse time, given interruptions to schooling that not only got in the way of participating in QTR, indeed any PD other than what was available online, but also created conditions in schools that affected teacher well-being, as evident in Analysis 1 – perceptions of teachers' work – change over calendar time. As data were not collected in a specified pre-post timeframe during this study, but rather as participants entered the study, it is possible that the negative trends observed across time have masked any effects of QTR (i.e., QTR participation is unable to impact on the difficult conditions teachers are experiencing). That average results by cohort changed across time, significantly in some cases, adds to the variance among these data, making any analysis less sensitive to establishing differences among specified groups.

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Appendices

Appendix A: Survey questions

Construct	Question/s
Collaboration	There is collaborative practice at this school
Efficacy – Classroom management	How much can you do to control disruptive behaviour in the classroom? How much can you do to get children to follow classroom rules? How much can you do to calm a student who is disruptive or noisy? How well can you establish a classroom management system with each group of students?
Efficacy – Instructional strategies	To what extent can you provide an alternative explanation or example when students are confused? How well can you implement alternative strategies in your classroom? To what extent can you craft good questions for your students? How much can you use a variety of assessment strategies?
Efficacy – Student engagement	How much can you assist families in helping their children do well in school? How much can you do to motivate students who show low interest in schoolwork? How much can you do to get students to believe they can do well in schoolwork? How much can you do to help your students value learning?
School Morale	Morale is high in this school
Burnout	I feel emotionally drained from my work I feel used up at the end of the workday 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
Intention to leave	Please indicate your intention to leave the teaching profession within the next 6 months:
Perceptions of success	I am a successful teacher
Belonging	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

Appendix B: Additional data

Table B. Summary statistics at each time point for each of the scales included in the longitudinal analysis

Outcome	Participant survey number	n	Statistic						
			Mean	SD	min	p25	Median	p75	max
Efficacy – Classroom management	1	1,559	7.6	1.2	1.0	7.0	7.8	8.5	9.0
	2	322	7.7	1.0	4.5	7.0	7.8	8.5	9.0
	3	129	7.6	1.2	3.0	6.8	7.8	8.8	9.0
	4	47	7.7	1.1	4.2	7.0	7.8	8.5	9.0
	5	13	8.1	0.8	7.0	7.5	8.0	9.0	9.0
	6	6	7.9	1.1	6.2	7.4	8.0	8.8	9.0
	7	2	7.1	1.9	5.8	6.4	7.1	7.8	8.5
Efficacy – Instructional strategies	1	1,559	7.8	1.1	1.0	7.0	8.0	8.8	9.0
	2	322	7.9	0.9	5.0	7.2	8.0	8.8	9.0
	3	129	7.8	0.9	4.5	7.0	7.8	8.5	9.0
	4	47	7.8	1.0	4.2	7.1	8.0	8.5	9.0
	5	13	8.1	0.8	6.8	7.2	8.8	8.8	9.0
	6	6	8.2	0.8	7.0	7.7	8.4	8.7	9.0
	7	2	7.5	0.7	7.0	7.2	7.5	7.8	8.0
Efficacy – Student engagement	1	1,559	7.2	1.3	1.0	6.5	7.2	8.2	9.0
	2	322	7.2	1.2	2.8	6.5	7.2	8.0	9.0
	3	129	7.3	1.3	3.0	6.2	7.2	8.5	9.0
	4	47	7.3	1.2	4.5	6.6	7.5	8.1	9.0
	5	13	7.5	1.3	6.0	6.2	7.2	8.8	9.0
	6	6	7.0	1.2	5.8	6.1	6.9	7.5	8.8
	7	2	6.0	0.7	5.5	5.8	6.0	6.2	6.5
Morale	1	1,539	4.0	0.9	1.0	3.4	4.0	4.8	5.0
	2	322	4.0	0.9	1.0	3.4	4.0	4.8	5.0
	3	128	3.9	1.0	1.2	3.2	4.0	5.0	5.0
	4	47	4.0	1.0	1.6	3.2	4.0	5.0	5.0
	5	13	3.9	1.1	1.8	3.2	4.0	5.0	5.0
	6	6	4.4	0.9	2.6	4.4	4.7	5.0	5.0
	7	2	4.5	0.1	4.4	4.4	4.5	4.5	4.6
Burnout	1	1,143	3.1	1.4	0.0	2.0	3.0	4.0	6.0
	2	239	3.4	1.4	0.5	2.2	3.5	4.5	6.0
	3	105	3.4	1.5	0.0	2.5	3.5	4.5	6.0
	4	40	3.1	1.3	0.5	2.2	3.0	4.0	6.0
	5	11	3.2	1.9	0.2	2.0	2.5	4.5	6.0
	6	4	2.4	1.0	1.2	1.8	2.4	2.9	3.5

Outcome	Participant survey number	n	Statistic						
			Mean	SD	min	p25	Median	p75	max
	7	2	1.9	1.6	0.8	1.3	1.9	2.4	3.0
Intention to leave the teaching profession within the next 6 months	1	1,406	1.8	1.5	1.0	1.0	1.0	2.0	7.0
	2	320	2.0	1.7	1.0	1.0	1.0	2.0	7.0
	3	125	2.0	1.6	1.0	1.0	1.0	2.0	7.0
	4	47	2.1	1.8	1.0	1.0	1.0	2.0	7.0
	5	13	2.6	2.4	1.0	1.0	1.0	5.0	7.0
	6	6	1.8	1.3	1.0	1.0	1.0	2.5	4.0
	7	2	1.5	0.7	1.0	1.2	1.5	1.8	2.0
Perceptions of success	1	1,197	6.6	1.7	0.0	6.0	7.0	8.0	10.0
	2	250	7.2	1.4	2.0	6.0	7.0	8.0	10.0
	3	115	7.1	1.8	1.0	6.5	7.0	8.0	10.0
	4	46	7.2	1.6	3.0	6.2	7.0	8.0	10.0
	5	13	8.1	1.2	6.0	7.0	8.0	9.0	10.0
	6	6	7.2	1.9	5.0	5.5	7.5	8.0	10.0
	7	2	8.0	0.0	8.0	8.0	8.0	8.0	8.0
Belonging	1	1,194	6.9	2.2	0.0	5.0	7.0	9.0	10.0
	2	248	7.3	2.2	0.0	6.0	8.0	9.0	10.0
	3	115	7.0	2.5	0.0	6.0	8.0	9.0	10.0
	4	46	7.2	2.2	2.0	6.0	7.5	9.0	10.0
	5	13	8.1	2.3	3.0	8.0	9.0	10.0	10.0
	6	6	7.7	2.7	3.0	6.5	8.5	9.8	10.0
	7	2	9.5	0.7	9.0	9.2	9.5	9.8	10.0