Global Teaching InSights

Technical Report

Section II: Instrument development

9 Teacher and student questionnaire development

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This chapter explains the rationale of using student and teacher questionnaires to complement the video records observations. In addition, the chapter provides a detailed description of the questionnaire construct development, and explains the process used to choose the final questionnaire items for the teacher and student pre- and post-questionnaires.

Introduction

Questionnaires were important components of Global Teaching InSights (results from the TALIS Video Study project, and is hereafter cited in this chapter as “the Study” or “GTI”) as they provide information about the learning and teaching contexts in participating countries/economies. This information provides important reporting indicators in addition to merely explaining the background context for video observations, artefacts and cognitive student test results.

In the Study, teachers and students were asked to complete questionnaires before and after the videotaped lessons to provide greater information about teaching and student learning. The student questionnaires covered information on context, input, processes, outcomes of student learning, and insight on non-cognitive dispositions such as a student’s motivation and interests. The teacher questionnaires, additionally, contained items that reflect the focal topic of the lessons and aspects of quality best understood through the teacher perspective.

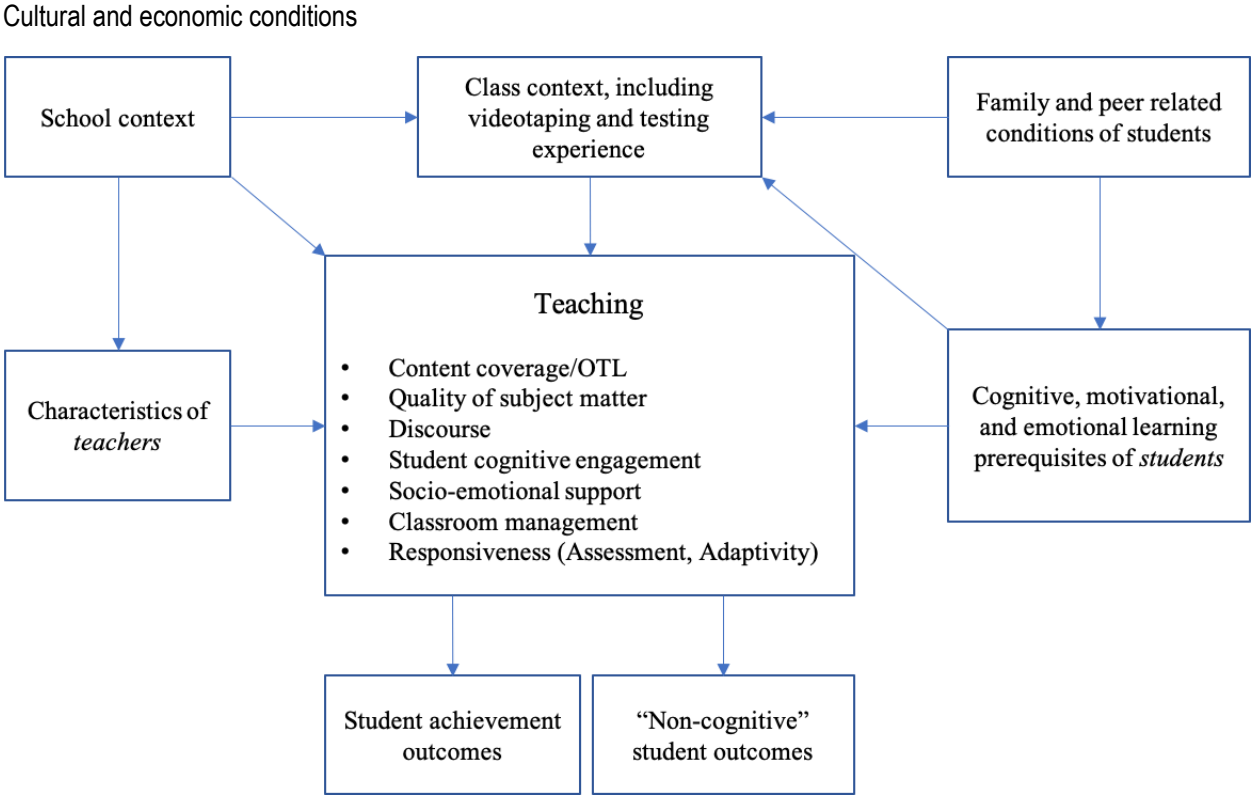
This chapter provides a brief overview of the questionnaires and their development process, while Chapter 17 describes the questionnaire scaling approaches and index construction.

Questionnaire frameworks

In international large-scale assessment studies, questionnaires usually provide a broad array of measures covering context, input, process and even outcome variables that are relevant for describing the functioning of educational systems and modelling educational quality, equity and efficiency (Kuger et al., 2016[1]). In the Study, a major part of the questionnaire material is dedicated to teaching processes – covering all six domains of teaching that the study intended to measure, in this case from the perspective of teachers and students, plus content coverage (also called opportunity to learn [OTL]) (Figure 9.1).

Measures of input factors – both teacher characteristics and students’ learning prerequisites – are needed in order to describe the study samples, compare them with representative samples from PISA 2018 and TALIS 2018 (OECD, forthcoming[2]; OECD, 2019[3]), control for these factors or use them as explanatory variables in analysis and reporting. Similarly, questionnaires help to take wider contextual conditions into account, such as family background, peer-related conditions, and the school context. In this study, with its dense sequence of data captures, it was especially important to ask about experiences and perceptions related to video recording and testing. Last but not least, student questionnaires provide important non-cognitive (i.e. not-based-on-achievement-testing) outcome measures such as students’ motivation (e.g. interest in the subject taught) and their domain-specific self-concept and self-efficacy beliefs.

Figure 9.1. Conceptual framework for questionnaire design



Source: OECD, Global Teaching InSights Database.

The selection of constructs to be included was informed by the conceptual frameworks developed for TALIS (TALIS 2018 for general aspects and TALIS 2013 mathematics teacher module for domain-specific constructs) and PISA (PISA 2015/2018 for general aspects and PISA 2012 mathematics-related constructs), by classroom teaching and educational effectiveness research in general, and by expert advice gained from the Study's Technical Advisory Group (TAG) and the National Project Managers (NPMs). Design overviews and lists of constructs were developed by the questionnaire development team, reviewed by all stakeholders, refined, and discussed again in multiple cycles during 2016 and 2017. A final selection took place once pilot findings were available (described in subsequent sections).

Overview of measured constructs and allocation to survey instruments

Constructs were allocated to four different questionnaires: 1) teacher pre-questionnaire (TQA); 2) teacher post-questionnaire (TQB); 3) student pre-questionnaire (SQA); and 4) student post-questionnaire (SQB). Quite often, parallel versions of constructs were included in several questionnaires. Student and teacher background measures appear just once – for students, in the very beginning of the student pre-questionnaire and, for teachers, after the focal unit, in the teacher post-questionnaire. Many aspects of teaching are covered in all four instruments by applying the following principles:

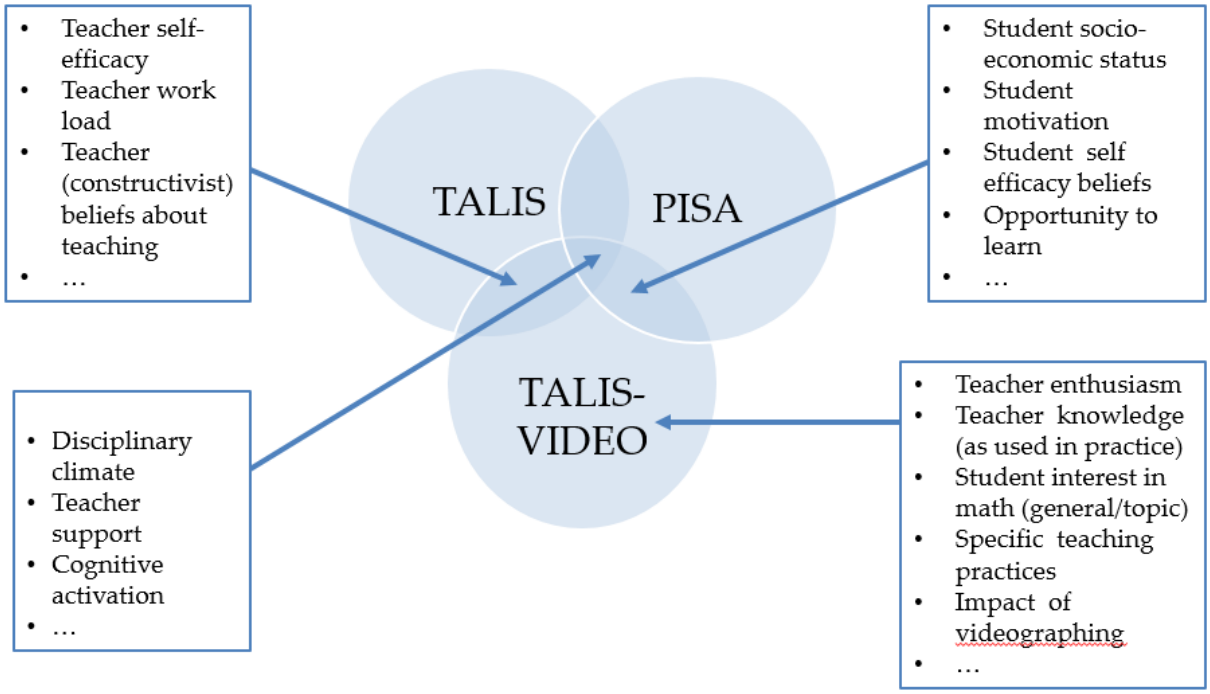
- Most constructs are assessed from the most appropriate perspective only (either teacher or student), with the exception of teaching-related constructs, which are measured from both perspectives as much as possible to study relationships between teacher reports and student perceptions, compare their reliability and validity, and cross-check with video ratings and artefact scores.
- Process-related constructs (such as measures of teaching quality, certain teacher characteristics and students' individual use of instruction) and student outcomes are usually measured twice, in pre- and post-questionnaires. As a rule, the pre-questionnaire version refers to mathematics teaching and learning in general, while the post-questionnaire version refers to the respective constructs as implemented or perceived during the focal unit on quadratic equations. Thus, in complex statistical analyses, the pre-questionnaire version of students' interest, for example, can be used as a baseline control variable to study the effects of teaching on students' interest in quadratic equations.
- In the case of two core student outcome variables, namely interest in mathematics and self-efficacy beliefs in mathematics, the pre-questionnaire version, in turn, is measured in two ways: referring to the current teacher (to control for the general impact of the individual teacher, discriminating teacher effects in general from teaching effects within the focal unit) and referring to the previous teacher that has taught the student (to control for students' dispositional, trait-level of interest and self-efficacy).

All in all, in the Global Teaching InSights pilot (resulting from the TALIS Video Study project), the International Consortium implemented no less than 24 questions in the teacher pre-questionnaire (TQA), 30 in the teacher post-questionnaire (TQB), 38 in the student pre-questionnaire (SQA), and 21 in the student post-questionnaire (SQB). The full set of constructs can be identified by combining Table 9.2 (constructs dropped after the pilot) and Annex 9.A (constructs kept for the main study).

Sources of questionnaire items

The choice of constructs was informed by both TALIS and PISA to ensure alignment with other OECD surveys and support the improvement of measures of teaching in future international studies. For example, the Study will be able to provide information on the validity of self-reports on classroom teaching. Figure 9.2 illustrates the interrelation of these item sources. Many questionnaire items were taken from PISA for student questions and TALIS for teacher questions. Sometimes adaptation was needed – especially for scales that appear in similar, although not identical, form, both in PISA and in TALIS, such as Disciplinary Climate. The alignment with PISA and TALIS is mostly on the construct level as changes were made on the wording of individual items.

Figure 9.2. Overlap of survey measures from the GTI, PISA and TALIS, with illustrative constructs



Source: OECD, Global Teaching InSights Database.

The Study's questionnaire development team (hereafter the questionnaire team) also used the following additional sources, most often to assess teacher characteristics related to professional instruction that have not been covered in detail in TALIS:

- teachers' enthusiasm for teaching the target class (OECD's Innovative Teaching for Effective Learning [ITEL] project (Kunter et al., 2011[4])
- emotions while teaching the target class (Frenzel et al., 2016[5])
- teachers' collective efficacy (Tschannen-Moran and Barr, 2004[6])
- responsibility (OECD's ITEL project (Lauermann and Karabenick, 2013[7])
- teacher knowledge as it is used in practice (Howell, n.d.[8])
- planning time – video-recorded lessons (Stigler et al., 1999[9])
- social desirability (Strahan and Gerbasi, 1972[10])
- mind versus virtue orientation beliefs (Van Egmond, Kühnen and Li, 2013[11])
- disciplinary climate (Thiel, Ophardt and Piwowar, 2013[12])
- student-teacher relationship (Ferguson, Frost and Hall, 2012[13])
- perception of the test (Martin, Mullis and Hooper, 2016[14])
- rich instruction in mathematics (National Centre for Teacher Effectiveness (NCTE), 2010[15])
- interest in mathematics (Schiefele et al., 1993[16])
- self-efficacy in mathematics (Pintrich et al., 1991[17]).
- use of mathematics instruction by individual students (Vieluf et al., 2020[18])

The questionnaire team developed their own questions in the following areas, albeit with similar questions from PISA 2012 in mind, to cover content-specific aspects of mathematics teaching and learning that related to quadratic equations:

- coverage, duration and order of the subtopics ("teacher log")
- student OTL and self-efficacy with regards to mathematics tasks
- importance of the goals for the unit on quadratic equations
- frequency of video recording lessons
- reactivity to being video recorded
- teacher's history of teaching the current class.

Piloting the questionnaires

All four questionnaires were piloted in all countries/economies (see Chapter 13 for more information). The main focus of analyses was on the student pre-questionnaire (SQA). This data were considered the most trustworthy due to the larger student sample size compared to the teacher sample size as well as the student pre-questionnaire's more general focus (compared to the post-questionnaires that focused on quadratic equations, which had mostly not been taught prior to the pilot).

Table 9.1 presents an overview of sample sizes across all countries/economies and the distribution of response time according to the time stamps that students and teachers had to provide when beginning and ending their work on the respective instrument.

Table 9.1. Time taken to fill out the pilot questionnaires across countries/economies

Questionnaire	Pilot sample size (N)	Response time in minutes			
		25th percentile	50th percentile	75th percentile	90th percentile
Student pre-questionnaire (SQA)	2 316	23	30	35	42
Student post-questionnaire (SQB)	2 263	15	20	25	32
Teacher pre-questionnaire (TQA)	110	30	38.5	47.5	60
Teacher post-questionnaire (TQB)	103	25	30	40	50

Source: OECD, Global Teaching InSights Database.

The next step of data analysis was checking if results were biased by cases with little credibility. For this purpose, cases were identified with:

- a high number of missing values (>20% across the instrument)
- fixed answering patterns (>80% same answering option chosen within an item battery)
- extreme or obviously invalid answering times (e.g. time stamp at the end of the questionnaire earlier than time stamp at the beginning; answering time more than 100 minutes).

The results indicated that fixed answering patterns, high amount of missing values and suspicious response times were uncorrelated events. Hardly any missing values occurred for the teacher questionnaires. For students, the mean proportion of missing values was 0.075 in the student pre-questionnaire (SQA) (range of country/economy means from 0.047 to 0.147) and 0.041 for the student post-questionnaire (SQB) (range of country/economy means from 0.005 to 0.086). A small proportion of student questionnaires had a high number of missing values. In-depth analyses showed that these cases were concentrated in a few schools in specific countries and on specific questions (especially questions on parental education and occupation). To avoid a high amount of missing data for the main study, the NPMs were contacted to provide feedback. No individual cases had to be excluded based on low credibility.

The final step of pilot analysis included the computation of item and scale parameters, including reliability estimates (Cronbach's alpha). For some scales, exploratory and confirmatory factor analyses within and across countries were also conducted.

Due to the small pilot sample size it was not possible to 1) consider the nested structure of the data (students nested in classes); and 2) conduct analyses separately for each country/economy for the teacher questionnaire data.

Finalising questionnaire items

After the pilot the student questionnaires had to be shortened to a length of approximately 30 minutes and the teacher questionnaires to a length of approximately 35 minutes. Since the teachers completed their questionnaires while their students worked on their questionnaires and tests, a slightly longer response time for the teacher questionnaires was acceptable. The following criteria was used to identify the number of items that had to be eliminated from the pilot questionnaires for the main study:

- The total response time across countries/economies was used to estimate the response time needed for each of the pilot questionnaires.
- At least 75%, and if possible 90%, of the respondents should be able to finish the questionnaires within 30 minutes (students) or 35 minutes (teachers).
- No fatigue effects should influence the completion of the questionnaires. (Missing data analyses led to the conjecture that fatigue effects were in fact negligible, as the number of missing values did not increase from the beginning to the end of the pilot questionnaires).

Based on these conditions, all but the student post-questionnaire (SQB) had to be shortened by 5 to 13 minutes (Table 9.1).

For the selection of the main study questionnaire content, the following principles (not necessarily in the order of priority) were applied:

- No new constructs, questions or items are introduced.
- The major content areas (e.g. teaching quality and non-cognitive outcomes) as defined in the conceptual framework are included, unless there are clear indications of measurement problems.
- All questions and items must have proven measurement quality in the majority of the participating countries/economies (e.g. reliability, no abnormality in missing responses) (see below for details).
- No changes to translated materials are made, with the exceptions of grammar, spelling, casing or consistency issues or changes to items taken over from TALIS 2018 after the TALIS 2018 field trial.

- If the pilot data indicate a fundamental defect, the construct, question or item is dropped rather than revised.
- Whenever possible, the number of items per question is reduced based on pilot results.
- If a construct is assessed from various perspectives (parallel in student and teacher questionnaires) and at multiple times (pre and post), necessary changes are made for all respective questionnaires in parallel.

The evaluation of measurement quality (third principle) was based on the following criteria:

- Questions were dropped if the number of missing values was extremely high.
- Questions were dropped if items did not show a clear factor structure or their subscales had an alpha below 0.7. High priority measures (see the second principle) were dropped only if alpha was below 0.6 in most of the participating countries/economies.

Individual items within a subscale were dropped (see the sixth principle) if:

- the item either did not belong to the core construct or represented a facet of the construct that was already covered by some other item
- at least three or four items would remain for each subscale
- reliability was still high enough after dropping an item.

In all, 235 items of the student pre-questionnaire (SQA), 17 items of the student post-questionnaire (SQB), 225 items of the teacher pre-questionnaire (TQA) and 143 items of the teacher post-questionnaire (TQB) had to be dropped based on the analysis and selection principles. Scales dropped (listed in Table 9.2) mostly had an alpha below 0.7 in most participating countries/economies (e.g. need for cognition, mind versus virtue orientation beliefs about learning) or did not belong to the core construct (e.g. scales on the school level). Annex 9.A lists all constructs kept in the main study questionnaires.

The pilot version of the teacher log – documenting content taught across the unit – received quite some criticism from countries/economies. Therefore, the International Consortium shortened and revised the log, adding clear instructions and an easy distinction between three levels of (non-)coverage.

Table 9.2 Constructs dropped after the pilot study

Construct (scales or item name)	Questionnaire (TQA= Teacher pre-questionnaire; (TQB= Teacher post-questionnaire; (SQA= Student pre-questionnaire; (SQA= Student post-questionnaire;	Reasons for elimination
Family background		
Mother's and father's profession	SQA	• high number of missing responses • difficult for students to answer • ISCO coding is time-consuming
Student dispositions/teacher characteristics		
Need for cognition	SQA	• alpha below 0.7 in three participating countries/economies no core construct
Internal control of success	SQA	• alpha below 0.7 in three participating countries/economies no core construct
Mind vs. virtue orientation beliefs about learning	SQA, TQA	• alpha below 0.7 in all participating countries/economies no core construct
Parent and peer influence on learning	SQA	• alpha below 0.7 in most of the participating countries/economies no core construct
Traditional beliefs	TQA	• no clear factor structure no core construct
Conditions of instruction in mathematics		
Student characteristics	TQA	assessed via student questionnaires
Teachers' collective efficacy for instruction	TQA	• no core construct just one teacher per school
Teachers' perception of school safety	TQA	• no core construct just one teacher per school
Student-teacher relations on the school level	TQA	• no core construct just one teacher per school
Value and policy influence teaching profession	TQA	• no core construct just one teacher per school
Teaching		
Traditional instruction in mathematics	SQB, TQA, TQB	alpha below 0.7 in five countries/economies
Criteria for student grading	SQB	• alpha below 0.7in three participating countries/economies no core construct
Group work	SQB, TQB	• single item • no assessment strategy no core construct
Homework	TQB	no core construct

Source: OECD, Global Teaching InSights Database.

After removing scales and items, reduced estimated response times of a maximum of 35 minutes for the teacher questionnaires and 30 minutes for the student questionnaires were achieved (Table 9.3).

Table 9.3. Time needed to fill out the pilot questionnaires across countries/economies and estimated response times for the main study questionnaires

Questionnaire	Pilot sample size (N)	Response time in minutes				Estimated response time (in minutes) for the main study	
		25th percentile	50th percentile	75th percentile	90th percentile	75th percentile	90th percentile
Student pre-questionnaire (SQA)	2 316	23	30	35	42	27	32
Student post-questionnaire (SQB)	2 263	15	20	25	32	21	27
Teacher pre-questionnaire (TQA)	110	30	38.5	47.5	60	31	39
Teacher post-questionnaire (TQB)	103	25	30	40	50	34	42

Source: OECD, Global Teaching InSights Database.

Table 9.4 summarises the content of the final student and teacher questionnaires. Both questionnaires collected information about student or teacher background characteristics, dispositions, teaching practices, school, class, and study context. These topics were included to cover context, input, process, and outcomes of classroom teaching and learning.

Table 9.4. Content of the main study questionnaires

	Student questionnaires	Teacher questionnaires
Individual background	gender, date of birth, migration, parental education, home possessions	gender, age, formal qualification, teaching qualification, education in mathematics, work experience
Dispositions	*interest in mathematics, self-efficacy in mathematics, self-concept in mathematics*, instrumental motivation, learning goal orientation, effort and perseverance,	*self-efficacy/enthusiasm/emotions teaching the target class*, enthusiasm/self-efficacy beliefs in general, knowledge as it is used in practice; constructivist beliefs, responsibility, job satisfaction
Teaching	*classroom management, discourse, cognitive activation, teacher support, student-teacher relations, OTL, clarity of instructio*n, focus on meaning, adaption of instruction, assessment practices	
	student-student-relations, expectations, use of learning opportunities, homework assignment	
School and class context	learning time	teacher collaboration, teacher autonomy, factors hindering instruction, quantity of instruction, teaching goals
Study context	reactivity videotaping, typicality of lessons	
	perception of the tests	experience of being videotaped

Note: Content in italics has been included both in the respective Pre-Questionnaire (asking for general baseline information) *and* the Post-Questionnaire (referring to the focal unit). Otherwise, content is used either in the Pre- or in the Post-Questionnaire.
Source: OECD, Global Teaching InSights Database.

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Annex 9.A.

Annex Table 9.A.1. Overview of main survey questions and constructs

Construct measured*	Variable name in the international data file	Type of variable**	Question number (and items)			
			Teacher pre-questionnaire (TQA)	Teacher post-questionnaire (TQB)	Student pre-questionnaire (SQA)	Student post-questionnaire (SQB)
Student background						
Current grade	SA_intgrade	DV			1	
Date of birth	SA_age	DV			2	
Gender	SA_gender	SI			3	
Migration background	SA_immig	DV			4	
Language at home	SA_langhome	SI			5	
Mother's school education	Combined into SA_pared = highest parental educational level in years of studying	DV			27	
Mother's tertiary education					28	
Father's school education					29	
Father's tertiary education					30	
Home possessions- existence	SA_homepos_IRT = Home possessions	DV			31	
Home possessions-numbers					32	
Number of books					33	
Mark in mathematics in last school report	SQA23	DV			23	
Student dispositions						
Students' learning prerequisites						
Self-concept*	SA_selfcon; SB_selfcon	S			6	1
Learning goal orientation in mathematics	SA_learngoal	S			7	
Instrumental motivation in mathematics	SA_instmot	S			8	
Effort and perseverance in mathematics	SA_persevere	S			9	
Test anxiety in mathematics	SA_testanx	S			10	
Students' non-cognitive outcomes						
Interest in mathematics						
Personal interest in mathematics - previous mathematics teacher	SA_pint_previous = PRE_PINT	S			12 (a-c)	

Construct measured*	Variable name in the international data file	Type of variable**	Question number (and items)			
			Teacher pre-questionnaire (TQA)	Teacher post-questionnaire (TQB)	Student pre-questionnaire (SQA)	Student post-questionnaire (SQB)
Situational interest in mathematics - previous mathematics teacher	SA_sint_previous	SI			12 (d)	
Personal interest in mathematics - current mathematics teacher	SA_pint_current ; SB_pint = POST_PINT	S			14 (a-c)	3 (a-c)
Situational interest in mathematics - current mathematics teacher	SA_sint_current, SB_sint	SI			14 (d)	3 (d)
Self-efficacy in mathematics						
Self-efficacy in mathematics - general measure - previous mathematics teacher	SA_genselfeff_previous = PRE_GENSELFEFF	S			13	
Self-efficacy in mathematics - general measure -current mathematics teacher	SA_genselfeff_current; SB_genselfeff = POST_GENSELFEFF	S			15	2
Students' self-efficacy with mathematical tasks	SA_efficacy; SB_efficacy	S†			16	7
Teacher background						
Gender	TB_gender	SI		1		
Age	TB_age	SI		2		
Highest level of formal qualification	TB_qualification	SI		3		
Teaching qualifications	TB_teachqual	SI		4		
Education in mathematics (courses on mathematics, teaching mathematics, practice)	TB_edumath; TB_eduteach; TB_edupract	SI		5		
Work experience in mathematics	TB_workexp	SI		6		
Teacher dispositions						
Enthusiasm						
Teacher Enthusiasm	TA_Teacher_enthusiasm	S	10			
Enthusiasm for teaching the target class	TA_enthusteach, TB_enthusteach	S	10 (a-d)	16		
Enthusiasm for the subject of mathematics	TA_enthusmath	S	10 (e-h)			
Self-efficacy teaching the target class						
Self efficacy in teaching the target class	TA_selfeff; TB_selfeff	S	11	17		
Self-efficacy in classroom management	TA_selfeff_classman; TB_selfeff_classman	S	11 (d,f,h,i)	17 (d,f,h,i)		
Self-efficacy in instruction	TA_selfeff_inst; TB_selfeff_inst	S	11 (c,j,k,l)	17 (c,j,k,l)		

Construct measured*	Variable name in the international data file	Type of variable**	Question number (and items)			
			Teacher pre-questionnaire (TQA)	Teacher post-questionnaire (TQB)	Student pre-questionnaire (SQA)	Student post-questionnaire (SQB)
Self-efficacy in student engagement	TA_selfeff_eng; TB_selfeff_eng	S	11 (a,b,e,g)	17 (a,b,e,g)		
Self-efficacy in general						
Self efficacy	TA_genselfeff	S	16			
Self-efficacy in classroom management	TA_genselfeff_classman	S	16 (d,e)			
Self-efficacy in instruction	TA_genselfeff_inst	S	16 (c,f)			
Self-efficacy in student engagement	TA_genselfeff_eng	S	16 (a,b)			
Emotions teaching the target class						
Enjoyment	TA_enjoy; TB_enjoy	S	12 (a,j,l,i)	18 (a,j,l,i)		
Anger	TA_anger; TB_anger	S	12 (b,c,k,g)	18 (b,c,k,g)		
Anxiety	TA_anxiety; TB_anxiety	S	12 (d,e,f,h)	18 (d,e,f,h)		
Responsibility						
Responsibility	TA_responsibility	S	15			
Responsibility for student motivation	TA_respmot	S	15 (i,e,d)			
Responsibility for student achievement	TA_respachiev	S	15 (a,b,c,)			
Responsibility for teaching	TA_respteach	S	15 (f,g,h)			
Pedagogical content knowledge and beliefs						
Knowledge as it is used in practice	TB_knowledge	S		22		
Constructivist beliefs	TA_conbeliefs	S	17			
Job satisfaction						
Job satisfation	TA_Job_satisfaction	S	22			
Job satisfaction regarding the specific school	TA_satschool	S	22 (c,e,g,i)			
Job satisfaction regarding the profession	TA_satprof	S	22 (a,b,d,f,h,j)			
Social desirability	TB_desirability	DV		23		
Context of instruction in mathematics						
School context						

Construct measured*	Variable name in the international data file	Type of variable**	Question number (and items)			
			Teacher pre-questionnaire (TQA)	Teacher post-questionnaire (TQB)	Student pre-questionnaire (SQA)	Student post-questionnaire (SQB)
Teacher collaboration	TA_collab	S	18			
Classroom autonomy	TA_autonomy	S	19			
Class context						
Previous exposure to the same teacher	SA_histteacher	SI			11	
Student background factors hindering instruction	TA_limitations	S	14			
Learning time						
Loss in individual learning time during the unit on quadratic equations	SB_lossinst	SI				4
Out-of-school learning (assigned self-controlled, assigned supervised, additional, other subjects)	SB_out_assignself; SB_out_assignsup; SB_out_add; SB_out_other	SI				5
Quantity of instruction						
Workload teaching the target class in general (teaching, preparation, other)	TA_loadteach; TA_loadprep; TA_loadother	SI	1			
Duration mathematics lesson in general	TA_lessdur	SI	2			
Planning time - videorecorded lesson (lesson 1, lesson 2)	TB_plantime_v1; TB_plantime_v2	SI		7		
Unit duration in minutes (summarised across lessons, based on teacher log)	TA_duration	DV	23			
Teaching goals						
Importance of the goals for the unit on quadratic equations (motivation, values, application, thinking, knowledge)	TA_impmot; TA_impval;TA_impapp; TA_imptr; TA_impks	DV	13			
Achievement of the learning goals of the videorecorded lessons and unit	TB_goalachiev	DV		21		
Teaching						
Classroom management						
Classroom management score	SA_classman; SB_classman; TA_classman; TB_classman	S†	7	11	20	11
Disruptions	SA_cm_disrupr;SB_cm_disrupr TA_cm_disrupr;TB_cm_disrupr	S	7 (a-c)	11 (a-c)	20 (a-c)	11 (a-c)
Teacher's classroom management	SA_cm_teachman; SB_cm_teachman; TA_cm_teachman; TB_cm_teachman	S	7 (f,g,i,j)	11 (f,g,i,j)	20 (f,g,i,j)	11 (f,g,i,j)

Construct measured*	Variable name in the international data file	Type of variable**	Question number (and items)			
			Teacher pre-questionnaire (TQA)	Teacher post-questionnaire (TQB)	Student pre-questionnaire (SQA)	Student post-questionnaire (SQB)
Socio-emotional support						
Teacher support for learning	SA_tesup; SB_tesup; TA_tesup; TB_tesup	S	8 (a-c)	12 (a-c)	21 (a-c)	12 (a-c)
(Perceived) Support for competence	SA_supcom; SB_supcom; TA_supcom; TB_supcom;	S	8 (d-g)	12 (d-g)	21 (d-g)	12 (d-g)
(Perceived) Support for autonomy	SA_supaut; SB_supaut; TA_supaut; TB_supaut;	S	8 (h-k)	12 (h-k)	21 (h-k)	12 (h-k)
Student-teacher relationship	SA_rel_studteach; SB_rel_studteach; TA_rel_studteach; TB_rel_studteach	S	9	13	22 (a-e)	13 (a-e)
Student-student relationship	SA_rel_studstud, SB_rel_studstud	S			22 (f-i)	13 (f-i)
Discourse						
Student participation in discourse	SA_discourse; SB_discourse; TA_discourse; TB_discourse	S	4 (i-k)	8 (i-k)	18 (i-k)	8 (i-k)
Quality of subject matter						
Subtopic coverage (number of lessons, weighted by strength of focus, for each of ten subtopics from the teacher log)	TA_subtopic1 to TA_subtopic10	DV	23			
Opportunity-to-learn for mathematical tasks	SA_otl; SB_otl;TA_otl	S†	3††		16	7
Clarity of instruction	SA_clarity; SB_clarity; TA_clarity; TB_clarity	S	4 (a-d)	8 (a-d)	18 (a-d)	8 (a-d)
Focus on meaning	SB_meaning; TA_meaning; TB_meaning	S	5	9		9
Explaining procedures	SB_expl_proc; TA_expl_proc;TB_expl_proc		5 (a-c)	9 (a-c)		9 (a-c)
Student cognitive engagement						
Cognitive activation	SA_cogact; SB_cogact; TA_cogact; TB_cogact	S	4 (e-h)	8 (e-h)	18 (e-h)	8 (e-h)
Assessment of and response to student understanding						
Adaption of instruction	SA_adapt; SB_adapt; TA_adapt; TB_adapt	S	6	10	19	10
Assessment practices (teacher's own assessment, checking by questions, self-evaluation, teacher observation)	SB_assess_check; SB_asssess_selfev; SB_asses_obs; TB_asses_own; TB_assess_check; TB_assess_selfev; TB_assess_obs	SI		14		15
Feedback	SB_feedback	S				16
Additional factors						
High expectations for students	SB_expect	S				14
Perceived teacher enthusiasm	SB_teachenthus	S				17
Frequency of homework assignment	TB_homework	SI		15		
Use of mathematics instruction by individual students						
Content-related activities	SA_usecont; SB_usecont	S			17 (a-c)	6 (a-c)

Construct measured*	Variable name in the international data file	Type of variable**	Question number (and items)			
			Teacher pre-questionnaire (TQA)	Teacher post-questionnaire (TQB)	Student pre-questionnaire (SQA)	Student post-questionnaire (SQB)
Self-reported cognitive engagement	SA_usecogact; SB_usecogact	S			17 (d-f)	6 (d-f)
Experience of autonomy, competence, social relatedness	SA_useselfdet; SB_useselfdet	S			17 (g-i)	6 (g-i)
Time on task	SA_usetot; SB_usetot	S			17 (j-l)	6 (j-l)
Experience with videorecording and testing						
Prior experience with videorecording						
Frequency of being videorecorded	TA_frequvid	SI	20			
Frequency of being videorecorded in a typical school year	TA_freqobs_year; TA_freqvid_year	SI	21			
Perceptions related to the videorecorded lessons						
Reactivity videographing	SB_reactivity; TB_reactivity	DV		19		18
Typicality of videorecorded lessons	TB_typvid1; TB_typvid2	SI		20		
Perceptions related to the pre- and posttests						
Perception of the test – difficulty	SA_testdiff; SB_testdiff;	SI			24	19
Perception of the test – motivation	SA_testmot; SB_testmot;	SI			25	20
Perception of the test – aspiration	SA_testasp; SB_testasp;	SI			26	21

Notes: Scales (S) in the pre-questionnaires focus on mathematics in general; in the post-questionnaires, scales focus on the quadratic equations unit. Most measures were adapted from TALIS or PISA.
** SI = single item(s): Individual items to be used as provided in the raw data set; DV = derived variable: Raw data to be transformed to provide indices necessary for analyses (these indices were added to the international data set); and S = scale: When multiple items within a question stem jointly represent a construct, their mean score was added to the international data set and used for reporting.
† Probably analysed using subscales.
†† Focusing on prerequisites necessary for the understanding of quadratic equation.
Source: OECD, Global Teaching InSights Database.