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Context questionnaire development

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INTRODUCTION

The context questionnaires in PISA provide information on the learning context at the individual, school, and education system or country/economy level. They assess non-cognitive outcomes, individual dispositions and structural and process characteristics of the institutional context. This diverse set of constructs is measured by addressing various stakeholders, namely students and school principals in all countries and economies, as well as parents and teachers in countries and economies that choose to implement additional optional questionnaires.

The questionnaire development for the sixth cycle of PISA introduced several innovations:

- a modular approach for the questionnaire design to identify (a) policy issues which participating countries and economies wanted to be addressed, (b) conceptual constructs related to the respective policy issue, and (c) measures (individual items, indices or questionnaire scales) operationalising these constructs
- an attempt to identify core questionnaire content which needs to be covered across cycles of PISA to report trends in education, finding a balance between core measures and new measures dealing with topics that are important for current education policy
- transitioning the context questionnaires from paper administration to computer-based administration mode
- a teacher questionnaire as an international option.

This chapter provides a brief overview of the questionnaires and their development process, while Chapter 16 describes the questionnaire scaling approaches and index construction and Chapter 17 describes the questionnaire design and implementation into the electronic platform. For more detailed information about different steps of instrument development and how the field trial informed the final instruments see also Kuger et al. (2016).

THE PISA CONTEXT QUESTIONNAIRE FRAMEWORK

Questionnaire development in PISA has been guided by different approaches since the first questionnaire framework was published for PISA 2009. While previous frameworks focussed on the hierarchical structure of educational systems (PISA 2009) and questions of educational effectiveness (2012), the framework and questionnaire development for PISA 2015 aimed at combining the existing approaches with new aspects of policy interest that currently guide the discussion on educational effectiveness and education policy decisions. Consequently, the questionnaire development used an iterative process linking policy demands with education research foundations and possibilities for instrument implementation.

The starting point for development of the PISA 2015 questionnaire framework (OECD, 2017) was a proposal for 19 highly important policy issues (so-called modules). These modules included aspects of science education, equity, broader educational outcomes beyond achievement, supportive school context and educational governance. The modules are presented in Figure 3.1. As a first step, each module was defined and explored based on literature from educational research and experience in previous cycles of PISA. The members of the PISA Governing Board (PGB) were then asked to provide feedback on the modules' definitions and rate their importance for reporting.

The areas which received the highest policy relevance included non-cognitive outcomes (modules 4 and 10), teaching and learning (modules 1, 2, and 12), and school policies (modules 15 and 19). This indication of policy relevance formed the basis of the development of questionnaire material, i.e. based on these ratings, trend material repeated from previous cycles was integrated and new material was developed for high-priority modules allowing more in-depth assessment in the field trial in PISA 2015 (see Chapter 17 for the design).

Another underlying principle in instrument development was balancing trend and new reporting on additional aspects of learning contexts. As one of the aims of PISA is to measure trend indicators across cycles, the framework identified the core content of questionnaire material, i.e. constructs of context assessment that should be kept across all cycles. This material was granted higher priority in instrument development to enable later trend reporting. All of the core content as displayed in Figure 3.2 is covered by the PISA 2015 questionnaires, mostly taking up measures from previous cycles, especially – for science-related constructs – from PISA 2006.

For PISA 2015, the conceptual framework for the context questionnaires has already been published (OECD, 2017). Therefore, this chapter only provides a summary of the context questionnaire framework and the questionnaire development. The newly-developed material that was not taken over into the main survey, but only used in the field trial, has been documented by Kuger et al. (2016).



■ Figure 3.1 ■

Modular structure of the PISA 2015 questionnaire design

	Student background		Processes			Non-cognitive outcomes
	Family	Education	Actors	Core processes	Resource allocation	
Science-related topics		5. Out-of-school science experience	1. Teacher qualification and professional knowledge	2. Science teaching practices	12. Learning time and curriculum	4. Science-related outcomes: motivation, interest, beliefs...
				Teaching and learning		
General topics		9. Educational pathways in early childhood	3. School-level learning environment for science			6. Career aspirations 10. General behaviour and attitudes 11. Dispositions for collaborative problem solving
	7. Student SES and family	8. Ethnicity and migration	14. Parental involvement	13. School climate: interpersonal relations, trust, expectations	16. Resources	
				School policies		
			15. Leadership and school management			
			Governance			
			17. Locus of decision making within the school system	19. Assessment, evaluation and accountability	18. Allocation, selection and choice	

Source: OECD (2017), “Modular structure of the PISA 2015 context assessment design”, in *PISA 2015 Assessment and Analytical Framework: Science, Reading, Mathematics, Financial Literacy and Collaborative Problem Solving*.

■ Figure 3.2 ■

Constructs identified as core content in the PISA 2015 Questionnaire Framework

	Student and school background	Processes	Non-cognitive outcomes
System Level		Governance: Decision making, horizontal and vertical differentiation	(Aggregated student data)
School Level	School location Type and size of school Amount and source of resources (incl. ICT) Social/ethnic/academic composition Class size Teacher qualification	School policies: Programmes offered, admission and grouping policies Allocated and additional learning time <i>Extra-curricular activities,</i> Professional development, leadership, parental involvement Assessment/evaluation/accountability policies School climate (teacher and student behaviour) Teaching and learning: Disciplinary climate, teacher support, <i>cognitive challenge</i>	(Aggregated student data) Drop-out rate
Student Level	Gender SES Language and migration background Grade level Pre-primary education Age at school entry	Grade repetition Programme attended Learning time at school (mandatory lessons and additional instruction) <i>Out-of school learning</i>	Domain-general non-cognitive outcomes (e.g. achievement motivation, well-being in school) Domain-specific non-cognitive outcomes (<i>motivation, domain-related beliefs and strategies, self-related beliefs, domain-related behaviour</i>)

Note: Measures in italics were adapted to the major domain, i.e. science in PISA 2015.

Source: OECD (2017), *PISA 2015 Assessment and Analytical Framework: Science, Reading, Mathematics, Financial Literacy and Collaborative Problem Solving*.

As in previous cycles, the Questionnaire Expert Group (QEG) guided the development of the PISA context questionnaires and framework through regular meetings. The members reviewed questionnaire drafts as well as feedback from countries and economies and discussed the material together with the OECD Secretariat and the international contractors to ensure the link between the assessment, the context questionnaires, and the frameworks. For the QEG 2015, liaison persons were nominated to attend meetings of the Science Expert Group and the Expert Group for Collaborative Problem Solving. This guaranteed a close link between the development of the assessment framework and tests and the questionnaire development process.

THE PISA 2015 CONTEXT QUESTIONNAIRES

The following questionnaires were administered in the PISA 2015 main survey:

- the Student Questionnaire (computer-based and paper-based)
- the School Questionnaire (computer-based and paper-based)
- the Educational Career Questionnaire as an international option (computer-based)
- the ICT Familiarity Questionnaire as an international option (computer-based)
- the Parent Questionnaire as an international option (paper-based)
- the Teacher Questionnaire as an international option (computer-based).

One important guiding principle for the development of the PISA 2015 questionnaires was that all policy modules (see Figure 3.1) should be represented in several questionnaires, thus gathering important information from different, and if possible the most knowledgeable, sources. Field trial data were used to choose the most reliable approach and source of information for each construct and module. Figure 3.3 highlights the coverage of policy issues across questionnaires for the final main survey questionnaires.

■ Figure 3.3 ■

Overview of the 19 policy issues (modules) and their relation to the questionnaires

		STQ	SCQ	TCQ	PAQ	ICT	EC
Policy area: Science education							
1.	Teacher qualification and professional knowledge		X	X			
2.	Science teaching practices	X	X	X			
3.	School-level learning environments for science		X	X		X	X
4.	Science-related outcomes: motivation, attitudes, beliefs, strategies	X				X	
5.	Out-of-school science experience	X			X	X	X
6.	Career aspirations	X					
Policy area: Equity							
7.	Student SES, family and home background	X			X	X	
8.	Ethnicity and migration	X		X	X		
9.	Educational pathways in early childhood	X			X		X
Policy area: Broader educational outcomes beyond achievement							
10.	Domain-general student behaviour and attitudes	X				X	
11.	Student dispositions related to collaborative problem solving	X		X			
Policy area: Supportive school context							
12.	Learning time and curriculum	X	X	X			X
13.	School climate: Interpersonal relations, trust, expectations	X	X				
14.	Parental involvement	X	X		X		
15.	Leadership and school management		X	X			
16.	Resources		X	X		X	
Policy area: Educational governance							
17.	Locus of control within the school system		X				
18.	Allocation, selection and choice		X		X		
19.	Assessment, evaluation and accountability	X	X	X			

Note: The following acronyms are used for: Student Questionnaire (STQ), School Questionnaire (SCQ), Teacher Questionnaire (TCQ), Parent Questionnaire (PAQ), ICT Familiarity (ICT) and Educational Career (EC). X indicates if this module was implemented in the respective instrument.

The Student Questionnaire (computer-based and paper-based)

As in previous cycles, the PISA Student Questionnaire was administered to all students participating in the PISA assessment. It was administered on computer, while countries testing on paper implemented a slightly shorter version.

The School Questionnaire (computer-based and paper-based)

As in previous cycles, the PISA School Questionnaire was administered to the principal for those schools participating in PISA. It was administered on computer, while countries and economies using paper-based testing implemented a slightly shorter version.



The Educational Career Questionnaire (computer-based)

This optional questionnaire was first introduced in 2003 and was administered to all students participating in PISA if a country or economy chose to implement this option. It included additional questions on students' past and current education, focussing on additional instruction and learning time in PISA 2015. The Educational Career option was administered after the main Student Questionnaire.

The ICT Familiarity Questionnaire (computer-based)

This optional questionnaire was first introduced in PISA 2003 and was administered to all students participating in PISA if a country or economy chose to implement this option. It included additional questions on students' usage of electronic and digital devices, as well as their confidence and attitudes towards ICT. The ICT option was administered after the main Student Questionnaire.

The Parent Questionnaire (paper-based)

The optional Parent Questionnaire was administered on paper and targeted the parents of all students participating in PISA. It enquired about learning contexts, support, and resources at home as well as spending on education and parents' science-related interests and attitudes.

The Teacher Questionnaire

The Teacher Questionnaire was introduced for the first time in PISA 2015. The underlying idea was that important predictors of academic achievement, such as teacher qualification and quality of teaching and learning settings, are best assessed by asking teachers directly. Resulting data can be used to analyse differences between countries/economies and schools. Although some of these aspects were also covered by the School Questionnaire or the Student Questionnaire, administering a questionnaire to teachers was likely to improve the objectivity, reliability, and validity of information. Teachers were addressed as experts for teaching and student learning in the Teacher Questionnaire. The framework and item development for the Teacher Questionnaire were integrated into the overall development process of the PISA questionnaires, thus fitting in with the overall design and the policy issues mentioned above.

Taking into account the major domain of science as well as general differences in teacher characteristics and practices, PISA 2015 implemented two different teacher questionnaires. One questionnaire addressed teachers eligible for teaching science to 15-year-olds in PISA schools, the other one addressed teachers of all other subjects. For detailed information about the sampling see Chapter 4.

Implementing a Teacher Questionnaire into PISA yields several opportunities, as it can deliver information on:

- the professional background of teachers
- the education and training of teachers, including school-based professional development
- teachers' beliefs and attitudes
- school level policies such as teacher co-operation, and shared values
- teachers' perception of school culture, school management and leadership, parental involvement, and school development
- domain-specific and domain-general instructional policies and practices
- the curriculum and opportunity-to-learn.

The PISA 2015 Teacher Questionnaire focussed on the policy topics described below.

Teacher qualification and professional knowledge (module 1)

While basic information on teacher qualification is available from the School Questionnaire, the Teacher Questionnaire incorporated questions that were partially taken from the OECD Teaching and Learning International Study (TALIS) (OECD, 2009). This includes teacher background information, such as gender, age, employment status, job experience, information on initial education and professional development, as well as information about teachers' beliefs, self-efficacy (for example on teaching science), and their job satisfaction.



Science teaching practices (module 2) and school-level learning environments for science (module 3)

Science teachers were asked to describe their teaching practices in two longer questions: “*Teacher-directed teaching and learning activities in science lessons*” and a selected set of “*Inquiry-based activities*”. As parallel scales were implemented in the Student Questionnaire, teacher and student perspectives could be combined and compared (triangulated) at school level. In addition, teachers reported about collaborative learning as well as assessment and grading practices in the classroom.

Learning time and curriculum (module 12)

Teachers are the stakeholders who can be assumed to be most knowledgeable of the science curriculum. They were thus asked whether there was a formal curriculum in place, which educational goals and processes were covered in the curriculum and whether the students’ parents were informed about the curriculum.

Leadership and school management (module 15)

The Teacher Questionnaire also collected information on school leadership and management from teachers’ perspectives. These questions covered aspects of the principal’s leadership style.

School resources (module 16) and assessment, evaluation and accountability (module 19)

Teachers answered a question that reported their perspective on teaching resources in the school and the extent to which they might affect their capacity to provide instruction. This question complements a parallel question in the School Questionnaire. In addition, teachers were asked about their experiences with school evaluation.

The Teacher Questionnaire was implemented as an international option and was administered via an electronic online platform. Teachers were given individual access to this platform, providing each eligible teacher within a school with an individual password. This procedure guaranteed nondisclosure of teacher identity to any stakeholder, including the school principal. Chapter 17 explains the technical implementation in more detail.

QUALITY ASSURANCE IN THE DEVELOPMENT OF QUESTIONNAIRES

Specific standards underlie the PISA questionnaire development process as well as the implementation of the material into the final instruments. These standards aim at quality assurance as well as comparability of the data across countries and economies. Mechanisms for PISA 2015 included a national review, cognitive labs, linguistic translatability assessment, centralized transfer of trend material, negotiation of adaptations and linguistic verification. The following sections each give a short introduction to these procedures.

National review

PISA questionnaires aim at covering topics of education that are important to all participating countries and economies and that can help to explain student achievement both within and between countries/economies. To achieve this goal, newly developed material was shared with representatives of countries and economies at an early stage in the development process to obtain in-depth feedback. This process not only helps to ensure comparability, but asks for ratings on several important factors for each question to be implemented in PISA. Each participating country and economy was asked to judge the relevance of the specific topic for their educational system. The review also aimed to establish whether the addressee that is targeted in the questionnaire (e.g. teachers, principals) is indeed the best person to answer. A very important aspect of ratings touched on issues of sensitivity. Feedback was collected on whether a topic might be sensitive, i.e. was politically acceptable, complied with data privacy regulations in the country/economy or could lead to cultural bias. Potential translation and adaptation difficulties were also addressed in this review. Finally, countries and economies were asked to give an overall rating of each proposed question. Based on these national reviews, proposed questions were rephrased or even deleted.

Cognitive labs

Newly developed questionnaire material for the Student and School questionnaire was pre-tested in English and French, and in English, French and Spanish for the Teacher Questionnaire during the development stage. This pre-testing was implemented in the form of cognitive labs with small groups of students and teachers. The respondents first answered selected, newly-developed questions. During this phase, the test administrator recorded the time it took to read and answer the questions. In a second step, respondents were asked about the answering process including whether they understood the questions, if they could answer these based on the response options given and about any other comment



they might want to give. In addition, small focus group interviews were conducted with teachers to discuss the newly-developed Teacher Questionnaire material. All feedback was collected and led to revision of the proposed questionnaire material.

Translatability assessment

To enhance comparability, a translatability assessment of the questionnaire material was carried out. Linguistic experts evaluated the material with due consideration for the Ask-the-Same-Question (ASQ) model (Harkness, 2003). This approach seeks to optimize the wording in the source questionnaire so that the items can be translated in all relevant languages while maintaining the construct covered, and therefore maintaining the intended measurement properties. The newly-developed questionnaire material was translated into several languages representing the most common language groups, including an East-Asian language (Korean), a Slavic language, an Indo-German language (German), a Romance language (French), and Modern Standard Arabic. Translators highlighted any linguistic issues related to the translation of the questionnaire content that could lead to non-translatability or possible bias in later meaning of a question. Questionnaire developers then revised the material based on this feedback. The translatability assessment is described in detail in Chapter 5 of this report.

Centralised trend material transfer

With the transition to computer-based assessment, the international contractors implemented a centralized transfer process for national trend material. All questionnaire material from previous cycles that was chosen to be administered again for PISA 2015 was centrally transferred into the electronic platform by Core 3. Any changes to these questions needed to be requested and justified by the country/economy. This process allowed for external control to preserve national trend material in PISA 2015. For more explanation see Chapter 5 and Chapter 17.

Adaptation negotiation and verification

In some cases, cultural traditions, national understanding of a question or features of the education system vary largely, leading to the need for adaptations in questionnaires. As in previous cycles, the National Centres in each country and economy were asked to document which national adaptations they needed or wished to implement in the materials by describing them in specially designed standardized forms. For the questionnaires, a Questionnaire Adaptation Spreadsheet (QAS) was provided describing all adaptations that a country or economy wished to implement. For each country/economy and each questionnaire, all adaptations were checked by the international contractors and documented in the QAS. After translation and negotiation of adaptations, all national material was verified by the international contractors. Linguistic checks were performed, and any unclear translation was discussed with the international questionnaire developers, the country/economy, and the linguistic quality control team (Core 3). More information is given in Chapter 5.

All final questionnaire material was then implemented into the paper-based or computer-based versions, tested, and provided to the PISA participants. Further information about these steps is given in Chapter 17.

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