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# The Development of the PISA Context Questionnaires

## INTRODUCTION

In its Call for Tender for PISA 2009, the PISA Governing Board (PGB) established the main policy issues it sought to address in the fourth cycle of PISA. In particular, the PGB required PISA 2009 to collect a set of basic demographic data as a core component that replicated key questions from the previous cycles. In addition, PISA 2009 needed to address issues related to important aspects of the affective domain, information about students' experience with reading in and out of school (e.g. experience of different approaches to the teaching of reading, preferred ways of learning), motivation, interest in reading and engagement in reading. At the school level, PISA 2009 needed to explore curriculum, teaching and learning in the area of reading, including aspects of the teachers' careers and qualifications concerning the test language. Since the impact of out-of-school factors was considered of particular interest in a PISA survey where reading literacy was the major domain, the PGB recommended the inclusion of a parent questionnaire as an optional instrument.

The Core B Consortium undertook the operationalisation of these goals with the assistance of a variety of experts. In particular, a Questionnaire Expert Group (QEG) was established, consisting of experts from various research backgrounds and countries (see Annex H). The Core B Consortium and the QEG worked together to develop the Questionnaire Framework for PISA 2009 which was included in the publication, *PISA 2009 Assessment Framework: Key Competencies in Reading, Mathematics and Science* (OECD, 2010a) and the related contextual instruments. Other experts were consulted where appropriate, especially some members of the Reading Expert Group (REG).

## THE DEVELOPMENT OF THE PISA 2009 QUESTIONNAIRE FRAMEWORK

The first step in the process was the development of a questionnaire framework which allowed the mapping of the PGB's priority policy issues to the design of PISA 2009. To aid this, a set of criteria established by the INES (International Indicators of Educational Systems) Network A was used:

- First, the research area must be of enduring policy relevance and interest. That is, a research area should have policy relevance, capture policy makers' attention, address their needs for data about the performance of their educational systems, be timely, and focus on what improves or explains the outcomes of education. A research area should also be of interest to the public, since it is this public to which educators and policy makers are accountable.
- Second, research areas must provide an internationally comparative perspective and promise significant added value to what can be accomplished through national evaluation and analysis. This implies that research areas need to be both relevant (i.e. of importance) and valid (i.e. of similar meaning) across countries.
- Third, there must be some consistency in the approach of each research area with PISA 2000, PISA 2003 and PISA 2006.
- Fourth, it must be technically feasible and appropriate to address the issues within the context of the PISA design. That is, the collection of data about a subject must be technically feasible in terms of methodological rigour and the time and costs (including opportunity costs) associated with data collection.

In developing the questionnaire framework, the following aspects were considered, both in terms of restrictions and of potential outcomes related to the study design:

- PISA measures knowledge and skills for life and so it does not have a strong curricular focus. This limits the extent to which the study is able to explore relationships between differences in achievement and differences in the implemented curricula. On the other hand, consideration was given to the out-of-school factors with a potential of enhancing cognitive and affective learning outcomes.
- PISA students are randomly sampled within schools, not from the same classrooms or courses and therefore come from different learning environments with different teachers and, possibly, different levels of instruction. Consequently, classroom-level information could only be collected either at the individual student level or at the school level.
- PISA uses an age-based definition of the target population. This is particularly appropriate for a yield-oriented study, and provides a basis for in-depth exploration of important policy issues, such as the effects of a number of structural characteristics of educational systems (e.g. the use of comprehensive vs. tracked study programmes, or the use of grade repetition). On the other hand, the inclusion in the study of an increasing number of partner countries (where the enrolment rate for the 15-year-old age group is maybe less than 100%) requires that retention be taken into account in the analysis of between-countries differences.
- The cross-sectional design used in PISA does not allow any direct analysis of school effects over time. However, the cyclic nature of the study will permit not only the investigation of change in the criterion measures, but also in the effects of rates of change in the predictor variables.

The questionnaire framework that is at the basis of the development of the context questionnaires is fully described in the *PISA 2009 Assessment Framework: Key Competencies in Reading, Mathematics and Science* (OECD, 2010a). It describes the content of the questionnaires for students, schools and parents. In addition, it puts forward ideas for analysing the policy-relevance of the data collected, such as investigating effective learning environments in reading, ensuring school effectiveness and management, promoting educational equity and cost effectiveness, and developing system-level indicators. The PISA 2009 Questionnaire Framework presents a description of the types and purposes of the information collected at each of four educational levels. The types of the information collected at these levels can be described as following:

- At the system-level, the macroeconomic, social, cultural and political context sets constraints for the educational policies in a country. Outcomes at the system-level are not only aggregated learning outcomes but also equity-related outcomes.
- At the level of the educational institution, characteristics of the educational provider and its community context are antecedents for the policies and practices at the institutional level as well as the school climate for learning. Outcomes at this level are aggregates of individual learning outcomes and also differences in learning outcomes between sub-groups of students, for example whether the gap between the average performances of boys and girls differs from school to school.
- At the level of the instructional units, characteristics of teachers and the classrooms/courses are antecedents for the instructional settings and the learning environment; learning outcomes are aggregated individual outcomes.
- At the student level, characteristics (like gender, age, grade) and background (like social status, parental involvement, language spoken at home) are antecedents for the individual learning process and learning outcomes (both cognitive and affective).

The questionnaire framework is based on a multilevel model of antecedent conditions, policy amenable process factors and outcomes. The choice of variables within this model is theory-driven and evidence-based, using the research literature on educational effectiveness and related research areas (e.g. Creemers, 1994; Good & Brophy, 1986; Purkey & Smith, 1983; Sammons, Hillman & Mortimore, 1995; Scheerens, 1992; Scheerens & Bosker, 1997; Teddlie & Reynolds, 2000). An exemplary mapping of potential contextual variables against the categories of the Questionnaire Framework for PISA 2009 is outlined in Figure 3.1.

The PISA 2009 Questionnaire Framework is especially designed to study four core policy issues in education:

- Educational productivity can be highlighted by focusing on output variables at different aggregation levels, and to make the well-known comparisons between mean performance levels between countries, so that countries can serve as benchmarks for one another.
- Educational effectiveness seeks to determine the net effect of amenable educational conditions on outputs, while controlling for relevant antecedent conditions at the level of individual participants.
- Educational equity is captured by examining disparities between resources and processes as well as the variation between students and schools in educational outputs; and the degree to which achievement levels and disparities hang together with specific antecedents of students, schools and school contexts; e.g. the reading performance of girls from cultural minority backgrounds, the average achievement levels of schools in rural areas.
- Educational efficiency addresses questions of input provision and effectiveness at the lowest possible costs.

## RESEARCH AREAS IN PISA 2009

One important objective of the questionnaire framework was to facilitate the development and choice of research areas that combine policy relevance effectively with the strengths of the PISA design. PISA's contributions to policy makers' and educators' needs were maximised by identifying possible policy-relevant research areas and choosing carefully from among the many possibilities so that the strengths of the PISA design were capitalised on. The following research areas were developed following recommendations from the QEG – see *PISA 2009 Assessment Framework: Key Competencies in Reading, Mathematics and Science* (OECD, 2010a).

■ Figure 3.1 ■

**Summary of the Questionnaire Framework for PISA 2009**

| *Level* | Antecedents | Amenable processes | Outcomes |
|---|---|---|---|
| ***Educational system as a whole*** | General affluence of the country/region | Functional decentralisation | System level aggregates of reading, reading engagement and meta-cognition |
| | Status of teachers | Evaluation, examination and accountability arrangements | Equity and efficiency related outcomes |
| | Community involvement in schooling | Structural differentiation of secondary education | |
| | Societal (in)equality of country or region | Investment in education | |
| | Income distribution (e.g., Gini index) | Degree of centralisation in curriculum and assessment | |
| | | Investment in education | |
| | | Degree of centralisation in curriculum and assessment | |
| | | Equity oriented policies | |
| ***School level*** | School managerial overhead | School policies, including implemented national policies, e.g., school autonomy | Institution level aggregates of reading literacy, reading engagement and meta-cognition, differences in outcomes for students of various backgrounds |
| | Student body composition in terms of socio-economic background and percentage of immigrant students | Educational leadership | |
| | Affluence of the school neighbourhood | Disciplinary climate | |
| | Parental involvement | Curricular emphasis on reading (opportunity-to-learn) | |
| | | Extra-curricular activities | |
| | | Aspects of a supportive teaching/learning environment | |
| ***Instructional settings*** | Class size | Opportunity to learn in reading literacy | Similar as those with respect to school level issues |
| | Classroom composition | Orderly classroom climate | Institution level aggregates of reading literacy, reading engagement and meta-cognition, differences in outcomes for students of various backgrounds |
| | Teacher characteristics | Supportive teaching/learning conditions with respect to:<br>▪ reading literacy tasks<br>▪ reading engagement<br>▪ metacognition | |
| | | Monitoring and feedback | |
| ***Student level*** | Socio-economic status | Learning strategies | Reading literacy performance of 15-year-old students |
| | Gender | Meta-cognition with respect to reading literacy | |
| | Immigration status | Reading engagement | |
| | Parental educational level | | |

**Educational effectiveness**

- System level indicators: Characteristics of school systems and performance in reading
- School effectiveness: Amenable school characteristics and compositional effects
- Effective learning environments in reading
- Educational leadership

**Efficiency**

- Cost effectiveness

**Equity**

- Equality and equity in education

The contextual information collected with the student and school questionnaires, as well as with the optional Information and communication technologies (ICT) familiarity, educational career and parent questionnaires, comprises only a part of the total amount of information available to PISA. Indicators describing the general structure of the education systems (their demographic and economic contexts – for example, costs, enrolments, school and teacher characteristics, and some classroom processes) and their effect on labour market outcomes are already routinely developed and applied by the OECD (e.g. the yearly OECD publication *Education at a Glance*).

■ Figure 3.2 ■

**Themes and constructs/variables in PISA 2009**

| *Research area* | Constructs or variables | Questionnaire used to collect information: | | |
|---|---|---|---|---|
| | | Student | School | Parent |
| ***Student engagement in reading*** | Enjoyment of reading | * | | |
| | Diversity in reading | * | | |
| | Online reading activities | * | | |
| | Approaches to learning | * | | |
| | Use of libraries | * | | |
| | Metacognition strategies: Understanding and remembering | * | | |
| | Metacognition strategies: Summarising | * | | |
| | Students' reading resources at home | | | * |
| | Parents' current support of child's reading literacy | | | * |
| | Parental support of child's reading literacy at the beginning of ISCED 1 | | | * |
| | Motivational attributes of parents' own reading engagement | | | * |
| ***Test language lessons*** | Disciplinary climate | * | | |
| | Teachers' stimulation of reading engagement | * | | |
| | Use of structuring and scaffolding strategies | * | | |
| | Learning time | * | | |
| ***Organisation and educational systems*** | School size, location and funding | | * | |
| | Grade range | | * | |
| | Class size | | * | |
| | Grade repetition at school | | * | |
| | Ability grouping | | * | |
| | Teacher-student ratio | | * | |
| | Computer availability at school | | * | |
| | School selectivity | | * | |
| | School responsibility for resource allocation | | * | |
| | School responsibility for curriculum & assessment | | * | |
| | Teacher shortage | | * | |
| | Quality of the school's educational resources | | * | |
| | Parents' perception of school quality | | | * |
| | Parental involvement in their child's school | | | * |
| ***School climate*** | Teacher behaviour | | * | |
| | Student behaviour | | * | |

## THE DEVELOPMENT OF THE PISA 2009 CONTEXT QUESTIONNAIRES

The PISA 2009 Questionnaire Framework provided the foundation for the development of the following questionnaires:

- Student Questionnaire
- School Questionnaire
- ICT Familiarity Questionnaire (international option)
- Parent Questionnaire (international option)
- Educational Career Questionnaire (international option)
- Teacher Questionnaire (this was not implemented as not enough countries expressed interest in participating in this international option)

The questions proposed for inclusion in PISA 2009 were developed through a process which is outlined below:

- After the QEG had recommended the broad research areas, a range of constructs were identified from the elaborations of these areas.
- The PGB prioritised the constructs and established framework weights. The PGB evaluated the relevance, feasibility and time value of the proposed constructs, taking into account relevant background information. In general, all constructs achieved high ratings of relevance, and no low ratings of feasibility. The Core B Consortium took both the ratings and the variation of the ratings across countries into account in developing the questions for the student, school and parent questionnaires.
- The Core B Consortium worked with members of the QEG to prioritise these constructs and operationalise draft questions.
- The REG drafted additional instruments for measuring supportive classroom and school conditions and metacognition.
- For all adapted and newly developed questions of all questionnaires prior cognitive interviews were held in order to obtain a first indication of their efficiency, reliability and validity, as well as their international comparability (Kuhlemeier, Smits & Van den Bergh, 2007). It involved a think-aloud process where respondents were asked to complete the questionnaire while verbalising their thought processes. The pre-pilot provided qualitative feedback on the understanding and appropriateness of the items. The pre-pilot not only included the draft materials initiated by the Questionnaire Expert Group, but also the additional draft questions that were recommended by the REG. Qualitative feedback was obtained on the extent to which the respondents interpreted the questions as intended by the authors. If necessary, questions were revised and pre-piloted again.
- After refining the items in light of the pre-pilot results, a series of similar pre-pilots was undertaken in Mexico and Finland (Ceneval, 2007; Sulkunen & Reinikainen, 2007).
- The feedback obtained from the pre-pilots, coupled with continued collaboration with members of the QEG and REG, other internationally recognised experts, and National Project Managers (NPMs), resulted in pilot questionnaires for students, schools and parents.
- The draft constructs and questions were discussed with the NPMs during their September 2007 meeting in Dubrovnik, Croatia. The Core B team has taken into account the NPMs' comments, together with the outcomes of the additional cognitive interviews and expert reviews, to prepare an improved proposal for the field trial.

## THE FIELD-TRIAL OF THE PISA 2009 CONTEXT QUESTIONNAIRES

Data concerning the reliability, validity and usability of the student, school and parent questionnaires were gathered from a full scale field trial in each of the participating countries. The field trial was able to facilitate the investigation of a large number of questionnaire items through the use of a rotational design with five questionnaire forms that were randomly allocated to students and two questionnaire forms that were randomly allocated to parents. Empirical analyses included the examination of:

- the frequency of missing values by country;
- the magnitude and consistency of item-total score correlations for each scale, by country;
- the magnitude and the consistency of scale reliability (Cronbach's alpha), by country;
- the magnitude and consistency of correlations with each scale and reading literary achievement as determined in the PISA field trial reading literacy test, by country;

- confirmatory factor analyses to determine construct validity and reliability of each scale across the pooled sample;
- Item Response Theory (IRT) analyses to determine item fit for the pooled sample; and
- item-by-country interaction of items across countries using IRT scaling.

In addition to the empirical analyses, the choice of items, item format and wording was informed by:

- directions from the PGB
- feedback from NPMs
- feedback from linguistic experts
- discussions with the QEG
- discussions with members of the REG
- discussions with the Technical Advisory Group
- consultation with the OECD secretariat

Finally, a large and comprehensive set of potential items and topics was provided to the PGB. From this set, the PGB indicated priority areas for investigation.

## THE COVERAGE OF THE QUESTIONNAIRE MATERIAL

PISA 2009 obtained contextual information through a student and school questionnaire that were administered to all participating countries. As in previous surveys, additional questionnaires were developed, which were offered as international options to participating countries. In PISA 2009, three international options were available for countries:

- ICT Familiarity Questionnaire
- Parent Questionnaire
- Educational Career Questionnaire

The questions of each questionnaire have been published in Annex B of the *PISA 2009 Assessment Framework* (OECD, 2010a). Below a brief summary of their content is provided.

### Student and School Questionnaires

The vast majority of contextual questions of the student and school questionnaires were reiterated from previous PISA surveys, establishing continuity of data collection for comparison and the ability to search for trends over time. However, the wording of some questions was modified to improve the quality of the data based on experiences in previous surveys. Particular care was taken to minimise any impact that changing the questions might have on measuring changes from one survey to another. Annex D lists the core questions of the questionnaires with changes in wording from PISA 2006 to PISA 2009. A number of additional questions were developed to explore new theoretical and policy dimensions (OECD, 2010a).

The student questionnaire was administered after the literacy assessment and it took students about 30 minutes to complete. It covered the following aspects:

- student characteristics
- family context and home resources
- individual engagement in reading
- instructional time, learning and assessment
- classroom and school climate
- students' views on their test language lessons
- access to and use of libraries
- students' strategies in reading and understanding text

The school questionnaire was administered to the school principal and took about 30 minutes to complete. National project managers followed up with the principal and school co-ordinator to ensure a high response rate. It covered the following school-related aspects:

- the structure and organisation of the school
- the student and teacher body
- the school's resources
- the school's instruction, curriculum and assessment
- the school climate
- the school policies and practices
- the characteristics of the principal or designate

### Educational Career Questionnaire

The educational career questionnaire consisted of seven questions on the student's interruptions of schooling or change of schools, educational aspirations and grade marks, as well as lessons taken out of school.

### ICT Familiarity Questionnaire

Based on a request of the PGB, the ICT Familiarity Questionnaire was fully redesigned. The revision served three general objectives: *a*) to address a broader range of digital devices, services and applications, *b*) to emphasize how availability and use of ICT at school and at home are different and *c*) to address new digital learning environments in schools. The adaptation also reflects the growing interest in collaborative, online games as opposed to stand-alone games for the individual player, the increased use of synchronous as opposed to asynchronous electronic communication and the differences between computer use at school during lessons versus outside lessons. The new ICT Familiarity Questionnaire was administered to students after the international student questionnaire (sometimes combined within the same booklet) and it took about five minutes to complete. It covered the following ICT-related aspects:

- availability of ICT at home and at school
- general use of computers
- use of ICT at home
- use of ICT at school, in classroom lessons and outside classroom lessons
- attitude toward computers

### Parent Questionnaire

The impact of out-of-school factors is considered of particular interest in a cycle where reading literacy is the major domain. The Parent Questionnaire had to be newly designed to provide efficient, reliable and valid data about home, school, and community factors influencing reading literacy against limited (international) costs and efforts. The questionnaire took about 20 minutes to complete. One questionnaire was administered per student. The Parent Questionnaire covers parental reports related to following aspects:

- basic parent and family characteristics (father's education, mother's education, and number of children in the household);
- child's past reading engagement (e.g. the child's participation in pre-primary education and reading engagement at the beginning of primary education);
- home reading resources and support (home language, current home reading literacy support);
- parents' own reading engagement (time spent on reading for enjoyment and attitudes to reading);
- annual household income and annual spending on children's education;
- parents' perception of and involvement in school; and
- school choice (i.e. options and reasons).

## THE IMPLEMENTATION OF THE CONTEXT QUESTIONNAIRES

In order to make questions easier to understand by 15-year-old students and their parents, and by school principals in participating countries, it was necessary to adapt parts of the questionnaire material from the international source version to the national context without jeopardising the comparability of the collected data. This is particularly important

for questions that relate to specific aspects of educational systems like educational levels, study programmes or certain school characteristics which differ in terminology across countries.

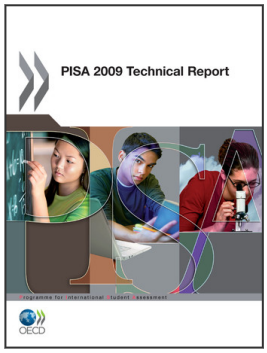
To achieve a maximum of comparability, a process was implemented during which each adaptation was reviewed and discussed by the Core B Consortium and national centres. To facilitate this process, national centres were asked to complete a questionnaire adaptation spreadsheet (QAS), where adaptations to the questionnaire material were documented. Each adaptation had to be reviewed and agreed upon before the questionnaire material could be submitted for linguistic verification and the final optical check (see Chapter 5). The QAS also contained information about additional national questionnaire material and any deviation from the international questionnaire format.

Prior to the review of questionnaire adaptations, national centres were asked to complete three different tables describing necessary adaptations:

- Study programme tables: These document the range of different study programmes that are available for 15-year-old students across participating countries. This information was not only used as a codebook to collect these data from school records but also assisted the review of questionnaire adaptations.
- Language tables: These document the language categories included in the questions about language use at home.
- Country tables: These document the country categories in the questions about the country of birth for students and parents.

Information on parental occupation was collected through open-ended questions in Student Questionnaire. The responses were then coded according to the International Standard Classification of Occupations (ISCO) (International Labour Organisation, 1990). Once occupations had been coded into ISCO, the codes were re-coded into the International Socio-Economic Index of Occupational Status (ISEI) (Ganzeboom, de Graaf & Treiman, 1992), which provides a measure of the socio-economic status of occupations comparable across the countries participating in PISA.

The International Standard Classification of Education (ISCED) (OECD, 1999) was used as a typology to classify educational qualifications and study programmes. The ISCED classification was used to get comparable data across countries. Whereas this information was readily available for OECD member countries, for partner countries and economies extensive reviews of their educational systems in co-operation with national centres were necessary to map educational levels to the ISCED framework.

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