The Programme for the International Assessment of Adult Competencies

PIAAC Technical Standards and Guidelines
June 2014

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PIAAC TECHNICAL STANDARDS AND GUIDELINES

INTRODUCTION TO THIS DOCUMENT

The Programme for International Assessment of Adult Competencies (PIAAC) will establish technical standards and guidelines to ensure that the survey design and implementation processes of PIAAC yield high-quality and internationally comparable data.

The attached document provides a revised version of the technical standards and guidelines originally distributed (11 October 2008). The document is structured in two parts:

- Part I provides an introduction to PIAAC and its objectives as well as the methodologies.
- Part II presents the proposed standards, together with their rationale, technical implications, recommendations for implementation and quality assurance procedures.

The standards presented in this document are the generally agreed upon policies or best practices to be adhered to in the conduct of the survey. The guidelines are statements which elaborate on the implementation of the standard(s). Once the guidelines and standards are adopted, it is essential that all countries follow them. Where this is not possible, countries may apply for derogations from the standards. Where such derogations would compromise the survey objectives, the PIAAC Consortium will bring these to the attention of the OECD Secretariat, which, in turn, may refer them to the BPC for arbitration in situations where they might compromise the collective value of PIAAC.

In addition to the standards and guidelines, the document provides recommendations which are designed to further improve the quality of the survey implementation and results. The recommendations are suggestions based on experience and best practices which would be acceptable approaches or activities to be undertaken in conjunction with a standard(s). Inquiries pertaining to the PIAAC standards should be addressed to: *Claudia Tamassia, PIAAC Project Co-ordinator, Educational Testing Service, E-mail: ctamassia@ets.org, Telephone:+1- 609-734-1792.*

PART I. OVERVIEW

INTRODUCTION TO PIAAC

The Programme for the International Assessment of Adult Competencies (PIAAC) is a multi-cycle international programme of assessment of adult skills and competencies sponsored by the Organisation for Economic Co-operation and Development (OECD). Governments in OECD countries face the challenge of maintaining competitiveness in a global economy by ensuring that labour markets are flexible and responsive and are open to a wide range of people of all ages.

PIAAC will assess the level and distribution of adult skills across countries, focusing on the cognitive and workplace skills needed for successful participation in the economy and society of the 21st-century. PIAAC will collect information on skills required in the workplace, participants'[1] educational backgrounds and professional attainments, and their ability to use information and communications technology. In addition, PIAAC will include an assessment of cognitive skills to measure participants' general levels of literacy and numeracy.

PIAAC has evolved from two previous international literacy surveys: the International Adult Literacy Survey (IALS), conducted between 1994 and 1998, and the Adult Literacy and Lifeskills Survey (ALL), conducted between 2002 and 2006. The 1994 IALS was the first effort to undertake a large-scale assessment of adult literacy skills at the international level. IALS compared the demonstrated literacy skills of people across countries, cultures and languages. Thus, it highlighted the importance of literacy to the economic and social well-being of countries. Twenty-three countries participated in IALS: Australia, Belgium (Flanders), Canada, Chile, the Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Mexico (Nuevo Leon), the Netherlands, New Zealand, Northern Ireland, Norway, Poland, Portugal, Slovenia, Sweden, Switzerland, the United Kingdom and the United States.

The practical experience gained from the implementation of IALS and from the analysis of the survey results indicated that there was room for improvement in future surveys of this type. In particular, the need was identified to standardise, as much as practically possible, the survey design, survey implementation procedures and estimation methods. ALL therefore sought to improve on IALS by developing standards to ensure that minimum quality assurance goals would be met, sources of survey variability could be minimised and survey results could be compared. Eleven countries participated in ALL: Australia, Bermuda, Canada, Hungary, Italy, Korea, Norway, the Netherlands, New Zealand, Switzerland and the United States.

With the first round of data collection, PIAAC seeks to ensure continuity with these previous surveys, to extend the concept of literacy and numeracy to problem solving in technology-rich environments and to provide more information about individuals with low proficiency levels by assessing reading component skills. The standards developed for PIAAC are based on, and expand upon, the ALL standards.

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[1] A participant is a member of the target population, as defined in Section 4.1, and is a completed case, as defined in Standard 4.3.3.

In PIAAC, as in any survey, it is a challenge to minimise potential survey errors, which may be due to such factors as the sample design, the survey frame, the selection of the sample, the measurement instruments, errors during data collection, data processing problems, weighting and estimation difficulties, and so on. PIAAC has the added complexity of requiring the administration of a psychometric assessment of adult literacy and numeracy in addition to the administration of a questionnaire. Furthermore, in a multi-national survey such as PIAAC, there is the challenge associated with the diversity of cultures, languages and survey-taking practices among participating countries. No single survey design will be effective for every participating country – each country must implement PIAAC in a manner that is appropriate to its population structure and survey-taking realities. Nevertheless, because of the survey complexities and the possibility that different countries will use different survey practices, it is important to standardise, as much as practically possible, the PIAAC survey procedures.

The design and implementation of PIAAC is the responsibility of an international consortium of well-established institutions from North America and Europe led by the Educational Testing Service in the United States. The other partners of this consortium are Westat in the United States; cApStAn in Belgium; the Research Centre for Education and the Labour Market (ROA) at the University of Maastricht in the Netherlands; and the GESIS - Leibniz Institute for the Social Sciences, the German Institute for International Education Research (DIPF), and the Data Processing Centre of the International Association for the Evaluation of Educational Achievement (IEA) in Germany.

SURVEY OBJECTIVES

The primary objectives of PIAAC are to 1) identify and measure cognitive competencies believed to underlie both personal and societal success, 2) assess the impact of these competencies on social and economic outcomes at individual and aggregate levels, 3) gauge the performance of education and training systems in generating required competencies, and 4) help to clarify the policy levers that could contribute to enhancing competencies.

One of PIAAC's core objectives will be to assess how well participants use information and communications technology to access, manage, integrate and evaluate information; construct new knowledge; and communicate with other people. In addition, PIAAC will collect information on participants' use of key work skills in their jobs, a first for an international study. In this way, PIAAC will offer a far more complete and nuanced picture of the "human capital" on which countries can count as they compete in today's global economy. It will help policy makers assess the effectiveness of education and training systems, both for recent entrants to the labour market and for older people who may need to continue learning new skills throughout their lifetimes.

This precise description of the main objectives of the study will ensure uniformity and consistency in the design and analysis of PIAAC across participating countries. It is important that the participating countries share a set of survey objectives, to facilitate comparisons of survey results between countries. PIAAC assessments and questionnaires will be designed to ensure cross-cultural, cross-national and cross-language validity. All participating countries will adhere to the common technical standards specified in this document when implementing the survey.

METHOD OF DATA COLLECTION

In-person interviews must be used to complete the background questionnaire and to administer the direct assessments (*i.e.* literacy, numeracy, component skills and/or problem solving in technology-rich environments).

In-person interviews or telephone interviews will be used to identify appropriate respondents. A computer-assisted data collection method must be used at all stages of the data collection, including completion of the background questionnaire.

The direct assessments will be available in paper- and computer-based formats. However, they must be administered in the mode specified by the computer system that will be used to collect the background questionnaire data.

Proxy responses are not acceptable for the background questionnaire or the direct assessments.

PART II. STANDARDS

1. QUALITY ASSURANCE AND QUALITY CONTROL

Purpose

To produce a comprehensive quality assurance (QA) and quality control (QC) plan and procedures covering all major aspects of PIAAC that will help ensure that the sources of survey variability are kept to a minimum and that the data collected and reported through the PIAAC study are reliable and valid.

Rationale

For a complex international survey such as PIAAC, it is critical to develop a QA and QC plan and set of procedures that will support overall judgements about the usefulness of the survey results at both the national and international levels. While the terms *quality assurance* and *quality control* are sometimes used interchangeably, they relate to different aspects of quality. QA is most often associated with the processes and procedures that are put in place to make sure the survey is likely to meet its intended goals. QC, on the other hand, relates to the set of judgements that are made with regard to the suitability of the survey results in terms of their intended uses or applications.

While error is a part of any survey, it is common practice to distinguish among two broad categories: *sampling error* and *non-sampling error*. Because PIAAC is a household survey and will employ national probability sampling, it is subject to the first type of error. The target sample size for PIAAC will allow countries to produce reliable and valid national results while also controlling national costs associated with contacting adults living in households. Non-sampling errors in PIAAC can come from a variety of sources, including nonresponse bias; the development and translation of the assessment instruments; deviations in data collection procedures; errors associated with data capture, coding and processing; errors associated with the scoring of open-ended items; and errors associated with the analysis and reporting of the results.

Standards, Guidelines and Recommendations

Standard 1.1 Establish a set of QA/QC plans and procedures to ensure that the survey design and implementation processes of PIAAC yield high-quality and internationally comparable data, thereby minimising potential survey error.

> **Guideline 1.1** The Consortium must establish a clear QA process for each facet of the project, including the design of the field test and main study; the development and validation of the background questionnaire and direct assessment instruments; the development and testing of the computer delivery platforms; the activities countries will need to take to translate the instruments and to implement the survey in their country; and the processing, analysis and reporting of the data. As part of the QA plan,

the Consortium has developed the PIAAC Technical Standards, Guidelines and Recommendations which must be followed by the Consortium and all participating countries.

Countries are required to document their proposed methods and procedures for adhering to the standards and guidelines in the National Survey Design and Planning Report (NSDPR) for the field test and the main study. The Consortium will review the NSDPR for each country and will work with the countries to ensure that they meet the standards and guidelines. Refer to Section 3.6 for more details.

To facilitate the NSDPR process, the Consortium will prepare a series of standardised electronic forms and templates to be completed by the countries. For example, Sampling Plan Forms will be developed by the Consortium and filled out by countries as a planning document and will serve as the sampling chapter of the NSDPR. As part of this process, countries must review their sample design, sampling frame and selected samples, to ensure that they are consistent with the sample design goals.

The QC processes are put in place to help ensure that the QA plans are followed during all phases of the study, including the design, development, implementation, estimation, analysis and documentation of the survey results. The QA plans are established through standards, guidelines and recommendations that are grouped by topic and presented in the chapters of this document.

The Consortium will conduct QC monitoring of its own activities and will make corrections along the way, if needed. Monitoring is expected to result in ongoing enhancements, when feasible, as well as tracking of recommendations, with the aim of improving all aspects of the future rounds of PIAAC.

Standard 1.2 The Consortium will prepare a report at the end of the project that will summarise, in a single source, all areas in which processes and procedures were put in place to help minimise the various sources of sampling and non-sampling error.

Standard 1.3 The PIAAC Consortium must provide for ongoing communication, via the study Share Point site, between the countries and the Consortium and ensure timely response to countries.

2. ETHICS STANDARDS

Purpose

To ensure that all countries and organisations participating in PIAAC adhere to recognised standards of ethical research practices.

Rationale

Research organisations have a responsibility to survey participants, clients, data collectors and the public to follow ethical principles and practices in the conduct of their work. See the Cross-Cultural Survey Guidelines (http://ccsg.isr.umich.edu/pdf/fullguide061108.pdf) for more discussion of ethical practices in survey research.

Standards, Guidelines and Recommendations

Standard 2.1 Professional standards for scientifically rigorous research must be observed at all stages of the study.

> **Guideline 2.1A** Clearly and objectively describe PIAAC's major research questions.

> **Guideline 2.1B** Ensure that a survey is the most appropriate method for answering the research questions.

> **Guideline 2.1C** Submit all research plans to the appropriate institutional review boards and/or ethics committees for approval.

> **Guideline 2.1D** Train staff on the importance of ethics and scientific rigor in research involving human subjects. (See Section 9.4.)

> **Guideline 2.1E** Follow best practices in survey design, data collection and post-survey processing according to the PIAAC standards and guidelines.

> **Guideline 2.1F** Hire or equip staff involved in design, data collection and analysis with appropriate skills to perform scientifically rigorous research.

> **Guideline 2.1G** Employ appropriate tools and methods of analysis.

Standard 2.2 Research organisations have a responsibility to survey participants and must protect their human rights.

> **Guideline 2.2A** Researchers must avoid using practices or methods that may harm, humiliate or seriously mislead survey participants.

Guideline 2.2B Participation in the survey must not impose an undue burden for the respondent.

- Researchers must take care not to collect information that is already available or that could be obtained by another means.
- Researchers must ensure that each question in the survey addresses a specific measurement goal and must not collect new data unnecessarily.
- Researchers must balance the need for information against the effort that is required to complete additional survey questions.
- Interviewers must make every effort to facilitate the data collection process for the respondent.
- Interviewers must ask questions and administer the assessment in such a way that it is easy and comfortable for a respondent to answer.

Guideline 2.2C Survey institutes in each country must ensure that each respondent receives sufficient information and opportunity to give informed consent prior to participation in the survey.

- Participants must be provided with information on the following basic study elements, delivered either in the form of advance materials or in person by the interviewer. (See Section 10.2.)

  o sponsor, purpose and duration of research
  o explanation of how the respondent was selected for the study
  o interview procedures to be followed by the respondent
  o voluntary nature of participation
  o expected risks and benefits
  o compensation (if included)
  o maintenance of confidentiality
  o right to withdraw from the study at any time without penalty
  o whom to call with questions

- Interviewers must be able to thoroughly and accurately describe the purpose and nature of the study, including participant requirements and anticipated risks and benefits, and respond to any respondent queries.

Guideline 2.2D Researchers must respect the free will and privacy of respondents.

- While interviewers should attempt to avoid and convert respondent refusals, they must not allow these practices to approach harassment. (See Section 10.5.)
- Interviewers must obtain permission from respondents before using any electronic devices, such as the use of tape recorders for quality control.

Guideline 2.2E The country's survey institute must maintain confidentiality of respondent data. (See Chapter 13.)

- All PIAAC staff must sign a pledge of confidentiality and a non-disclosure form. (See Section 13.4.)
- Survey participants must be assured that information provided in confidence will not be used outside the stated purposes of the study.
- All PIAAC staff must maintain the security of data while it is stored on interviewer laptop computers, as well as during transmission, analysis and reporting.
- All PIAAC staff must be careful not to reveal information that uniquely identifies respondents in non-secure communication or reports.

Guideline 2.2F Interviewers must be sensitive to social and cultural differences when contacting respondents and conducting the interview.

- Local customs must be observed in planning for and conducting the interview.
- Study materials must be presented in a manner that can be understood by the respondent.
- Cultural norms must be observed when assigning interviewers to sample cases.
- Cultural traditions and norms must be considered when deciding whether to offer respondent incentives and determining what type of incentives would be most appropriate. (See Sections 4.8 and 10.5.)

Standard 2.3 Researchers have a responsibility to conduct work as agreed upon and to maintain all proprietary information in a confidential manner.

Standard 2.4 Researchers must not ask data collectors to engage in any activity that does not follow the principles specified in this chapter with regard to study participants, clients and the public.

Standard 2.5 Researchers have a responsibility to the public to ensure that findings released are an accurate portrayal of survey data.

Guideline 2.5A Researchers must be clear and honest when interpreting and reporting data.

Guideline 2.5B Researchers must account for all data collected and describe the sample design. All inadequacies of the data from all data sources must be reported. Researchers must report all data cleaning and screening procedures used.

Guideline 2.5C Results must be reported accurately, even if they are not the anticipated or desired results.

Guideline 2.5D Researchers must not place undue confidence in any conclusions drawn based upon the data collected.

Guideline 2.5E Researchers must not condone unethical, incompetent or careless practices conducted during any aspect of the survey process.

Guideline 2.5F If an error is discovered after the publication of results, researchers must 1) make an effort to correct the error using an erratum document that describes the error and its impact on study results and 2) provide an additional variable or other means by which analysts can identify the corrected value, along with appropriate documentation. Researchers must report errors to OECD and the Consortium.

Guideline 2.5G Researchers must understand the sampling methods used. The fact that a process is automated does not ensure its correctness or appropriateness. Beginning in the planning stage, a competent survey practitioner is needed to ensure that the sampling methods are understood and applied appropriately.

Standard 2.6 Materials and procedures related to the ethical conduct of the study and ethics committee reviews must be documented.

> **Guideline 2.6** Researchers must maintain a copy of the following documents:

- scripts, letters, fact sheets and any other materials provided to give respondents information they need to make an informed decision about participation;
- consent protocols;
- confidentiality procedures and protocols;
- affidavits of confidentiality completed by staff (see Section 13.4);
- records of completion of any specialised staff training on ethics;
- ethics review committee submissions and correspondence.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to report their methods and procedures for adhering to ethical research standards. (See Section 3.6.)

During the survey planning and data collection period, countries will be required, as part of the Survey Operations National Monitoring Report, to report their methods and procedures for adhering to ethical research standards for the field test and the main study. (See Section 3.6.)

3. SURVEY PLANNING STANDARDS

3.1 QUALIFICATIONS OF NATIONAL PROJECT MANAGER

Purpose

To ensure that the National Project Manager (NPM) possesses the necessary skills and experience to fulfil the PIAAC responsibilities outlined below.

Rationale

Each participating country will appoint an NPM to take responsibility for implementing PIAAC at the national level. The NPM has overall responsibility for ensuring that all required tasks are carried out on schedule and in accordance with the specified international standards. A well-qualified NPM will facilitate the conduct of PIAAC.

Standards, Guidelines and Recommendations

Standard 3.1.1 The position of NPM will ideally involve a full-time contract under stable conditions, to ensure continuity of activities over time.

    Guideline 3.1.1A The NPM must be able to commit a significant amount of his/her time to PIAAC.

    Guideline 3.1.1B If the NPM does not work full time on PIAAC, s/he must employ full-time senior staff in key positions such as operations and data management.

Standard 3.1.2 A person appointed to the NPM position should have experience in planning, organising and conducting large-scale surveys.

    Guideline 3.1.2A Essential skills for the NPM position include the ability to identify, select and manage a team of project staff, together with the experience and competence to handle multiple tasks that may require attention simultaneously.

    Guideline 3.1.2B Previous work in the fields of adult literacy, education, educational assessment and household surveys would be very beneficial for the NPM position, as would familiarity with data processing, survey quality control procedures and data file structures.

    Guideline 3.1.2C The NPM must possess excellent oral and written communication skills in the local language, as well as in English. The NPM will need sufficient linguistic knowledge and confidence to represent the participating country at international meetings where all aspects of the project will be discussed in English, the official communication language of PIAAC.

Standard 3.1.3 The NPM will undertake or supervise all tasks related to the development and implementation of PIAAC in his/her country.

Guideline 3.1.3A The NPM must hire or confirm the leading survey institute responsible for implementing PIAAC. (See Section 3.2)

Guideline 3.1.3B The NPM is responsible for organising the following committees and meetings:

- A national committee composed of leading professionals in the fields of survey operations, research, sampling, education and adult competencies to offer advice to the project and ensure that national views are represented. This committee should reflect the views of the agency responsible for PIAAC, as well as other government agencies and teaching and research institutions. This national committee should meet at regular intervals to review progress, procedures and results throughout the project.
- Groups of national subject area experts to contribute to the development of questionnaire and assessment materials. The NPM is responsible for 1) arranging meetings of these groups to prepare the country's official response to the materials reviewed and 2) setting up structures and opportunities for communication between the national subject area experts and members of the Subject Matter Expert Groups who will guide the international development of the PIAAC framework and instruments.

Guideline 3.1.3C The NPM must attend up to two annual NPM meetings convened for three main purposes: 1) to provide a forum for national representatives to review, comment on and ratify proposals presented by the Consortium relating to assessment frameworks and instruments, indicators, sampling requirements, survey administration, data confidentiality, monitoring and quality control plans, status reports, and dissemination of results; 2) to provide training for NPMs on instruments, sampling tasks, operational procedures, response rates, scoring and coding, data preparation, data cleaning, and delivery tasks; and 3) to brief NPMs on data analyses and report preparation at the national and international levels.

Guideline 3.1.3D The NPM is responsible for the following communication and reporting activities:

- Communicate the country's official position on a range of aspects of the project, both to the Consortium and at NPM meetings.
- Interact with the Consortium and other international committees as needed.
- Prepare reports on the preparation and implementation of the field test and main study, including detailed reports of sampling plans, adaptation and translation of survey instruments, development of training protocols and manuals, quality control features, scoring reports, and the overall conduct and progress of data collection.
- Monitor and utilise the PIAAC website for communications on all project-related activities.
- Prepare summaries of data file layouts and country-specific additions to coding schemes.
- Prepare reports documenting scoring activities.
- Prepare reports documenting data cleaning and verification steps.
- Conduct national analyses, both for data checking purposes and for preparation of national and international reports.
- Review draft international reports.
- Co-ordinate the preparation of national reports of results and documentation of procedures.

Guideline 3.1.3E The NPM is responsible for the following test development activities:

- Review questionnaires and cognitive instruments for accuracy of information, national interest and functionality.
- Co-ordinate submission of new items for the cognitive instrument in one of the six acceptable languages (English, French, Spanish, German, Japanese and Italian).
- Co-ordinate submission of new background questionnaire items in one of the six acceptable languages (English, French, Spanish, German, Japanese and Italian) or adapt existing questionnaire items to meet national interest.

Guideline 3.1.3F The NPM is responsible for the following translation and adaptation activities:

- Monitor and co-ordinate the translation and adaptation of instruments and supporting materials according to international specifications.
- Document proposed changes to instruments and supporting materials for further verification.
- Communicate with the Consortium on translation and adaptation issues.
- Organise translation of all training and operational manuals as needed.

Guideline 3.1.3G The NPM is responsible for the following sampling activities:

- Monitor the sample design and selection process according to detailed specifications.
- If a country chooses to conduct the weighting step, monitor the weighting process according to detailed specifications.
- Monitor the nonresponse bias analysis according to detailed specifications.

Guideline 3.1.3H The NPM is responsible for the following survey operations activities:

- Monitor the production, dispatch and receipt of materials to and from interviewers.
- Ensure that procedures for administering the questionnaires and cognitive instruments are thoroughly understood by the field supervisors and interviewers.
- Conduct training sessions for supervisors and interviewers (*i.e.* approve data collector training materials and monitor the quality of data collector training).
- Supervise training of scorers and monitor all scoring and coding operations according to international requirements.
- Explain data entry procedures and supervise data entry operations.

Guideline 3.1.3I The NPM is responsible for ensuring quality control throughout survey implementation through prescribed monitoring, verification and reporting activities.

Guideline 3.1.3J The NPM is responsible for the following data file preparation activities:

- Communicate data entry procedures and supervise data entry operations.
- Conduct validation checks of data from the survey instruments, following PIAAC guidelines.
- Organise the dispatch of data files to the Consortium.
- Respond to data queries in a timely fashion.

Guideline 3.1.3K The NPM is responsible for the following data product activities:

- Attend secondary analysis training workshops to understand PIAAC analysis methodologies and to develop expertise in the appropriate use of PIAAC data products.
- Participate in the review and validation of results generated using PIAAC data products.
- Respond to national inquiries on PIAAC data management, data analysis and data summarisation methodologies.

Recommendation 3.1.3 Because PIAAC involves computer-assisted delivery of instruments, NPMs must perform significant activities related to systems integration and operation. Each NPM should appoint an information technology co-ordinator who will have direct responsibility for the following activities:

- Obtain sufficient laptop computers to support survey operations. These computers must meet the minimum technical requirements established by the Consortium and should be dedicated to the PIAAC project during the field test and main study.
- Configure these laptop computers with survey software to Consortium specifications.
- Train interviewers in the operation of the laptop computers and the survey software.
- Along with the NPM and related staff, receive training on the survey software, including a hypertext builder that can be used to author items for the background questionnaire and cognitive instruments.
- Operate a national helpdesk to provide technical support for the interviewers.
- Extract survey data from laptop computers and manage the formatting and cleaning of the data for delivery to the Consortium.

Quality Control Procedures

Countries must provide the NPM's name, qualifications and project time commitment to the Consortium as part of the National Survey Design and Planning Report process. (See Section 3.6.)

3.2 QUALIFICATIONS OF THE SURVEY INSTITUTE

Purpose

To ensure that the leading survey institute selected by each participating country has the necessary qualifications and practical experience to conduct PIAAC.

Rationale

To ensure survey quality, the survey institute must have expertise and qualifications specific to the design and implementation of large-scale international surveys. If there is collaboration between different institutes, at a minimum the leading survey institute must have qualifications in collaborating with other national and international institutes so that expertise in the relevant areas is available.

In addition, as PIAAC progresses, key survey institute staff will acquire considerable knowledge and expertise related to the survey. Survey institutes should make every reasonable effort to employ these staff for the duration of PIAAC.

Standards, Guidelines and Recommendations

Standard 3.2.1 Each participating country will identify the leading survey institute responsible for the design and implementation of PIAAC.

> **Guideline 3.2.1A** A country's survey institute will have the following qualifications:

- Experience in collaborating with other institutes/organisations/agencies within its own country as well as in other countries;
- Successful completion of at least two national probability surveys, each with a sample size of several thousand (ideally, 4 500 to 5 000 completed interviews).

> **Guideline 3.2.1B** The survey institute will possess substantial practical experience in the following areas:

- Survey management;
- Probability sample design and sample selection;
- In-person household data collection;
- Computer-assisted personal interviewing (CAPI);
- Instrument and materials translation/adaptation;
- Interviewer training;
- Achievement of high response rates on household surveys;
- Maintenance of data confidentiality;
- Data processing, including data capture, coding and editing;
- Sample weighting and estimation.

Guideline 3.2.1C The survey institute must establish a project team to carry out PIAAC. If the survey institute does not possess expertise or experience in all the activities necessary to conduct the survey, it may engage the services of other organisations or individuals to obtain the necessary expertise or experience. Consequently, a country's PIAAC project team shall consist of individuals, either from the survey institute or from other sources, whose combined expertise and experience constitute the essential skills and knowledge in the areas outlined in this section of the standards and guidelines. However, it is strongly advised that data collection tasks be conducted by a single organisation (either the survey institute or a sub-contractor) so as to ensure that standards associated with data collection are applied consistently within countries.

Recommendation 3.2.1A When selecting the survey institute, countries should consider the following:

- Ability to conform to the technical specifications for the implementation of PIAAC;
- Experience in conducting nationally representative surveys of households;
- Experience in carrying out tests of literacy or surveys involving the administration of assessments;
- Ability to achieve desired response rates, as demonstrated in previous relevant surveys;
- Experience in briefing and training interviewers;
- Mechanisms to ensure high-quality data coding and preparation;
- Demonstrated ability to adhere to timelines and schedules;
- Experience with CAPI methods;
- Value for money;
- Economic and financial strength of the organisation.

Recommendation 3.2.1B Each participating country should review the qualifications of the organisation selected, to determine its merits and ability to adhere to the standards. Adaptations or deviations from the standards may be permitted if the organisation will be able to achieve the overall quality objectives of PIAAC. The qualification data should include the following:

- A capability statement providing information on corporate experience in conducting surveys similar in size and scope to PIAAC, including description of survey content, name of sponsor, sample size, field staff requirements, use of computer-assisted interviews and response rates achieved;
- Qualifications of key personnel to be employed.

Standard 3.2.2 A country's survey institute must appoint a sufficient number of key personnel on its PIAAC project team to ensure that the following tasks are covered:

- Overall management of the PIAAC project within the participating country;
- The participating country's sample design and implementation, weighting (if the country chooses to conduct the weighting step), and regular data analysis;
- The hiring, training, monitoring and control of data collection staff such as interviewers and field supervisors; implementation of data collection procedures to minimise both unit nonresponse[2] and item nonresponse;[3] and employment of a sufficient number of interviewers to conduct more than 5 000 interviews within the PIAAC data collection timeframe;
- The scoring of the paper-and-pencil version of the assessment;

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[2] Unit nonresponse is failure of an eligible sample unit to participate in the survey.

[3] Item nonresponse is a missing response to a specific survey question.

- The set up and maintenance of the computer system for delivering the PIAAC instruments, integration of that system with the organisation's field management system, support for data collection activities, and final data delivery;
- Data capture, coding, and editing and tabulation of survey results.

Quality Control Procedures

Each participating country will identify to the Consortium the survey institute responsible for all aspects of the design and implementation of PIAAC as soon as possible after the initiation of the project.

Each country will provide the Consortium with a capability statement for the survey institute that includes the following:

- Information on corporate experience in conducting surveys similar in size and scope to PIAAC, including description of survey content, name of sponsor, sample size, field staff requirements, use of computer-assisted interviews and response rates achieved;
- Qualifications of key persons to be employed on the country's project team.

3.3 QUALIFICATIONS OF NATIONAL SAMPLING MANAGER

Purpose

To ensure that the National Sampling Manager (NSM) possesses the necessary skills and experience to fulfil the PIAAC responsibilities outlined below.

Rationale

Each participating country will appoint an NSM to take responsibility for all sampling-related activities of PIAAC, including sample design, selection, weighting, and nonresponse bias analysis.

Standards, Guidelines and Recommendations

Standard 3.3.1 The role of the NSM is to oversee sampling-related activities and communicate with the Consortium sampling group. The NSM must have the following qualifications:

- Experience in sample design and selection of household samples;
- Familiarity with weighting and nonresponse bias analysis procedures;
- Proficiency in English.

Recommendation 3.3.1 It is recommended that role of NSM is filled by a person with a statistical background who is distinct from the NPM. In that way, the NSM can provide support to the NPM and will be able to quickly and accurately respond to sampling QC questions. It is also recommended that the NSM be able to attend sampling workshops held by the Consortium.

Quality Control Procedures

Each country must specify an NSM contact.

3.4 QUALIFICATIONS OF NATIONAL INFORMATION TECHNOLOGY CO-ORDINATOR

Purpose

To ensure that all personnel responsible for information technology (IT) operations on PIAAC have an adequate knowledge of how to provide first-level support in their country.

Rationale

Because the National IT Co-ordinator will be responsible for operational IT issues (*e.g.* purchasing and selecting the laptop computers used for PIAAC, training interviewers, repairing interviewers' laptop computers), it is expected that these personnel will have adequate qualifications and experience.

Standards, Guidelines and Recommendations

Standard 3.4.1 Each National IT Co-ordinator must fulfil the following qualification profile:

- Experience in troubleshooting hardware and networking problems;
- Experience in troubleshooting web-based or web services problems;
- Experience with the operating system specified for use by that country (*e.g.* Windows, Linux);
- Experience in extracting survey data from laptop computers and managing the formatting and cleaning of data for delivery;
- Experience using trouble ticket systems and/or providing first- and second-level support;
- Experience using virtual machine technologies at the workstation level (*e.g.* VMware Workstation, VMware Server or VMware Player);
- Familiarity with survey operations.

Recommendation 3.4.1 The following qualifications will also be beneficial for IT support operations:

- experience training interviewers to operate laptop computers and the survey software (this function could also be performed by the National Project Manager);
- IT certifications for the software and operating system used in that country (*e.g.* Microsoft MCSA/MCSE/MCITP, Linux LPIC, VMware VCP);
- IT certifications that are support centred (*e.g.* ITIL Foundation).

Quality Control Procedures

Before the field test, countries will be required to document the qualifications of their IT support staff.

3.5 QUALIFICATIONS OF NATIONAL DATA MANAGER

Purpose

To ensure that the National Data Manager (NDM) possesses the necessary skills and experience to fulfil the PIAAC responsibilities outlined below.

Rationale

Since data related tasks tend to be highly technical and require special skills, each country will appoint a National Data Manager (NDM) to provide support for the NPM tasks and responsibilities described in Guideline 3.1.3J (data file preparation activities) and Guideline 3.1.3K (data product activities).

Standards, Guidelines and Recommendations

Standard 3.5.1 The NDM will be responsible for the day-to-day data management tasks within the country. More specifically, the NDM:

- Should possess the required knowledge and skills with respect to survey research in general and specifically the PIAAC assessment design, systems and instruments (i.e., the CAPI background questionnaire and the paper and computer-based cognitive exercises);
- Should possess the required technical skills with respect to databases and the conversion between different file formats and data types;
- Should have experience in planning, conducting and supervising the data management in large-scale surveys of this kind;
- Should work under stable conditions, i.e. be the same person throughout the project, including the main data collection and the subsequent post-collection phase;
- Should work within the same organisation as the NPM;
- Is the main contact person to the IEA DPC and needs to be fully authorised to engage in data editing and cleaning communication with the Consortium (in case the NPM and NDM are affiliated with different organisations, the Consortium expects that the NDM communicates with the Consortium *via* the NPM);
- Should be proficient in English to reliably engage in data related communication.

Standard 3.5.2 It is expected that the NPM and NDM will further be supported by staff for manual data capture during the applicable phases of the survey.

Guideline 3.5.2 The contribution that technical and data entry personnel make is crucial to the survey's success and quality. You should select staff with care and provide comprehensive training to them.

Quality Control Procedures

As part of the National Survey Design and Planning Report, countries must verify the authority and ability of the NDM to respond to data queries from the Consortium in a timely manner.

3.6 COUNTRY PLANNING REPORTS

Purpose

To provide the Consortium with details, in a standardised format, regarding each country's proposed implementation of PIAAC.

Rationale

Each country will produce two planning reports in preparation for the field test and the main study. The National Survey Design and Planning Report (NSDPR) for the main study is intended to provide a detailed description of the final survey design so the Consortium can assess the appropriateness of the plan. The NSDPR for the field test will follow the same outline (see Annex 3-1) as the main study NSDPR but will cover only those topics applicable to the field test design and implementation.

The Consortium will review the planning reports to determine whether the survey requirements have been satisfied. To ensure comparability of the PIAAC results across participating countries, it is important that each country's survey design plan is consistent with the PIAAC objectives and standards, is methodologically sound, and is operationally practical. The review of the NSDPR will also give the Consortium an advance opportunity to detect potential problems with a country's survey design plan and to provide advice on dealing with these issues.

Standards, Guidelines and Recommendations

Standard 3.6.1 Each country will submit an NSDPR [National Survey Design Planning Report] for the field test and the main study to the PIAAC Consortium at least nine months prior to the commencement of field test data collection (for countries with a multi-stage area sample) or at least six months prior to the commencement of field test data collection (for less extensive designs, such as countries using a registry). The reports will consist of responses to a series of questions relating to the sections of the PIAAC Technical Standards and Guidelines. (See Annex 3-1 outline.) Countries must specify the rationale for any deviations from the PIAAC standards. The PIAAC Consortium will provide its feedback to the country's planning report within two months after submission.

Standard 3.6.2 Countries will submit a second, final NSDPR to the PIAAC Consortium, reflecting any design and implementation changes resulting from the field test experience. This report must also specify the rationale for any deviations from the PIAAC standards. (See Annex 3-1 outline.) Sampling plans must be submitted at least seven months prior to the main study, and the remaining NSDPR chapters (except weighting and nonresponse bias analysis) are due five months prior to the main study. Weighting and nonresponse bias analysis plans must be submitted at least one month prior to the start of the main study. The PIAAC Consortium will provide its feedback to the country's planning report within two months after submission.

Quality Control Procedures

The Consortium will review each country's field test and main study NSDPR before the field test to ensure that the proposed plans are methodologically sound and satisfy PIAAC standards. The Consortium will provide feedback regarding the acceptability of the preliminary plans. Any concerns will be communicated to the countries.

The Consortium will review each country's revised NSDPR before the PIAAC main study and will follow the same quality assurance protocol specified above.

3.7 FIELD TEST

Purpose

To provide data that can be used to inform the evaluation of all key aspects of PIAAC: the assessment and questionnaire items, modes of administration, translations, sample design and selection, data collection procedures, data capture and scoring, and data processing and delivery.

Rationale

The field test will give participating countries experience with instrument administration, sample selection, and overall data collection and post-data collection activities. It will provide empirical evidence for assessing all major PIAAC components and activities before the main study. The overall performance of items from the background questionnaire (BQ), assessment, and national and international options will be evaluated; that is, items that do not appear to be performing as expected will be examined and either revised or replaced. Errors that may have occurred during item translation and adaptation also will be corrected.

Standards, Guidelines and Recommendations

Standard 3.7.1 Each participating country must conduct a field test, prior to the PIAAC main study.

Guideline 3.7.1A Because this is the first round of PIAAC, the field test will, to the extent possible, serve as a dress rehearsal of all aspects of the main study. The field test can also be used to experiment with alternative procedures, as long as the added experiments do not in any way impact the main objectives of the field test. Participating countries should include any experimental plans in the field test planning report (see Section 3.6) and submit it to the Consortium for approval.

Guideline 3.7.1B All assessment and questionnaire items, including instrument translation and adaptation, will be evaluated.

Guideline 3.7.1C Survey sampling activities, including sample design and selection, will be evaluated.

Guideline 3.7.1D All survey operational procedures, including interviewer training and interview administration, will be assessed.

Guideline 3.7.1E The field test will be conducted in households to test the administration of the instruments in a household setting.

Guideline 3.7.1F Quality control forms and procedures will be developed and tested.

Guideline 3.7.1G The field test will be used to evaluate scoring procedures, including scoring standards and scorer training for paper-based instruments and automated scoring procedures for the computer-based instruments.

Guideline 3.7.1H Data capture, data processing, data delivery and data reporting activities will be evaluated.

Guideline 3.7.1I At the conclusion of the field test, each country will collect information from interviewers about the issues they encountered during data collection. The BQ Expert group has

developed a special questionnaire for this purpose at the end of the BQ (referred to as Interviewer Observation items, or section ZZ). A country may choose to add questions to serve its purpose.

Standard 3.7.2 The standards and guidelines in this document must be followed for the field test, with the following exceptions.

Guideline 3.7.2A A representative sample is not required for the field test, but the field test should pilot the aspects of probability sampling to be used for the main study. The sample must come from the same target population as the main study and must meet the requirements of the psychometric testing. In addition, countries with a sample design involving a household sampling stage are required to test the within-household sampling procedures during the field test.

Guideline 3.7.2B The sampling frame used for the field test is not required to cover 95% or more of the core PIAAC target population, but it should include all major analytic subgroups of interest.

Guideline 3.7.2C The field test sample will consist of a minimum of 1 500 completed respondents per reporting language. Countries that plan to report on general proficiency, regardless of the languages tested, should achieve a minimum completed sample size of 1 500 respondents for their main language. In addition, there is a requirement that a minimum of 1 300 respondents pass the information and communication technology core and, as a result, be randomly assigned to and complete one set of field test main task instruments. Thus the overall sample size may have to exceed 1 500 for some countries. No increase in the field test sample size is required for oversampling of subgroups within the core PIAAC target population.

Guideline 3.7.2D The definition of a *complete* is different for the field test and main study. For the field test, a case is considered complete if it has gone through the Core instrument and the Main task instrument, even if all are failed.

Guideline 3.7.2E There is no minimum response rate goal for the field test, but countries should use the field test to evaluate their procedures for obtaining high response rates.

Guideline 3.7.2F No weighting or nonresponse bias analysis is required for the field test. However, countries are still required to deliver a sample design file (Standard 4.6.7). Countries performing their own weighting for the main study are encouraged to test the procedures during the field test.

Guideline 3.7.2G An additional set of disposition codes pertaining to the ICT core is needed for the field test. In assigning status codes for the ICT core, all countries must implement the list of approved PIAAC ICT core disposition codes as shown in Table 3-1.

Table 3-1. Disposition Codes for the ICT Module

Description	Code
Complete	01
Partial complete/breakoff	03
Refusal – sample person	04

Quality Control Procedures

The Consortium will review each country's National Survey Design and Planning Report before the field test and provide feedback as appropriate.

During the survey planning and data collection period for the field test, countries will be required, as part of the National Monitoring Report, to report on the status of all of the various survey activities, just as they will during the main study.

Each country must report the results of the interviewer debriefing to the Consortium.

The Consortium must produce a field test report which will examine the results of the field test and make recommendations for changes to field operations for the main study. The report will be published with sufficient lead time to ensure that participating countries have adequate time to implement all major recommendations.

ANNEX 3-1. NATIONAL SURVEY DESIGN AND PLANNING REPORT

The Consortium has developed forms to aid countries in the completion of the NSDPR. Country plans relating to sampling (chapter 4) and weighting (chapter 14) will be collected through a series of sampling plans forms. All other survey plans will be collected through a series of questions in an NSDPR form. The topics covered by the sampling plan forms and the questions in the NSDPR form are provided below.

1.   Introduction
Q1.1   Please describe your country's involvement, if any, in previous adult competency assessment surveys.
Q1.2   Do you plan to:
   a.   Oversample any populations in your country? If yes, please describe your plans.
   b.   Extend the age range beyond 65? If yes, please describe your plans.
   c.   Extend beyond the target population in any other way? If yes, please describe your plans.

2.   Ethics
Q2.1   Have you submitted your research plan and study materials to the appropriate institutional review board/ ethics committee for approval? If not, what is your plan for doing so?
Q2.2   What procedures do you plan to implement to report or document any breaches to the ethics standards?
Q2.3   Do you foresee requiring any (other) deviations from the Technical Standards and Guidelines relating to Ethics? If yes, please explain.

3.   Survey planning
Q3.1   Identify the leading survey institute that will be conducting the data collection. Name/ Address.
Q3.2   Describe the qualifications and expertise of the leading survey institute, including names, types and sample sizes of prior surveys conducted.
Q3.3   Have the key project team members at the leading survey institute been identified? If yes, provide key staff members' title/position and responsibilities. List as many as necessary.
Q3.4   What percentage of his/her time does the current NPM devote to PIAAC?
Q3.5   If the NPM devotes only a small percentage of his/her time to PIAAC, is there a designate who is also working on PIAAC? If yes, what percentage of his/her time does the designate devote to PIAAC?
Q3.6   Have you designated a National Sampling Manager (NSM) who is distinct from the NPM?
Q3.7   For what organisation does the NSM work? Q3.8   Does the NSM have a degree in statistics?
Q3.9   How many years of experience with household surveys does the NSM have?
Q3.10   Does the NSM have experience with… sample design, sampling frames, sample selection, weighting, nonresponse bias analysis?
Q3.11   Have you organized a national committee of leading professionals to offer advice to the project? Provide details on planned or proposed committee meetings/membership.
Q3.12   Have you organized groups of national subject area experts? Provide details on planned or proposed meetings/membership.
Q3.13   Do you foresee requiring any (other) deviations from the Technical Standards and Guidelines relating to Survey Planning? If yes, please explain.

4.   Sample design and selection
Plans, submitted via forms, cover the following topics: Target Population, Sampling Frame (including known exclusions), Sample Size, Sample Design, Sample Selection, Response Rates and Nonresponse Bias, Respondent Incentives, and Sample Monitoring

5.   Survey instruments

Q5.1   In the case of structural adaptations of questions and/or response categories of the international BQ, how will you convert the national-specific information into the international standard? Structural adaptations refer to adaptations that either change the content of the question (e.g. asking two questions instead of one) or the content of the response categories (e.g having 5 categories instead of 4). You can simply use an Excel file and import from the BQAS the relevant information followed by information on the conversion rule that will be applied.

Q5.2   Please provide an explanation if you expect to deviate from the required sample size of 1,500 completed cases for each reporting language in the field test and 5,000 completed cases for each reporting language in the main study (4,500 if you do not participate in the assessment of problem solving in technology rich environments).

Q5.3   Please provide requested information on QC procedures as appropriate for this planning period under the subsections in the TSGs, as shown in the outline below. In each subsection, please describe any deviations from the TSGs, or any concerns.

    5.3.1 Background questionnaire
    5.3.2 Country-specific supplemental background questionnaire items
    5.3.3 Assessments
    5.3.4 Psychometric assessment design
    5.3.5 Instrument requirements to facilitate data processing

6.   Translation and Adaptations

Q6.1   Please describe in one or two paragraphs the qualifications of the person appointed to co-ordinate translation activities at your National Centre. Is it the NPM or a different person? Did this person attend the session on PIAAC Translation/Adaptation Tasks?

Q6.2   Please describe in one or two paragraphs the steps taken to give training on PIAAC Translation/Adaptation Tasks to your translation team. Were you able to successfully use the training module provided by the Consortium? Were there any problems you wish to report or do you have suggestions for future re-editions?

Q6.3   Please advise whether you have liaised with other PIAAC National Centres sharing a common language (e.g., to borrow materials or share translations).

Q6.4   Did you follow the recommended procedure 6.2.1A? If not, please describe the alternative method you adopted**. Recommendation 6.2.1A** The recommended procedure for developing the national versions of the BQ is double translation by two independent translators followed by reconciliation.

Q6.5   Relating to the recommendation that follows, please describe the reconciliation procedure you used for the BQ; include information on the credentials and expertise of the reconciliator as well as other persons involved, and when and how all these people were consulted. **Recommendation 6.2.1B** It is recommended that the reconciliation process include review input by national experts in survey methodology and the various domains covered by the BQ. The reconciliation procedure needs to be documented.

Q6.6.   Please describe for each of the recommendations that follows, whether you followed it; if not, please describe what alternative methods you adopted for your cognitive instruments. **Recommendation 6.1.1A** The recommended procedure for developing the national versions is double translation by two independent translators, followed by reconciliation by a third translator. **Recommendation 6.1.1B** It is also recommended that translations be reviewed by a national panel of domain and/or survey experts.

Q6.7   In addition to the above responses, please provide requested information on noted QC procedures as appropriate for this planning period under the subsections in the TSGs, as shown in the outline below. In each subsection, please describe any other deviations from the TSGs, or any concerns not mentioned above.

    6.7.1   Cognitive test items (i.e., Literacy, Numeracy, Problem Solving in Technology Rich Environments, and Reading Components)
    6.7.2   Background questionnaire

7.   Information technology standards

Q7.1   Please describe in one or two paragraphs the qualification of your National IT Co-ordinator (IT-C). Alternatively a CV can be used instead. Is the NPM and the IT-C the same person?

Q7.2   Which PIAAC Meetings, both NPM and others, has your IT-C attended?

Q7.3   Did the NPM or IT-C of your country fill-in the document "PIAAC_NPM(2008_10_20b)IT_Questionnaire"? If not or if the computer hardware and software configuration of your systems changed in the meantime, please fill in this form. It covers all questions regarding the Hardware (Laptop Computer) Specifications Plan, Operating System Plan, Software and Hardware Configuration Plan and Country-Specific Management System Plan. The document can be found as an attachment to the NSDPR or on the PIAAC Sharepoint Site.

Q7.4   How will your country provide Technology Support to interviewers? Do you plan to use a ticketing system? How do you document technical problems which have arisen in your country?

Q7.5   In addition to the above responses, please provide requested information as appropriate for this planning period, on the noted QC procedures under the subsections in the TSGs, as shown in the outline below. In each subsection, please describe any other deviations from the TSGs, or any concerns not mentioned above.

    7.5.1   Qualifications of national information technology co-ordinator

    7.5.2   Hardware (laptop computer) specifications and minimum capabilities

    7.5.3   Operating system standards

    7.5.4   Software and hardware configuration standards

    7.5.5   Software interface standards for integration with country-specific management systems

    7.5.6   Software configuration management standards

    7.5.7   Central technical support standards

    7.5.8   Country-specific technical support standards

    7.5.9   Information technology documentation standards

8.   Field Management

Q8.1   Describe the planned field management structure for the data collection in your country. Include the roles/titles (e.g., field director, field manager, supervisor, interviewer), as well as the number of staff assigned to each role.

Q8.2   For each type of staff, indicate the number required for data collection. (Be sure to account for attrition.) Interviewers, Supervisors, Field managers, Field director.

Q8.3   What sources do you plan to use in hiring interviewers?

Q8.4   Describe the desired interviewer characteristics (e.g. number of years of survey experience, familiarity with computers, etc.).

Q8.5   Indicate which methods of communication among staff are proposed for data collection. [SELECT ALL THAT APPLY.] Scheduled weekly telephone calls, Email, Telephone, Hardcopy newsletters, Other (specify).

Q8.6   How will interviewers be paid? Hourly wage, Other (specify).

Q8.7   Do you foresee requiring any (other) deviations from the Technical Standards and Guidelines relating to Field Management? If yes, please explain.

9.   Training

Q9.1   Describe your proposed training approach for train-the-trainers, supervisor training, and interviewer training. For each, provide the following information: Training dates (given as number of weeks prior to data collection); Location of training (site and city); Number of hours of training; and Whether all trainees will be trained in one session or in multiple sessions (such as in various locations around the country).

Q9.2   Indicate the number of training staff required for the interviewer training session(s). Lead trainers, Assistant trainers, Technical support staff.

Q9.3   What background are the lead trainers for interviewer training expected to have?

Q9.4   Do you plan to conduct interviewer training session(s) in more than one language? If yes, which method will be used? [CHOOSE ONE.] One full interviewer training session will be conducted in each administration language, One full interviewer training session will be conducted in the primary national language, followed by abbreviated training and practice interviews in the secondary language for applicable staff only, Other (specify).

Q9.5   Do you plan to produce a home study packet? If yes, please specify the content of the home study packet and the proposed number of hours to complete it.

Q9.6   Do you anticipate any deviations from the training materials provided by the Consortium? If yes, specify.

Q9.7   In addition to the Consortium-developed materials, on what topics do you plan to develop country-specific materials (e.g., screening questions, management system)?

Q9.8   Do you plan to use an evaluation or certification technique at the conclusion of the training session(s) to ensure that the interviewers are prepared to work on the study?

Q9.9   If issues arise during data collection, how do you plan to retrain staff as needed?

Q9.10   Do you foresee requiring any (other) deviations from the Technical Standards and Guidelines relating to Training? If yes, please explain.

10.   Data collection

Q10.1   Do you plan to develop a separate screening instrument to identify eligible respondents? If yes, specify the items to be included.

Q10.2   What survey promotion and advance materials do you plan to use? Advance letters, Brochure, Endorsement letters, Study website, Study toll free telephone number, Newspaper articles, Television advertising, Radio advertising, Other (specify).

Q10.3   Do you plan to conduct initial household/respondent contact in-person, via telephone, or both?

Q10.4   Will the household/respondent contact information be collected in a hardcopy format, through an automated component of the field management system, or both?

Q10.5   What strategies do you plan to use for working difficult cases and dealing with nonresponse/maximizing response rates? [SELECT ALL THAT APPLY.] Reassignment to other interviewers, Follow-up by senior interviewers, Follow-up by supervisors, Traveling reassignment with experienced/specially trained interviewers, Tailored letters (apartment managers, locked buildings, refusal conversion, refusals, uncooperative respondent), Refusal conversion letters mailed to households via priority or certified mail, Other (specify).

Q10.6   Do you plan to use a respondent incentive? If yes, what type of respondent incentive will be used? [SELECT ALL THAT APPLY.] Monetary (Amount), Nonmonetary (Type).

Q10.7   Do you have an automated case management system in place that you are planning to use? If yes, indicate which functionality the management system will be able to support. [SELECT ALL THAT APPLY.] Case assignment to interviewers, Case transfer/reassignment among interviewers, Case reset to prior state, Removal of data from the laptop computer, Production of management reports, Documentation of contact attempts, Tracking interviewers' time and expense data, Other (specify). If no, do you plan to develop an automated case management system? If not, how will you perform the necessary tasks?

Q10.8   Will interview validation be conducted in-person, via telephone, or both? What percentage of cases will be validated? Do you plan to use the validation form provided by the Consortium?

Q10.9   Besides validation, what techniques will be used to monitor interviewer performance and other quality control procedures? Tape recordings, In-person observation, Automated reports, Other (specify).

Q10.10   Describe your proposed plans for handling interviewer attrition during data collection.

Q10.11   Do you foresee requiring any (other) deviations from the Technical Standards and Guidelines relating to Data Collection? If yes, please explain.

11.   Data processing

Q11.1   Do you intend to use other means than the Consortium provided software, scoring sheets, and procedures to i) record scored responses for the paper booklets and ii) enter these into the Consortium provided data integration software (i.e., importing scored responses from an external source file)? If yes, please thoroughly describe these procedures, systems, and formats.

Q11.2   Please describe the logistics and procedures to manage, securely store, and look-up any paper booklets, scoring sheets, or other materials relevant for data capture, processing, and cleaning.

Q11.3   Please identify for each level of education that is being used in the national BQ, the formal number of years it takes to complete that level of education. You can do this in an Excel file copying the relevant information from the BQAS and adding a column indicating the formal number of years needed to complete this level

Q11.4   Please describe how you will code occupation and sector of industry. Will you use a national classification or do you code directly into the international classification? If a national classification is used, is this provided by the National Statistical Agency? If a national classification is used, what is the conversion scheme to the international classification?

Q11.5   How will coders be trained?

Q11.6   Please describe how you will comply with the following standards and guidelines concerning the coding of education, occupation and industry information: **Standard 11.2.3** Data that have been manually coded will be 50% verified by another coder. The average error rate for manually coded data must not exceed

6%. **Guideline 11.2.3A** Each country should train approximately five coders. These coders should preferably have extensive experience in coding education and industry/occupation data from censuses or other large-scale surveys. Training materials should consist of a master set of descriptions with associated expert codes for the data to be coded. By the end of the coder training programme, the coder error rate should not exceed 6%. **Guideline 11.2.3B** Some countries may opt to utilise software for automated coding. However, since automated coding software is rarely able to successfully code 100% of the data, a manual coding operation will still be necessary. In this case, fewer manual coders may be required.

Q11.7   Please describe how you will comply with the following standards and guidelines concerning the scoring of the paper booklets in the field test and in the main study: **Standard 11.4.1** The number of qualified scorers hired and trained by each country must be sufficient so that the scoring can be completed within three to four weeks. **Guideline 11.4.1A** Each country will employ a sufficient number of scorers (a minimum of three) so that the scoring can be completed within three to four weeks.

Q11.8   In addition to the above responses, please provide requested information on noted QC procedures as appropriate for this planning period under the subsections in the TSGs, as shown in the outline below. In each subsection, please describe any other deviations from the TSGs, or any concerns not mentioned above.

11.8.1 Manual data entry, verification and reliability

11.8.2 Coding

11.8.3 Scoring paper-and-pencil instruments

11.8.4 Qualifications, hiring, training and supervision of scoring staff

12.   Data file creation

Q12.1   As a national research center, are you under any legal obligation or undertaking that prevents you from submitting the national PIAAC database to the Consortium following the national record layout, i.e. including all adapted or extended source variables prior to any necessary recoding to recover the international target layout? If yes, please describe these limitations.

Q12.2   Will any of the adaptations you have implemented in the BQ/JRA require recoding logic that you can either not share with the Consortium because of disclosure restrictions or that are so complex that the PIAAC Consortium cannot directly implement the recoding itself by using the nationally adapted or extended source variables? If yes, describe the affected adaptations and provide the plan to derive the internationally required target variables from the nationally adapted or extended variables and the documentation that will be created along with the recoding. Note: By 'complex', we refer to adaptations that require complex, possibly multi-step or fuzzy-logic transformations of data to the international target layout. In contrast, 'simple' adaptations are those that require only a relatively straightforward transformation such as summing two variables or recoding two or more national answer categories to one international one.

Q12.3   Can you assure that the National Data Manager is authorised to respond to queries from the Consortium for a minimum of three months after database delivery and able to respond to queries within three working days in order to resolve identified data discrepancies?

Q12.4   Please provide requested information under the section on QC procedures using the following outline. In each subsection, please describe any deviations from the standards and guidelines, or any concerns.

12.4.1 Processing and record layout

12.4.2 Data integration

12.4.3 Data verification

12.4.4 Delivery

13.   Steps to ensure data confidentiality and security

Q13.1   Report any confidentiality concerns that limits data sharing in the Sample Design International File.

Q13.2   Report any confidentiality concerns that limits data sharing in the Weighting International File.

Q13.3   Please describe the security standards regarding the laptops in your country in one or two paragraphs (e.g. Do you use an encryption software on your laptops? Are there group policies which limit user access? Does the interviewer have administrative control over the laptop? How is security on folder level realized in the host operating system of the laptops?)

Q13.4   Do your plans for preparing a confidentiality agreement or affidavit of disclosure include staff assigned to PIAAC work, including: IT coordinators; Translators; Field supervisors; Interviewers; Coders and scorers; or Data processing personnel? Please describe such plans.

Q13.5   Do you have plans to obtain and keep these signed statements on file? Please explain.

Q13.6   Describe your plans for training interviewers on the importance of data security.

Q13.7   Please describe how you plan to maintain the continued confidentiality and security of PIAAC assessment materials and respondent data during data capture, coding, scoring, and processing. More specifically, please indicate whether all of the work for capture, coding, scoring, and processing will be carried out within the premises and reach of the survey organization as recommended.

Q13.8   Please describe the rules or regulations affecting the disclosure and sharing of PIAAC response data in the BQ/JRA and its derived variables and codes for ISCED, ISCO, and ISIC.

Q13.9   As far as known or projected at the time you complete the NSDPR, list the variables affected by these rules and regulations and the intended or typically used methods for disclosure avoidance.

Q13.10   Please explain whether the legislative regulations and rules described above apply to none, any, or all of the following: i) the micro-data files used by the Consortium/OECD to validate the instrumentation during the field trial, ii) the micro-data files used by the Consortium/OECD to model scales and report on an aggregated level following the main study or iii) any micro-data files to be released for use by other countries participating in PIAAC or the general public.

Q13.11   Please describe whether the confidentiality measures described above can i) be implemented by the Consortium itself (e.g., a simple suppression of a variable) or whether ii) they will have to be implemented by you as the country due to either legal requirements or methods that are too complex to be replicated by the Consortium. For any measure implemented by you as the country, thoroughly describe the methods as well as the documentation that you will make available to the Consortium for the purpose of quality control.

Q13.12   In addition to the above responses, please provide requested information on QC procedures as appropriate for this planning period under the subsections in the TSGs, as shown in the outline below. In each subsection, please describe any other deviations from the TSGs, or any concerns not mentioned above.

    13.12.1   Sample design
    13.12.2   Information technology
    13.12.3   Translations
    13.12.4   Data collection
    13.12.5   Data capture, coding, scoring and processing
    13.12.6   Data file creation

14.   Weighting/estimation

Plans, submitted via forms, cover weighting and variance estimation procedures.

15.   Quality assurance and quality control

Q15.1   Please describe any additional quality assurance and quality control procedures that are not covered in this NSDPR.

Q15.2   Provide a one-page overall summary of your plans for quality assurance and quality control procedures in PIAAC.

4. SAMPLE DESIGN STANDARDS

4.1 TARGET POPULATION

Purpose

To ensure that the target population for PIAAC is clearly defined in each country and is consistent across countries.

Rationale

A clear and precise definition of the target population is necessary to ensure that adequate steps are taken to accurately cover the population(s) of interest in the sampling process in each participating country.

Standards, Guidelines and Recommendations

Standard 4.1.1 The core PIAAC target population consists of all non-institutionalised adults between the ages of 16 and 65 (inclusive) who reside in the country (whose usual place of residency is in the country) at the time of data collection. Adults are to be included regardless of citizenship, nationality or language.

> **Guideline 4.1.1A** The target population excludes adults in institutional collective dwelling units[4] (or group quarters) such as prisons, hospitals and nursing homes, as well as adults residing in military barracks and military bases. Full-time and part-time members of the military who do not reside in military barracks or military bases are, however, included in the target population. Adults in other non-institutional collective dwelling units (or group quarters), such as workers' quarters or halfway homes, are also included in the target population.

> **Guideline 4.1.1B** The target population includes adults living at school in student group quarters, such as a dormitory, fraternity or sorority. Refer to Recommendation 4.4.1 for suggestions on sampling such adults.

> **Guideline 4.1.1C** Age is defined as age at the time of the interview. For surveys with a screener stage, age is determined when the screener is conducted. For countries with registries, age at the midpoint of the data collection period will be used to define the sampling frame of age eligible persons. Suppose 1 December is the midpoint of data collection; then a person who is 16 to 65 years old on 1 December is age eligible.

> **Guideline 4.1.1D** Adults who are unable to complete the assessment because of a hearing impairment, blindness/visual impairment or physical disability are considered in-scope; however, they will be removed from PIAAC response rate calculations because the assessment does not accommodate such situations. (See Section 10.7 on disposition codes.)

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[4] Collective dwelling units, or group quarters, are ones in which unrelated residents live in a communal arrangement or in a building that is of an institutional or commercial nature. It is a building where the occupants live collectively for disciplinary, health, custodial work or other reasons. The occupants share facilities with each other to a greater or lesser extent. Group quarters can be institutional or non-institutional. Examples of institutional group quarters are prisons, hospitals and nursing homes. Examples of non-institutional group quarters are college dormitories, halfway homes and workers' quarters.

Recommendation 4.1.1 The target population can be expanded to include additional subpopulations of interest to the country, subject to approval by the Consortium. (See Section 4.5 for the standards on country-specific options.)

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and main study, countries will be required to define the target population and any country-specific subpopulations of interest.

4.2 SAMPLING FRAME

Purpose

To ensure that the sampling frame(s) is of high quality, provides acceptable coverage of the target population, and meets the requirements for sampling, location of selected population members, and estimation.

Rationale

The sampling frame is the list from which the sample is selected, and so the quality of the sampling frame affects the quality of the sample. Standards for sampling frames are necessary to minimise coverage error and ensure that adequate information is available for carrying out sampling, data collection, weighting, and nonresponse bias analyses. It is also important that exclusions be clearly specified and limited as much as possible so that no extensive biases are introduced as a result of undercoverage of the population.

Standards, Guidelines and Recommendations

Standard 4.2.1 The sampling frame should include 95% or more of the core PIAAC target population. That is, the undercoverage rate, combined over all stages of sampling, should not exceed 5%.

> **Guideline 4.2.1** Any exclusions to the core PIAAC target population, whether or not they exceed the threshold, must be reviewed and approved by the Consortium.

> **Recommendation 4.2.1A** Exclusions should be made only because of operational or resource considerations, for instance, excluding persons in hard-to-reach areas. Another example is if the survey is unable to locate and interview some persons at their registered address; countries might choose to treat such cases as excluded if they are unable to trace such persons after multiple attempts or if such persons are in locations that are practically impossible to reach (inaccessible). The country should try to identify exclusions before sample selection, to the extent possible.

> **Recommendation 4.2.1B** Countries should attempt to adjust for any undercoverage of the target population through benchmarking during the weighting process (see chapter 14).

Standard 4.2.2 The sampling frame at each stage should include any information necessary for sample design, sample selection and estimation purposes. It should include sufficiently reliable information to sample individual units and ultimately to locate individuals for the interview and assessment.

> **Guideline 4.2.2A** The sampling frame(s) must be up to date and must include only one record for each member of the target population. Special care must be taken to eliminate duplicate records in the situation where lists have been combined to create a sampling frame. Countries should assess the extent of duplication and the proportion of out-of-scope units on the frame and if necessary, develop a plan to correct these problems. In addition, countries must evaluate and develop a plan to address any undercoverage in the frame that was not addressed in the documentation of country-specific exclusions.

Guideline 4.2.2B The sampling frame(s) must contain variables for stratification, calculation of measures of size, weighting and nonresponse bias analysis. Variables for stratification and weighting nonresponse adjustments must be available for all records on the frame and must be variables that are correlated with proficiency, such as age and education.

Guideline 4.2.2C For multi-stage area sample designs in which a registry is not being used, listing procedures must be used to develop a frame of households within the selected geographic clusters.

Recommendation 4.2.2A Some countries may wish to use national population registries as a sampling frame, which contain useful variables for stratification, weighting, and nonresponse bias analysis. If the country has a list of residents that is of sufficient quality, no frame of households or household sampling is necessary. However, some countries' lists of residents might not be complete (*e.g.* the lists may exclude non-nationals/non-citizens), complicating their use as a sampling frame. The Consortium will decide whether the documentation provided by the countries meets coverage expectations and will follow up on any issue or dispute.

Recommendation 4.2.2B Multi-stage sample designs will require a sampling frame for each stage of selection. For multi-stage area designs, a frame of geographic clusters can be formed by combining adjacent geographic areas, respecting their population sizes and taking into consideration the travel distance for interviewers. The geographic clusters should be formed within states, provinces or other geographic boundaries for which the country wants to create estimates.

Recommendation 4.2.2C Refer to Appendix C of PIAAC-NPM(2009_03_06)SamplingWorkshop _Sampling Plan Part I.pdf for more information about household listing procedures used to create local area frames.

Recommendation 4.2.2D To address undercoverage in the local area sampling frame, missed structure and hidden dwelling unit[5] procedures can be implemented, as described in Appendix C of PIAAC-NPM(2009_03_06)SamplingWorkshop_Sampling Plan Part I.pdf.

Recommendation 4.2.2E Refer to Section 2.7 of Kish (1965) for more information on frame quality.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to describe the sampling frame, including the following information:

- Sampling frame exclusions from the target population, justifications for the exclusions and the undercoverage rate;
- Source of the sampling frame(s);
- Date of the last frame update and description of updating procedures;
- Any known frame problems, such as duplicates, out-of-scope units or undercoverage, and plans for addressing these problems;

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[5] A dwelling unit (DU) is defined as a room or a group of rooms used, or intended to be used, for living purposes. A DU must be suitable for permanent human habitation and must have:
  1. A private entrance either outside or from a common hall, lobby, vestibule or stairway inside the building. A private entrance is one that can be used without passing through the living quarters of someone else.
  2. Cooking, living, sleeping and sanitary facilities that the occupants of the dwelling do not have to share with any persons other than their own household members.
(Definition from Bermuda's Adult Literacy and Lifeskills Survey)

- Variables on the frame for stratification;
- Variables on the frame for calculating measure of size, if applicable; and
- Variables on the frame for weighting adjustments and nonresponse bias analysis.

Also, during sample selection, countries will be required to provide quality sample selection forms with DU or population totals from the frame and from an independent source, overall and by key frame variables (*e.g.* education).

This information will be used to perform several validity checks, including the following:

- All sampling frame exclusions from the target population will be questioned, even if the undercoverage adds up to less than the threshold (5%).
- The actual counts of frame units will be compared with external totals at the DU stage (for area samples or household registries) or the person stage (for person registries).

4.3 SAMPLE SIZE

Purpose

To establish minimum sample size requirements for each country, in order to meet the analysis goals of PIAAC.

Rationale

The minimum sample size required for the field test is based primarily on psychometric considerations. Without an adequate number of participants responding to each of the field-tested items in each assessed language, the Consortium would be unable to evaluate the fit of the item parameters across the languages used in each country. The country, along with the Board of Participating Countries and the Secretariat, would need to be willing to accept the very strong assumption that the item parameters for that country are the same regardless of language. Experience indicates that this assumption is often violated as a result of correctable technical deficiencies (*e.g.* translation errors or scoring inconsistencies), thereby increasing measurement error. The Consortium recommends that such compromises not be made during this first cycle of PIAAC, given the need to establish comparability across modes, time and participating countries. The field test also provides information on the equivalence of scoring standards and the translation accuracy of both instruments and scoring rubrics. Countries that do not participate in the field test will miss the opportunity to correct errors.

The psychometric requirements for the main study are the same as those for the field test. Adequate sample sizes are needed to establish stable item characteristics for each tested language in a participating country. The achievement of adequate minimum sample sizes for each tested language will also enable the Consortium to estimate separate population models. Population modelling is a critical step in obtaining appropriate proficiency values that will be used in describing the distributions of skills in a country and in reporting national and subpopulation data.

Standards, Guidelines and Recommendations

Standard 4.3.1 The minimum sample size requirement for the main study is 5 000 completed cases[6] per reporting language for the core target population, for a self-weighting (proportional to the population) core design. Countries that plan to report on general proficiency, regardless of the languages tested, should achieve a minimum completed sample size of 5 000 respondents for their main language. The minimum sample size for the field test is 1 500 completed cases for each national language reported.[7] (See Standard 5.6.1 and the associated guidelines).

> **Guideline 4.3.1** The overall goal of the sample design for the main study is to obtain a nationally representative sample of the target population in each participating country that is proportional to the population across the country (*i.e.* a self-weighting sample design). For the field test and the main study, countries will have the option to increase the sample size to obtain reliable estimates for groups of special interest (*e.g.* 16- to 29-year-olds) or for geographic regions (*e.g.* states and provinces) or to

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[6] A completed case is a defined in Standard 4.3.3.

[7] The Consortium recognizes that this sample size requirement could become a significant financial and operational burden for countries planning to have multiple reporting languages. In such cases, the countries in question will need to approach the Consortium, which will work with them to reach a solution that does not seriously compromise their ability to test the PIAAC procedures and the assessment in different languages or their ability to obtain the nationally representative sample that will allow the country to report its data.

extend the age range (*e.g.* 66+). However, the minimum sample size is for a self-weighting design, and any sample size attributable to oversampling, or to subgroups outside of the PIAAC target population, is additional.

Standard 4.3.2 As part of the National Survey Design and Planning Report process for the field test and the main study, each country must specify sample size goals for each stage of sample selection. Each country must also specify its assumptions about nonresponse and ineligibility rates and about design effects.

Guideline 4.3.2A The sample size should be adjusted to account for expected nonresponse. For example, if the overall response rate is expected to be 70%, then an initial sample of 7 143 persons must be selected for the main study. For countries with a screener, sample size goals should be constructed for the screener, to account for ineligibility and screener nonresponse, as well as nonresponse to the background questionnaire and the assessment.

Guideline 4.3.2B Sample size requirements must be increased for countries with highly clustered samples or with a high degree of variation in sampling rates due to either oversampling or variation in household size, if those countries are to retain the same level of precision as other countries. The target sample size should be increased if the predicted design effect – calculated in advance of data collection, and based on the assumed model – due to clustering and differential sampling rates is expected to be greater than 1.5. Refer to PIAAC-NPM(2009_03_06)SamplingWorkshop_Sampling Plan Part I.pdf for computational details.

Recommendation 4.3.2 It is difficult to predict the nonresponse and ineligibility rate for a survey like PIAAC. As a result, the Consortium encourages each country to consider selecting a reserve sample of about 10% of the size of the main initial sample. The reserve sample should be selected at the same time as the main sample. The reserve sample is then set aside and not used unless sample monitoring shows potential for shortfall. Reserve samples are recommended over supplemental samples, since computing the selection probabilities is simpler with a reserve sample than supplemental samples. The same concept can be used if a country is concerned about exceeding the target sample size by a significant amount. After selecting a 110% sample, the country could release to the field a sample that is less than 100%, by randomly selecting (subsetting) from the original sample, and then release more sample as needed.

Standard 4.3.3 A completed case is one that contains at least the following:

- Responses to key background questions, including age, gender, highest level of schooling and employment status; and
- A completed Core instrument (*i.e.* the interviewer asked the respondent all Core questions or the Core instrument was not completed for a literacy-related reason [*e.g.* because of a language difficulty] or because the respondent was unable to read or write in any of a country's PIAAC official languages); or
- Responses to age and gender for literacy-related nonrespondents to the BQ/JRA.

Guideline 4.3.3A Each country must verify that its sample data are consistent with the definition of a complete case. The country must also check disposition codes against available interview data to ensure consistency before delivering the data.

Guideline 4.3.3B For countries with screeners, age and gender are collected in the screener and may be allowed in the analysis for literacy-related nonrespondents (DISP_CI or DISP_BQ = 7, 8, or 9). For registry samples, age and gender must be verified by a household representative for literacy-related

nonrespondents to be considered in the analysis. The outcome of this verification must be provided in the Sample Design International File (see variables QCFLAG_LR, AGE_LR, and GENDER_LR in Annex 4-2). Countries should attempt to limit literacy-related nonresponse to less than two per cent of completed cases. This can be done through the use of interpreters (see Standard 10.3.5). Otherwise, completion results of such cases will be scrutinised. The cases will be assigned an imputed assessment score at the lowest level of proficiency.

There is no standard process for verification of age and gender for such literacy-related cases. Various options may include having the interviewer confirm with a household representative at the time nonresponse occurs so that it may be entered in case initialisation. Another option is to maintain a log with PERSID, first name, DISP_CI, DISP_BQ, confirmed age (AGE_LR), confirmed gender (GENDER_LR), and the status of the confirmation attempted (QCFLAG_LR). This information would then be provided to the Consortium via the SDIF for all literacy-related cases as given by DISP_CI and DISP_BQ.

Standard 4.3.4 Assessment instruments must be randomly allocated by the Consortium and administered in a manner that ensures that the minimum number of cases is targeted per task.

Quality Control Procedures

The response rate and ineligibility rate assumptions specified as part of the National Survey Design and Planning Report process for the field test and main study will be reviewed to help ensure that initial sample sizes are large enough to achieve the target sample size.

The Consortium will compare the sample data to the PIAAC disposition codes to verify that completed background questionnaires and assessments (as indicated by disposition code) have sufficient data.

4.4 SAMPLE DESIGN

Purpose

To specify the PIAAC sample design that will produce a probability-based sample, representative of the target population, in each participating country.

Rationale

Probability-based scientific sampling is essential for two main reasons. First, probability sampling encompasses a set of designs that leads to a variety of unbiased sampling approaches that allow analysts to generalise the results to the target population. Second, measures of precision related to survey estimates (*i.e.* standard errors, margins of error, confidence intervals) can be computed only under a probability design. Hence, statistical tests for differences between survey estimates are possible only under a probability-based design.

The aim in developing the sample design and the selection process is to achieve the maximum precision possible for a given sample size, while limiting the costs of data collection. The PIAAC core sample design will be a stratified multi-stage clustered area sample. Deviations from the core design are expected because some countries are geographically small, and therefore will have less clustering and fewer stages of sampling. Also, some countries will have lists of households or persons already available from national registries. The general approach will allow for flexibility in the sample design and will be adaptable to each country's best sampling scenario.

Standards, Guidelines and Recommendations

Standard 4.4.1 Each person in the PIAAC target population will have a non-zero probability of selection resulting from the application of established and professionally recognised principles of scientific sampling.

> **Guideline 4.4.1** As the ultimate sampling unit, each person in the PIAAC target population will have a calculable and design-based non-zero probability of selection. That is, every in-scope person will have a chance of being selected into the PIAAC sample.

> **Recommendation 4.4.1** Countries should determine how to sample adults living at school in a student group quarter. A student group quarter, such as a dormitory, fraternity or sorority, is a collective dwelling unit (DU) with a shared kitchen in which rooms are paid for through the school. If the country's sample design has a household stage of selection, the Consortium recommends sampling such persons through their permanent residence rather than their student group quarters. Under this design, student group quarters should be excluded from the household frame, to ensure that such persons have only one chance of selection. If a college student was selected as a respondent from the sampled household, the data collection contractor would have two options: 1) depending on the location and the availability of nearby staff, attempt to conduct the interview at the student's dormitory or 2) attempt to schedule an interview with the student at the sampled residence, at a time when s/he will be home from college. An alternative approach is to include college dormitories in the sampling frame and select students from sampled dormitories. Under this design, students residing in such dormitories must be excluded from the sampled households which are considered their permanent residence.

For students living in a housing unit while attending school, the housing unit should be considered their permanent residence. A housing unit is a DU that contains its own kitchen and for which the student pays a realty company or landlord.

Standard 4.4.2 The sample design at each stage of sampling will be probability based to allow an overall probability of selection to be derived for each person. Hence, non-probability designs, such as quota sampling[8] and the random route approach,[9] are not allowed at any sampling stage.

Guideline 4.4.2 A multi-stage cluster sample is necessary when a complete listing of eligible persons or households is not available. In multi-stage cluster sampling, geographic clusters are formed and selected, giving each cluster a probability of selection. Within sampled clusters, a local registry of persons may be obtained. If no person registry is available, all households are listed and a sample of households is subsequently selected, giving each household a probability of selection. Within selected households, the eligible persons are listed and a sample of persons is selected, giving each eligible person a probability of selection. More information about multi-stage area samples is provided in PIAAC-NPM(2009_03_06)SamplingWorkshop_Sampling Plan Part I.pdf.

Recommendation 4.4.2A While cluster sampling reduces interviewer travel costs for in-person visits, it does have an increasing effect on sampling variance. Countries need to evaluate the cost-variance trade-offs of using a cluster sampling design; as an example, Kish (1965) outlines such evaluations.

Recommendation 4.4.2B Stratification is used to reduce the sampling variance associated with the resulting survey estimates. Stratification combines sample units into homogeneous groups and eliminates sampling variability between such groups. To maximise the benefit of stratification, stratification variables should be reliable and related to the survey outcome. Examples of stratifiers related to proficiency are geography, urbanicity, education, income, age, language, employment status and gender.

Standard 4.4.3. The core design is a self-weighting design of households (or of persons, for countries with person registries). A self-weighting design is typically achieved when each sample household (or person, if not sampling DUs) has an equal probability of selection.

Guideline 4.4.3 A self-weighting design is arrived at differently depending on the number of stages of sampling and whether or not one of the stages of selection consists of households.

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[8] Quota sampling is a non-random approach in which data collection stops when a target sample size is reached, even if all sample units have not been fully worked. Therefore, some bias is introduced into the sample because not all sample units were given a chance of selection.

[9] The random route approach is used for selecting households. The general approach is to have a master sample of starting points for each cluster. Then households are selected in the field using a pre-specified list (the 5th household, the 15th household, etc.) and a pre-defined route. As discussed in Murray, Kirsch and Jenkins (1998), for the random route household selection approach, selection probabilities are not generally known, and therefore the resulting samples are not considered probability samples. Furthermore, random route designs require control of sample selection in the field, and there is concern that the interviewers exert influence on the household selections. Control of the selection process by each country requires detailed instructions for selecting respondents that can be dependably followed by the interviewers. The random route approach differs from a systematic sample in which households are selected from a sampling frame using a specified sampling interval, and the interviewers are given exact addresses to attempt. Systematic samples are probability samples and are allowed for PIAAC.

If there is one stage of sampling, an equal probability selection scheme (*e.g.* simple random sample, systematic sampling from a sorted list or the same sampling rates across strata) will result in a self-weighting sample design.

For designs with more than one sampling stage, sampling units are selected with probability proportional to size at each stage before the household stage (or person stage, for countries with registries). Then households (or persons) are selected with a probability assigned to arrive at self-weighting households (or persons, if not sampling DUs), as described in Kish (1965).

Recommendation 4.4.3 To arrive at an equal probability person design when first selecting households, persons would have to be sampled at a constant rate within a household. However, this approach is not preferred, because a portion of single-person households would be eliminated after screening and more persons than necessary would be selected from large households, resulting in a large clustering effect to the extent of the intracluster correlation within households. Therefore, the within-household sample size constraints are that at least one but no more than two persons are to be selected.

Standard 4.4.4 For countries with a household sample, the goal is to select one person per household. Depending on the variability of household size in the country, two persons may have to be selected from large households.

Guideline 4.4.4 Although the goal is to select one person per household, the selection of more than one person per household is preferred for countries with a large variation in household size. The selection approach should attempt to minimise costs, household burden, clustering effects and variability of the sample weights, while retaining full coverage and randomisation within households with unbiased results. The percentage of households with two sample persons should be kept relatively low (10% or less).

Recommendation 4.4.4A An example of a sampling rule that allows for the selection of two sample persons is to select one person in households with three or fewer eligible persons and to select two persons in households with four or more eligible persons. Countries should develop a rule that best fits their country. For example, the cost per screener and per interview/assessment may differ by country and may therefore affect the sampling rules within households. The intracluster correlation within households may differ across countries because of household composition. Therefore, the clustering effects that result from selecting one or two persons at random per household may have more impact in some countries than in others. The impact of within-household clustering on variances is reduced for multi-stage sample designs that have substantial variance contributions from prior stages of selection. Also, in general, differential sampling rates cause an increase in variances. For example, due to varying household sizes, a one sample person design will result in differential sampling rates. The impact of the one sample person design will vary by country depending on the distribution of household sizes.

Recommendation 4.4.4B A limit of two sample persons per household is recommended because of the household burden associated with the length of the interview and assessment.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, each country will be required to provide details of its country-specific PIAAC Sampling Plan. The plan will be reviewed for adherence to the above standards prior to approval.

4.5 COUNTRY-SPECIFIC SUPPLEMENTAL SAMPLES

Purpose

To describe potential country-specific supplemental sampling options and their implications for sample size.

Rationale

The target population for PIAAC includes non-institutionalised adults between the ages of 16 and 65. Given the interest in the youth population and its transition from education to work, some countries may be interested in oversampling youth (16- to 29-year-olds, for example). In addition, a country may include oversamples of other subpopulations or include additional subpopulations outside of the standard PIAAC target population (66- to 74-year-olds, for example).

Countries will need to increase the sample size to obtain reliable estimates for groups of special interest beyond the minimum of 5 000 completed cases for the main study core PIAAC sample. (See Section 4.3 on sample size.) Countries that decide to increase their sample size will need to develop and document processes to provide estimates at the regional level or to provide more detailed information about particular demographic groups.

Standards, Guidelines and Recommendations

Standard 4.5.1 Countries have the option to select an oversample of individuals who are within the scope of the PIAAC target population (*e.g.* those aged 16 to 29 or those in geographic regions such as provinces or states).

> **Guideline 4.5.1** The minimum sample size for the core self-weighting design (ages 16-65) is 5 000 completed cases and does not include the sample size associated with oversampling of subgroups. Interested countries should provide a sampling plan in the National Survey Design and Planning Report for their oversampling options for review and approval by the Consortium.

Standard 4.5.2 Countries have the option to select individuals outside the PIAAC target populations (*i.e.* ages 66 and older).

> **Guideline 4.5.2A** The minimum sample size for the core design (ages 16-65) is 5 000 completed cases and does not include the sample sizes associated with any subgroups outside the scope of PIAAC. Interested countries should provide a sampling plan in the National Survey Design and Planning Report for extending their sampling frame for review and approval by the Consortium.

> **Guideline 4.5.2B** If individuals outside the PIAAC target population are included, countries must develop specifications for any necessary augmentation of the sample size to accommodate the analysis requirements for these additional subsamples.

Standard 4.5.3 All activities associated with the design and selection of country-specific samples are the responsibility of the country. The Consortium will review the country-specific options to ensure that they do not affect the core sample design in any harmful way (*i.e.* sample yield, response rates, etc). The country-specific samples must adhere to the standards outlined in this document.

Standard 4.5.4 Response rates must exclude cases outside the scope of the core target population for PIAAC.

> **Guideline 4.5.4** When computing response rates, countries must exclude cases that are outside the scope of the core PIAAC target population. For example, if data are collected for those aged 66 and older, these individuals must be excluded from response rate computations.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, each country will be required to outline any special circumstances that deviate from the core target population and sample design. The report must be submitted to the Consortium for approval.

4.6 SAMPLE SELECTION

Purpose

To specify procedures for selecting a probability-based sample from the PIAAC target population following the sample design of PIAAC.

Rationale

The samples that are selected at each stage of sampling must be verifiable, *i.e.* the same sample would be selected if the same sampling procedures were repeated. Errors in sample selection will produce a bias in survey estimates; therefore, the Consortium must approve each country's sample design plan and countries must conduct checks at each stage of sample selection.

Standards, Guidelines and Recommendations

Standard 4.6.1 The sampling unit at each stage of selection must be clearly defined.

> **Guideline 4.6.1** Units such as dwelling, household and usual residence[10] must be defined clearly by the countries to determine whether or not the sampling unit is in scope for the target population.

> **Recommendation 4.6.1** The country-specific census definitions (or national statistical standards) should be consulted where available.

Standard 4.6.2 No substitution of sampling units will be allowed.

> **Guideline 4.6.2** Replacement of sampling units at any stage of sampling is not allowed. If the selected person is unavailable, the interview may not be conducted with a non-selected family member, neighbour or anyone else.

Standard 4.6.3 For sample designs involving household sampling, persons must be selected from within households using a fully enumerated grid of household members.

> **Guideline 4.6.3A** A full enumeration grid of household members must be completed to allow for a thorough and systematic approach to determining the eligibility of household members. If full enumeration is not used, there is a greater chance of missing eligible household members. Full enumeration also facilitates the collection of specified variables (*e.g.* age and gender) for each person, which can be used in a weighting adjustment for nonresponse.

> **Guideline 4.6.3B** The "most recent birthday" method (or, similarly, the "next birthday" method) must not be used to select a person from a household. For the "most recent birthday" approach, the respondent is first asked how many eligible persons are in the household and is then asked which of these respondents had "the most recent birthday." The person with the most recent birthday is selected. Because a full household enumeration is not conducted using these approaches, no screener data are captured (*e.g.* age and gender) that could be useful for person-level nonresponse adjustment during the weighting process. In general, the birthday approaches have an inherent lack of correlation between

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[10] The place of usual residence is the geographical place where the enumerated person usually resides. This may be the same as, or different from, the place where s/he was present at the time of the census or his/her legal residence. (UN definition)

birth month and the eligible-person characteristics of interest; however, if such a correlation exists, it will result in a bias in the estimates. Another concern about the birthday approach is that it depends upon how accurately the respondent remembers the birthdays of the household members (90% according to O'Rourke and Blair [1983] and 75% according to Lavrakas and Bauman [1993]). See the Cross-Cultural Survey Guidelines (http://ccsg.isr.umich.edu/pdf/fullguide061108.pdf) for more discussion of the birthday approaches. The authors of the Cross-Cultural Survey Guidelines express concern that the person who is first contacted will be more likely to say that s/he had the most recent birthday or will have the next birthday.

Recommendation 4.6.3 For countries implementing a paper screener, one operational approach is to select one or two persons per household using Kish-style grids (Kish, 1965). Countries using computer-assisted screeners may use Kish-style grids or write computer code to assign random numbers to each eligible person and then select the person(s) associated with the smallest random number(s). To select two persons, the eligible persons should be sorted by age and gender or other screener variables, and then two persons should be selected systematically with a random start. More information about within-household sampling is provided in PIAAC-NPM(2009_03_06)SamplingWorkshop_Sampling Plan Part I.pdf.

Standard 4.6.4 For the field test, the Consortium will randomly pre-assign assessment instruments to households or persons (depending on the country's sample design) to meet the needs of the psychometric testing. For the main study, the random assignment will be done through the virtual machine (VM).

Guideline 4.6.4 For the field test, a random systematic approach will be used to assign assessment task instruments to sampled households (or sampled persons). The assignment should be included in the survey management system. Refer to PIAAC-NPM(2009_03_06)SamplingWorkshop_Sampling Plan Part I.pdf for further explanation of the random systematic approach.

Standard 4.6.5 At the end of each stage of selection, countries will complete a sample selection quality control form to help the Consortium verify that the sample selection process was conducted accurately.

Standard 4.6.6 At the end of sample selection, each country will construct a survey control file. The survey control file will have a record for each sampled household for countries with household samples, and will have a record for each sampled person if persons are selected directly from a registry.

Guideline 4.6.6 At a minimum, the survey control file must include a unique ID for each record, country ID, location information, booklet type random pre-assignment (field test only), identification of sample analysis groups (e.g., language areas), sampling strata and sampling units at different stages, probabilities of selection, and other sampling or frame information. Not all survey control file contents will need to be loaded into the study management system to support the data collection effort. The contents needed are shown in the Survey Control File Layout in Annex 4-1.

Standard 4.6.7 At the end of data collection, each country will provide sample selection data for each sampled unit, including sampling strata, probabilities of selection, ID variables, disposition codes and auxiliary variables for weighting adjustments. (See the Sample Design International File Layout in Annex 4-2.)

Guideline 4.6.7 The sample design international file layout must be followed if a country is to stay on schedule for the weighting process. The sample design file consists of all sampled persons and any

nonrespondent sampling units (*e.g.* households) from the prior stage. For example, a household design with a screener would require a sample file consisting of all sampled persons, as well as all sampled households that did not select a sampled person through the screener. The contents of the sample design international file will consist of data from the survey control file and the study management system.

Recommendation 4.6.7 Throughout the data collection period, it is recommended that countries perform edits checks on the data collection variables that will be included on the sample design international file. Examples of edit checks include checking for consistency among disposition codes at the screener-level (if applicable) and BQ-level, verifying the sampling of persons, and confirming that the requirements for a completed case, as given in Standard 4.3.3, are satisfied.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide sample selection plans. Also, countries will be required to complete quality control sample selection forms, which will collect sampling information for each stage of selection, using sampling information templates. The templates will be designed to capture aggregated information that is necessary for verifying that the sample is representative of the target population and that sampling was conducted in an unbiased and randomised way. At each stage, countries will be asked to estimate the total target population within each stratum so that distributions by stratum can be reviewed at each sampling stage. Countries should gather the following information <u>for each stage of selection</u>:

- A list of variables used for stratification and their categories;
- Procedures used to construct the sampling frame and to stratify and select sampling units;
- The definition of sampling unit;
- Data sources used for forming sampling units;
- Average, minimum and maximum cluster size;
- List of certainty units,[11] such as large primary sampling units;
- Measure of size for the sampling units, as well as minimum measure of size;
- A description of units collapsed to obtain the minimum measure of size;
- Sample selection tables that provide the following details:
  - Target population totals for geographic areas;
  - Number of sampling units on the frame for each level of stratification;
  - Total measure of size on the frame for each level of stratification;
  - Actual sample size for each stratum, for certainty and noncertainty units;
  - Weighted sample estimates for each level of stratification and by geographic area, where the weight is equal to the inverse of the overall selection probability for the sampling unit of the current selection stage;
  - Listing of the first 200 records on the sampling frame in sort order, with indicators of which units were selected and their measure of size.

For the field test, a frequency check should be run on the allocation of assessment instrument types to sample units to help verify that the instruments were allocated appropriately.

The actual sampling information provided by the country (such as stratification variables, clusters, sample sizes and stages of sampling) will be checked against the information given at the time of sample design.

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[11] Certainty units are sampling units with a probability of selection equal to 1. This occurs most often when selecting primary sampling units, which are geographic clusters.

4.7 INDICATORS OF SURVEY QUALITY -- UNDERCOVERAGE BIAS, NONRESPONSE BIAS AND RESPONSE RATES

Purpose

To establish indicators to measure the quality of PIAAC survey data with respect to representation of the target population, and to provide standard procedures for measuring these indicators.

Rationale

Under ideal situations, every eligible adult in the target population would have a non-zero chance of selection in a national sample, would be located and would agree to participate in the study. In practice, these circumstances are not realised in any survey population. There is a potential for bias whenever part of the target population is excluded from the frame or sampled persons who did not participate in the survey have different characteristics than those who did. For some important characteristics, the respondents may be substantially different from the rest of the target population, resulting in biased outcome estimates.

While there have been studies (such as by Keeter *et al.* [2000] and Curtin, Presser and Singer [2000]) suggesting that nonresponse rates are not as strongly related to nonresponse bias as previously thought, it is well understood that when response rates are low, there is a greater chance for nonresponse bias. The extent of nonresponse bias depends on many survey conditions, including the differential impact that the likelihood of response has on the bias of each of the survey outcomes. It is, therefore, critical to evaluate the potential for nonresponse bias, as a quality check on the estimates, at the conclusion of the data collection. Similarly, undercoverage bias (due to exclusions) can be substantial if the undercoverage rate is high and the difference in proficiency levels between adults included in the sample and those excluded from the frame is relatively large. Standard 4.2.1 sets the maximum allowable exclusion rate at 5% to guard against high undercoverage bias in PIAAC estimates. Given the relationships between bias and undercoverage and response rates, countries must keep the exclusion rates low and implement procedures to reduce the potential for nonresponse bias and attain high response rates.

There are several ways to reduce the potential for nonresponse bias. First and foremost is to plan and implement field procedures that obtain a high level of cooperation. It is also critical to monitor the distribution of the sample during data collection to ensure steps are taken to reduce the potential for bias as much as possible (see Section 4.9). As discussed in Groves (2006), as nonresponse rates increase, one needs to actively seek auxiliary data to reduce the impact of response propensities on the survey estimates. These auxiliary variables can then be used in weighting adjustments for the purpose of reducing nonresponse bias.

Although sample weight adjustments based on auxiliary data are effective in reducing nonresponse bias, they are not considered as replacements for a vigorous effort to achieve the highest response rate possible. Response rate is a valuable data quality measure and the most widely used indicator of survey quality. A high response rate increases the likelihood that the survey accurately represents the target population, and a low response rate reflects the possibility of bias in the outcome statistics.

It is important that all countries use the same approach to computing response rates in order to assess the quality of the resulting estimates. All response rate computations must use the same definition of a completed case and the same response rate formulas.

Standards, Guidelines and Recommendations

Standard 4.7.1 Response rates will be computed for the following stages of data collection, using a standard formula:

- Screener (only for countries that need to sample households before selecting respondents)
- BQ/JRA
- Assessment (without reading components)
- Reading components

Guideline 4.7.1A The standard response rate formula uses the disposition codes provided in Section 10.7. The computations at each stage are hierarchical; that is, they depend on the response status from the previous data collection stage. Persons with codes equal to 27 (duplicate) for their respective data collection stage must be excluded from their respective response rate calculation. Detailed formulae are given in Annex 4-3.

Guideline 4.7.1B For purposes of calculating the BQ/JRA response rate, a completed BQ/JRA is one that contains responses to at least the key background questions: age, gender, highest level of schooling and employment status.

Recommendation 4.7.1 Refer to Standard 4.3.3 for the definition of a completed case.

Standard 4.7.2 The overall response rate will be computed as the product of the response rates for the stages included in data collection.

Guideline 4.7.2 For countries with a screener questionnaire, the overall response rate is the product of the response rates for the screener, BQ/JRA and assessment. For countries without a screener, the overall response rate is the product of the response rates for the BQ/JRA and the assessment.

Standard 4.7.3 All response rates must be weighted by the household base weight, in the case of a screener response rate, and by the person base weight, in the case of a BQ/JRA or assessment response rate.

Guideline 4.7.3 The base weights will account for any oversampling conducted within countries, and therefore weighted response rates will be a comparable measure across countries.

Standard 4.7.4 A minimum overall response rate of 70% is the goal.

Guideline 4.7.4A Data from all countries with a minimum response rate of 70% will generally be included in international indicators and reports unless sample monitoring activities (discussed in Section 4.9) and/or nonresponse bias analyses (discussed in Standard 4.7.6) indicate serious levels of bias in the country data.

Guideline 4.7.4B Unless problems resulting from response rates of between 50% and 70% are compounded by other factors, such as undercoverage bias, results from countries with such response rates will typically be included in international indicators and reports (in which case the OECD Secretariat will prepare for the Board of Participating Countries a specific recommendation on the use and annotation of country results). Deviations from the international standards on response rates will, however, be documented in the international reports and publications.

Guideline 4.7.4C Results from countries with response rates below 50% will not be published unless the country can provide the OECD Secretariat with evidence that the potential bias introduced by the low response rates is unlikely to be greater than the bias associated with response rates of between 50% and 70%. (See Standard 4.7.6 on evaluating nonresponse bias.) The OECD Secretariat will examine this evidence, along with estimated undercoverage bias, and prepare a recommendation to the BPC on the use and annotation of the country results. The costs for this examination will be borne by the individual country and will not be charged to the general PIAAC budget.

Recommendation 4.7.4 The data collection standards in Section 10.5 include ways to help reach the response rate goal. In addition, the Consortium is available to consult with countries that experience response rate difficulties.

Standard 4.7.5 Countries with any unit nonresponse will be required to conduct a basic nonresponse bias analysis and report on the results. The basic analysis will be used to evaluate the potential for bias and to select variables for nonresponse weighting adjustments.

Guideline 4.7.5A The analysis will involve an evaluation of the relationship between response status and available auxiliary variables. (See Standard 14.5 for the requirements on nonresponse adjustment variables.)

Guideline 4.7.5B A logistic regression analysis or classification tree algorithm should be conducted for this evaluation of potential bias, to incorporate interactions between the auxiliary variables as well as main effects.

Recommendation 4.7.5A The evaluation can be performed using base weights (*i.e.* weighting each unit by the inverse of its selection probability) to reflect differential sampling weights.

Recommendation 4.7.5B Registries and other frame listings may contain useful variables for the nonresponse bias analysis.

Standard 4.7.6 Countries will be required to conduct and report the results of a more extensive nonresponse bias analysis for:

- All stages of data collection (screener, background questionnaire/job requirements approach module, assessment without reading components, reading components) with less than an 80% response rate;
- The overall sample if the overall response rate is less than 70%.

Guideline 4.7.6 Some possible analyses include:

- A comparison of estimates to external totals;
- A comparison of response rates by demographic subgroup;
- A comparison of respondents and nonrespondents on auxiliary variables;
- A logistic regression model of the relationship between response status and auxiliary variables;
- A comparison of estimates before and after weighting adjustments;
- Correlations between weighting adjustment variables and proficiency measures;
- A comparison of "late" or "hard-to-contact" respondents to "early" or "easy-to-contact" respondents;
- Calculation of the range of potential bias. (Refer to the PIAAC Nonresponse Bias Analysis Plan for a description of this estimate.)

Recommendation 4.7.6A The analysis should include some auxiliary variables not used in the weighting adjustments.

Recommendation 4.7.6B Refer to Van de Kerckhove, Krenzke and Mohadjer (2006) for examples of unit nonresponse bias analyses.

Recommendation 4.7.6C One option countries may consider is a nonresponse follow-up procedure. This procedure requires following up with a set of nonrespondents and then comparing the characteristics of the follow-up respondents to those of the original set of respondents to assess nonresponse bias. One possible nonresponse follow-up procedure is to ask nonrespondents a brief set of questions related to background questionnaire items such as current employment status and reading activities (e.g. how often read letters, memos, or emails).

Standard 4.7.7 Countries will be required to compute item response rates and conduct an item nonresponse bias analysis for any background questionnaire items with response rates below 85%.

Recommendation 4.7.7 Respondents and nonrespondents to the item can be compared on other background questionnaire items that were completed by all or almost all (99.9% or more) respondents to the survey.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their planned response rate computations and outline a strategy for assessing nonresponse bias. Also, during the data collection period, countries will be required to submit periodic quality control monitoring forms showing the number of completed cases, the number of cases worked, response rates and expected yield (refer to Section 4.9 for more details). The report will be reviewed by the Consortium so that any concerns can be addressed.

After data collection, countries are required to conduct the nonresponse bias analysis, and the results will be reviewed by the Consortium and reported to the country and OECD.

4.8 RESPONDENT INCENTIVES

Purpose

To increase response rates by offering sampled adults some incentive for participating in PIAAC and for attempting the assessment.

Rationale

Respondent incentives have been shown to be effective for improving response rates without affecting the respondent's performance. As a result, the use of incentives can potentially reduce bias in the estimates. See, for example, Mohadjer *et al.* (1997) and Singer (2002). Because the effectiveness of incentives will vary by country, each country should choose what works best for its situation.

Standards, Guidelines and Recommendations

Standard 4.8.1 Each participating country may opt to provide a "modest" incentive to obtain respondent co-operation, such as a monetary or non-monetary incentive (*e.g.* pen, notepad, candy, mug, voucher, gift certificate). However, the planned incentive must be approved by the Consortium.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to specify whether or not incentives will be used and, if so, the type of incentives.

4.9 SAMPLE MONITORING

Purpose

To produce a plan for countries to use in monitoring the sample during data collection, to allow timely reaction to any developing shortfalls or other potential for bias in the outcome sample.

Rationale

Close monitoring of the sample is critical to the success of the data collection effort. The sample monitoring process can help countries identify potential shortfalls in the sample, problems in achieving the desired response rate and potential for nonresponse bias in the collected sample. Continuous monitoring of the sample will allow countries to employ procedures to address these problems during data collection, while it is still possible to meet goals associated with sampling and data quality.

Standards, Guidelines and Recommendations

Standard 4.9.1 Each participating country will provide completed periodic quality control monitoring forms during data collection to the Consortium. The report must contain the number of cases completed, the number of cases worked, response rates and expected yield.

> **Guideline 4.9.1A** The forms will follow a template provided by the Consortium.

> **Guideline 4.9.1B** Sample monitoring must begin the first week of the data collection process so that potential problems can be identified and corrected as soon as possible.

> **Guideline 4.9.1C** Response rates must be computed for each data collection stage. (See Section 4.7 for guidelines on response rate calculations.)

> **Guideline 4.9.1D** Response rates and sample yield must be monitored according to key demographics, such as age and gender. This will help countries identify potential shortfalls for specific subgroups, which could result in biased estimates.

> **Guideline 4.9.1E** The distribution of assessment instruments must be monitored to ensure that the assignment will meet the needs of the psychometric testing.

> **Guideline 4.9.1F** Toward the end of data collection, after the standard data collection protocol has been exhausted for all cases, a more extensive sample monitoring report can be generated to identify subgroups with low response rates. The subgroups should be formed according to demographic or area-level characteristics believed to be related to proficiency. Multivariate techniques, such as a classification tree algorithm, are recommended for this evaluation. To the extent that proficiency levels differ among the subgroups, the differential response rates could be an indicator of potential nonresponse bias. The subgroups with low response rates, or areas containing these subgroups, can then be targeted for follow-up efforts to address the potential for nonresponse bias. See, for example, Krenzke, Van de Kerckhove and Mohadjer (2005).

> **Recommendation 4.9.1** To help countries anticipate shortfalls, sample size and response rate projections should be approximated using three sources of information and three independent methods.

Method 1. Use finalised cases and assumptions for interim cases and cases not yet worked, to predict the results at the end of the data collection period. For example, the projected number of completes can be estimated as:

Projected # completes = Current # completes + (refusal conversion rate) × (# of interim refusals) + (completion rate) × (# of other interim and not worked cases)

This simplified formula should be refined based on the country's assumptions about completion rates for each type of interim code.

Method 2. Prior to the start of data collection, establish goals for the number of cases to reach at the end of each month. At the end of each month, compare these goals with the actual counts.

Method 3. Request that the field director or field managers estimate the number of completes that could be reached at the end of data collection, given the amount of work left to do in the field and the current field conditions as they relate to interview performance and types of initial nonresponse.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their sample monitoring process.

During the data collection period, countries will be required to complete quality control monitoring forms periodically as described above. The report will be reviewed by the Consortium so that any concerns can be addressed.

ANNEX 4-1. SURVEY CONTROL FILE LAYOUT

If households are selected, then the survey control file includes all sampled households. If persons are selected directly from registries, then this file includes all sampled persons.

A subset of this file will be loaded into the Study Management System (Section 10.6) for each country. The variable formats are at the country's discretion, but suggestions are provided below to make the format consistent with TAO and the Sample Design International File (SDIF).

Variable Name	Label	Format	Type	Comments
CNTRYID	Country ID	3	N	Required; ISO 3166 3-digit numeric codes.
CNTRY	Country ID and language sample	4	C	Optional; distinguishes samples that are to be analyzed separately, such as by language area.
CASEID	Household operational ID	9	N	Required if household sampling; subset of PERSID that will be assigned in screening; Does not include CNTRYID; Matches to other PIAAC databases when combined with CNTRYID; Blank if persons are selected from registries.
PERSID	Person operational identification number (ID)	12	N	Required if persons selected from registries; Does not include CNTRYID; Matches to other PIAAC databases when combined with CNTRYID; Blank if household sampling.
ID_MAJDES	Sampling ID: Major design stratum ID	2	N	Optional; Refer to Sampling Plan Part I for more information
ID_PSU	Sampling ID: Primary sampling unit (PSU) identification number	3	N	Blank if no PSU selection.
ID_SSU	Sampling ID: Second-stage sampling unit (SSU) identification number	3	N	Blank if no SSU selection, otherwise, it is sequentially numbered within PSUs.
ID_HH	Sampling ID: Household (HH) identification number	5	N	Required if HHs are selected; Blank if no household selection, otherwise a sequential number is assigned within geographic clusters.
ID_OTH	Sampling ID: Other unit identification number	5	N	Optional; This may be useful when an additional stage of sampling is conducted (*e.g.* addresses within second-stage units).

Variable Name	Label	Format	Type	Comments
PROB_PSU	First-stage sampling unit probability of selection	18.16	N	Required for multi-stage designs, as appropriate; blank for one-stage designs.
PROB_SSU	Second-stage sampling unit probability of selection (within prior-stage clusters, if applicable)	18.16	N	Required for multi-stage designs, as appropriate; blank for one-stage designs.
PROB_HH	HH probability of selection (within prior-stage clusters, if applicable)	18.16	N	Required if household sampling; blank for one-stage designs.
PROB_PERS	Person probability of selection (within HHs, if applicable)	18.16	N	Required if persons selected directly from registries.
PROB_OTH	Other stage sampling unit probability of selection	18.16	N	Optional; blank for one-stage designs.
STRAT_PSU	Explicit strata used for stratifying PSUs (or persons if one-stage design)	5	N	Required if stratification is used
STRAT_SSU	Explicit strata used for stratifying SSUs	5	N	Required if stratification is used
STRAT_HH	Explicit strata used for stratifying HHs	5	N	Required if stratification is used
SORT_PSU	Sort order for PSU selection (or persons if one-stage design)	5	N	Required if systematic sampling
SORT_SSU	Sort order for SSU selection	5	N	Required if systematic sampling
SORT_HH	Sort order for HH selection	5	N	Required if systematic sampling
ADDRESS1	Address line 1		C	
ADDRESS2	Address line 2		C	
ADDRESS3	Address line 3		C	
CITY	City Name		C	
JURISDICTION	Name of state, province, etc		C	
ADDRESS4	Address postal area number		C	For example, zip code
PHONE	Telephone number		N	
HIDD_DU	Hidden dwelling unit (DU) Flag	1	N	Required if applicable; Flag for the hidden DU procedure to reduce undercoverage bias; 0=false, 1=true
GQ_FLAG	Group Quarters structure flag	1	N	Required; 0=false, 1=true
GEONAME1	Geographic area name 1		C	PSU name
GEONAME2	Geographic area name 2		C	SSU or county name

Variable Name	Label	Format	Type	Comments
BOOKLET_SP1	Booklet type if sample person (SP) 1 passes the ICT core	2	N	Required for field test
PAPER_SP1	Paper booklet type if SP 1 fails the ICT core	2	N	Required for field test
BOOKLET_SP2	Booklet type if SP 2 passes the ICT core	2	N	Required, for field test, if two sample persons are allowed in a dwelling unit.
PAPER_SP2	Paper booklet type if SP 2 fails the ICT core	2	N	Required, for field test, if two sample persons are allowed in a dwelling unit.
QCFLAG_ASSIGN	Quality control flag	1	N	Required; 0=not selected, 1=selected
SUBSAMP	Subsample flag	1	N	Required; 1= original sample (first release), 2= released sample #2 3 = released sample #3,… 9 = released sample #9
FRAMEVAR1	Variable from the sampling frame or registry		N/C	Optional
FRAMEVAR2	Variable from the sampling frame or registry		N/C	Optional
FRAMEVAR3	Variable from the sampling frame or registry		N/C	Optional
…				
FRAMEVARN	Variable from the sampling frame or registry		N/C	Optional
For Countries that select persons from registries				
PNAME1	Person first name		C	
PNAME2	Person last name		C	Optional and depends on country confidentiality concerns
GENDER_REG	Person gender from registry	1	N	Required, as determined by registry
AGE_REG	Person age from registry	2	N	Required, as determined by registry

N: numeric; C: character; PSU: primary sampling unit; SSU: secondary sampling unit

ANNEX 4-2. SAMPLE DESIGN INTERNATIONAL FILE LAYOUT

This file includes all sampled persons (SPs) in original sample, and released from reserve sample. In addition, if the sample design involves a household sample, then all sampled households in which no sampled persons were selected during the administration of the household screener must be included as well. It will be assumed that the file will be imported into the national database managed by the data management software ("DME") provided by the Consortium.

Required precision is stated below. The w.d notation is that commonly used in SPSS and SAS for numbers, where w is the number of positions to be used (including the decimal separator) and d the number of digits to the right of the decimal point. If a field is blank, use SYSMISS/. (as appropriate).

Variable Name	Label	Format	Type	Data Source	Comments
CNTRYID	Country ID	3	N	+	Required; ISO 3166 3-digit numeric codes.
CNTRY	Country ID and language sample	4	C	+	Optional; distinguishes samples that are to be analyzed separately, such as by language area.
CASEID	Household operational ID	9	N	+	Required if household sampling; subset of PERSID that will be assigned in screening; Does not include CNTRYID; matches to other PIAAC databases when combined with CNTRYID.
PERSID	Person operational identification number (ID)	12	N	+	Required; Does not include CNTRYID; matches to other PIAAC databases when combined with CNTRYID.
ID_MAJDES	Sampling ID: Major design stratum ID	2	N	+	Optional; refer to Sampling Plan Part I for more information
ID_PSU	Sampling ID: Primary sampling unit (PSU) identification number	3	N	+	Blank if no PSU selection.
ID_SSU	Sampling ID: Second-stage sampling unit (SSU) identification number	3	N	+	Blank if no SSU selection, otherwise, it is sequentially numbered within PSUs.
ID_HH	Sampling ID: Household (HH) identification number	5	N	+	Required if households are selected; blank if no household selection, otherwise a sequential number is assigned within geographic clusters.

Variable Name	Label	Format	Type	Data Source	Comments
ID_OTH	Sampling ID: Other unit identification number	5	N	+	Optional; this may be useful when an additional stage of sampling is conducted (e.g. addresses within second-stage units).
INTVID	Interviewer ID	4	N	+	Non-blank for all records.
PROB_PSU	First-stage sampling unit probability of selection	14.12	N	+	Required for multi-stage designs, as appropriate; blank for one-stage designs.
PROB_SSU	Second-stage sampling unit probability of selection (within prior-stage clusters, if applicable)	14.12	N	+	Required for multi-stage designs, as appropriate; blank for one-stage designs.
PROB_HH	HH probability of selection (within prior-stage clusters, if applicable)	14.12	N	+	Required for all records if household sampling; blank otherwise
PROB_PERS	Person probability of selection (within HHs, if applicable)	14.12	N	+	Required where PERSID is nonmissing. If HHs are selected, this is the within HH selection probability for designs with DU selection (NUM_SEL/NUM_ELG).
PROB_OTH	Other stage sampling unit probability of selection	14.12	N	+	Optional; This is blank for one-stage designs.
PROB_OVERALL	Overall probability of selection of the sampled person or non-respondent HH	14.12	N	+	Required for all records; product of the probabilities of selection for each stage
NUM_ELG	Number of eligible persons in the household from screener.	2	N	+	Required for HH samples; blank otherwise. Greater than zero for DISP_SCR = 1, 2.
NUM_SEL	Number of selected persons in the household from screener.	1	N	+	Required for HH samples; blank otherwise. Greater than zero for DISP_SCR = 1, 2.
THEOR_HBWT	Theoretical base weight for selected HH (inverse overall selection probability of HH)	13.6	N	+	Required if household sampling; blank otherwise
THEOR_PBWT	Theoretical base weight for selected person (inverse overall selection probability of person – no NR adjustments)	13.6	N	+	Required for all sampled persons.

Variable Name	Label	Format	Type	Data Source	Comments
STRAT_PSU	Explicit strata used for stratifying PSUs (or persons if one-stage design)	5	N	+	Required if stratification is used
STRAT_SSU	Explicit strata used for stratifying SSUs	5	N	+	Required if stratification is used
STRAT_HH	Explicit strata used for stratifying HHs	5	N	+	Required if stratification is used
STRAT_PERS	Explicit strata used for stratifying persons	5	N	+	Required if stratification is used
SORT_PSU	Sort order for PSU selection (or persons if one-stage design)	5	N	+	Required if systematic sampling
SORT_SSU	Sort order for SSU selection	5	N	+	Required if systematic sampling
SORT_HH	Sort order for HH selection	5	N	+	Required if systematic sampling
SORT_PERS	Sort order for person selection	5	N	+	Required if systematic sampling
HIDD_DU	Hidden dwelling unit (DU)	1	N	+	Leave blank; Intended to be flag lag for the hidden DU procedure to reduce undercoverage bias; 0=false, 1=true
GQ_FLAG	Group Quarters structure flag	1	N	+	Required for screener countries only; 0=false, 1=true (dwelling unit is part of a collective dwelling unit)
QCFLAG	Quality control validation flag	1	N	+	Required; 0=not selected, 1=selected, validated but falsified data, 2 = selected, validated correct data, 3 = selected but not successfully validated
QCFLAG_LR	Quality control flag for 100% verification of literacy-related[12] BQ NRs age and gender	1	N	+	Required; 0=not BQ literacy-related NR, 1 = literacy-related BQ NR, age and gender successfully collected and values provided in AGE_LR and GENDER_LR, 2 = literacy-related BQ NR, age or gender not successfully collected Screener countries to assign a 2 to DISP_SCR = 7 as well.
SUBSAMP	Subsample flag	1	N	+	Required; 1= original sample (first release), 2= released sample #2 3 = released sample #3,… 9 = released sample #9
SAMPTYPE	Flag for oversample	1	N	+	1: PIAAC sample 2: Oversample or supplemental sample

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[12] Literacy-related BQ NR occurs when DISP_CI = 7, 8, or 9, or DISP_BQ = 7, 8, or 9.

Variable Name	Label	Format	Type	Data Source	Comments
CI_AGE	Person age (Case Initialization).	2	N	-	Required. Nonmissing for all sampled persons. Typically data from screener or registry.
CALCAGE	Person age, derived from BQ	2	N	-	Required; derived from DOBYY and DOBMM and date of interview. Nonmissing for DISP_BQ = 1
DOBYY	Date of birth – year (BQ)	2	N	-	Optional (yy). BQ variable A_Q01a.
DOBMM	Date of birth – month (BQ)	2	N	-	Optional (mm). BQ variable A_Q01b.
AGE_LR	Person age as collected by QC check on literacy-related cases	2	N	+	Required for registry samples only. Nonmissing for only cases with QCFLAG_LR = 1 (where age for literacy-related cases is successfully collected).
AGE_R	Person age (from BQ and QC check)	2	N	-	Resolved age, For registries, equal to CALCAGE for DISP_BQ = 1 and equal to AGE_LR for QCFLAG_LR = 1. For HH samples, equal to CALCAGE for DISP_BQ = 1 and CI_AGE for (DISP_CI or DISP_BQ = 7, 8, or 9).
CI_GENDER	Person gender (Case Initialization).	1	N	-	Required. Nonmissing for all sampled persons. Typically data from screener or registry.
GENDER	Person gender (BQ)	1	N	-	Required, 1=male, 2=female; BQ variable A_N01. Nonmissing for DISP_BQ = 1.
GENDER_LR	Person gender as collected by QC check on literacy-related cases	1	N	+	Required for registry samples only. Nonmissing for only cases with QCFLAG_LR = 1 (where gender for literacy-related cases is collected).
GENDER_R	Person gender (from BQ and QC check)	1	N	-	Resolved gender, For registries, equal to GENDER for DISP_BQ = 1 and equal to GENDER_LR for QCFLAG_LR = 1. For HH samples, equal to GENDER for DISP_BQ = 1 and CI_GENDER for (DISP_CI or DISP_BQ = 7, 8, or 9).
DISP_SCR	Final disposition code for household for screener	2	N	+	Required if HH sample; this is blank for one-stage designs.
DISP_CI	Final disposition code for person for case initialization	2	N	-	Required, from VM
DISP_BQ	Final disposition code for person for BQ/JRA	2	N	-	Required, from VM
DISP_CIBQ	Final disposition code for person – combining CI and BQ/JRA	2	N	-	Required, derived from VM

Variable Name	Label	Format	Type	Data Source	Comments
DISP_CORE	Final disposition code for person for Core instrument	2	N	-	Required; main study only, blank in field trial. From VM
DISP_CBA	Final disposition code for person for Main task instrument, computer	2	N	-	Required, from VM
DISP_PP	Final disposition code for person for Main task instrument, paper literacy/numeracy	2	N	-	Required, from VM
DISP_PRC	Final disposition code for person for Main task instrument, paper reading components	2	N	-	Required, from VM
DISP_MAIN	Final derived disposition code for person for Main task instrument	2	N	-	Required, derived from VM
DISP_MAINWRC	Final derived disposition code for person for Main task instrument, including reading components	2	N	-	Required, derived from VM
GLOBALDISPCODE	Final disposition code for person	2	N	-	Required, from VM
COMPLETEFLG	Completed case flag	1	C	-	Required, 1: if DISP_CIBQ = 1 and DISP_CORE = 1 and CORESTAGE1_PASS = 1; 2: DISP_CIBQ = 1 and PPC_SCORE <> NULL; 3: DISP_CIBQ = 1 and DISP_PP= (7,8,9,14) and PPC_SCORE is NULL; 4: DISP_CIBQ = (7,8,9) and QCFLAG_LR = 1; 5: DISP_CIBQ = 90 or DISP_MAIN = 90; 0: Other This follows Technical Standard 4.3.3 and is used to monitor sample size goals. Values of 1 and 2 determine if the core assessment was completed. Value of 3 and 4 is for literacy-related NRs for BQ/JRA and core assessments, and a value of 5 is for technical problems with the VM.

Variable Name	Label	Format	Type	Data Source	Comments
WEIGHTFLG	Weighted case flag	1	N	-	Required, derived from DISP_CIBQ and QCFLAG_LR. 1: DISP_CIBQ = 1, or DISP_CIBQ = 7,8,9 and QCFLAG_LR = 1 0: Other This flag is used to identify cases in which a non-zero weight is needed. It includes records that completed the BQ/JRA or is a literacy-related NR with collect age and gender data.
REGFLG	Registry situation flag	1	N	+	Required, for registry samples only 1: Deceased 2: Moved outside country 3: Moved into institution 4: Moved to PIAAC PSU 5: Moved to non-PIAAC PSU 6: Moved to unknown PSU 7: Unknown whereabouts 8: Invalid address, 0: Other
EXCFLG	Exclusion flag	1	N	+	Required for registry samples only 1: Inaccessible SP eligible and excluded 2: Inaccessible SP with unknown exclusion status 9: Inaccessible SP known to be ineligible 0: Other
EXCFRM_PROP	Proportion in target population who are excluded from the sampling frame	6.4	N	+	Required. Constant.
CORESTAGE1_PASS	Core Stage 1 status	2	N	-	Required for all persons with DISP_CIBQ = 1 , from VM
CORESTAGE2_PASS	Final indication of pass/not pass of Core Stage 2	2	N	-	Required, from VM 1: pass 29: did not pass
PPC_SCORE	Final score for the paper core assessment	1	N	-	Score from the paper core assessment, from VM
TECHPROB	Flag for identifying the case as having technical problems during the administration of the interview or assessment	1	N	+	Optional 1. - Zip-file exists but is empty 2. - Zip-file exists, but one or more XML are corrupt or missing 3. - VM froze/crashed and immediate re-launch was possible 4. - VM froze/crashed and immediate re-launch was not possible, but case was rescued and completed 5. - Scripts did not function properly when launching VM 6. - Other
VARSTRAT	Variance stratum	2	N	+	Optional
VARUNIT	Variance unit	2	N	+	Optional

Variable Name	Label	Format	Type	Data Source	Comments
TRIMGRPS	Trimming domains	2	N	+	Identifies the groups for computing the trimming factor. It should be consistent with oversampling domains or strata.
RAKEDIM1	Raking dimension variable 1	2	N	+	Required; must match in name and categories with control total file in Annex 14-1. Must be available for all BQ respondents, including literacy-related nonresponse cases.
RAKEDIM2	Raking dimension variable 2	2	N	+	Required if more than one raking dimension; must match in name and categories with control total file in Annex 14-1. Must be available for all BQ respondents, including literacy-related nonresponse cases.
RAKEDIM3	Raking dimension variable 3	2	N	+	Required if more than two raking dimensions; must match in name and categories with control total file in Annex 14-1. Must be available for all BQ respondents, including literacy-related nonresponse cases.
RAKEDIM4	Raking dimension variable 4	2	N	+	Required if more than three raking dimensions; must match in name and categories with control total file in Annex 14-1. Must be available for all BQ respondents, including literacy-related nonresponse cases.
RAKEDIM5	Raking dimension variable 5	2	N	+	Required if more than four raking dimensions; must match in name and categories with control total file in Annex 14-1. Must be available for all BQ respondents, including literacy-related nonresponse cases.
RAKEDIM6	Raking dimension variable 6	2	N	+	Required if more than five raking dimensions; must match in name and categories with control total file in Annex 14-1. Must be available for all BQ respondents, including literacy-related nonresponse cases.
RAKEDIM7	Raking dimension variable 7	2	N	+	Required if more than six raking dimensions; must match in name and categories with control total file in Annex 14-1. Must be available for all BQ respondents, including literacy-related nonresponse cases.
NRVAR_PERS1	Variable 1 to be used for creating nonresponse adjustment cells for BQ/JRA nonresponse adjustment	2	N	+	Required; must be available for both BQ/JRA respondents and non-respondents

Variable Name	Label	Format	Type	Data Source	Comments
NRVAR_PERS2	Variable 2 to be used for creating nonresponse adjustment cells for BQ/JRA nonresponse adjustment	2	N	+	Required if more than one nonresponse adjustment variable; must be available for both BQ/JRA respondents and non-respondents
NRVAR_PERS3	Variable 3 to be used for creating nonresponse adjustment cells for BQ/JRA nonresponse adjustment	2	N	+	Required if more than two nonresponse adjustment variables; must be available for both BQ/JRA respondents and non-respondents
NRVAR_PERS4	Variable 4 to be used for creating nonresponse adjustment cells for BQ/JRA nonresponse adjustment	2	N	+	Required if more than three nonresponse adjustment variables; must be available for both BQ/JRA respondents and non-respondents
NRVAR_PERS5	Variable 5 to be used for creating nonresponse adjustment cells for BQ/JRA nonresponse adjustment	2	N	+	Required if more than four nonresponse adjustment variables; must be available for both BQ/JRA respondents and non-respondents
NRVAR_PERS6	Variable 6 to be used creating nonresponse adjustment cells for BQ/JRA nonresponse adjustment	2	N	+	Required if more than five nonresponse adjustment variables; must be available for both BQ/JRA respondents and non-respondents
NRVAR_PERS7	Variable 7 to be used for creating nonresponse adjustment cells for BQ/JRA nonresponse adjustment	2	N	+	Required if more than six nonresponse adjustment variables; must be available for both BQ/JRA respondents and non-respondents
LR_NRVAR_PERS1	Variable 1 to be used for literacy-related nonresponse adjustment	2	N	+	Required. Non-missing for all literacy-related nonresponse cases.
LR_NRVAR_PERS2	Variable 2 to be used for literacy-related nonresponse adjustment	2	N	+	Required, if more than one literacy-related nonresponse adjustment variable. Non-missing for all literacy-related nonresponse cases.

Variable Name	Label	Format	Type	Data Source	Comments
LR_NRVAR_PERS3	Variable 3 to be used for literacy-related nonresponse adjustment	2	N	+	Required, if more than two literacy-related nonresponse adjustment variables. Non-missing for all literacy-related nonresponse cases.
LR_NRVAR_PERS4	Variable 4 to be used for literacy-related nonresponse adjustment	2	N	+	Required, if more than three literacy-related nonresponse adjustment variables. Non-missing for all literacy-related nonresponse cases.
LR_NRVAR_PERS5	Variable 5 to be used for literacy-related nonresponse adjustment	2	N	+	Required, if more than four literacy-related nonresponse adjustment variables. Non-missing for all literacy-related nonresponse cases.
NRVAR_HH1	Variable 1 to be used for creating nonresponse adjustment cells for screener nonresponse adjustment	2	N	+	Required for HH samples; must be available for both screener respondents and non-respondents
NRVAR_HH2	Variable 2 to be used for creating nonresponse adjustment cells for screener nonresponse adjustment	2	N	+	Required for HH samples if more than one nonresponse adjustment variable; must be available for both screener respondents and non-respondents
NRVAR_HH3	Variable 3 to be used for creating nonresponse adjustment cells for screener nonresponse adjustment	2	N	+	Required for HH samples if more than two nonresponse adjustment variables; must be available for both screener respondents and non-respondents
NRVAR_HH4	Variable 4 to be used for creating nonresponse adjustment cells for screener nonresponse adjustment	2	N	+	Required for HH samples if more than three nonresponse adjustment variables; must be available for both screener respondents and non-respondents
NRVAR_HH5	Variable 5 to be used for creating nonresponse adjustment cells for screener nonresponse adjustment	2	N	+	Required for HH samples if more than four nonresponse adjustment variables; must be available for both screener respondents and non-respondents

Variable Name	Label	Format	Type	Data Source	Comments
NRVAR_HH6	Variable 6 to be used for creating nonresponse adjustment cells for screener nonresponse adjustment	2	N	+	Required for HH samples if more than five nonresponse adjustment variables; must be available for both screener respondents and non-respondents
NRVAR_HH7	Variable 7 to be used for creating nonresponse adjustment cells for screener nonresponse adjustment	2	N	+	Required for HH samples if more than six nonresponse adjustment variables; must be available for both screener respondents and non-respondents
UNK_NRVAR_1	Variable 1 to be used for unknown eligibility status adjustment	2	N	+	Required. For HH samples, must be available for all selected HHs. For registry samples, must be available for all SPs.
UNK_NRVAR_2	Variable 2 to be used for unknown eligibility status adjustment	2	N	+	Required. If more than one unknown eligibility status adjustment variable, for HH samples, must be available for all selected HHs. For registry samples, must be available for all SPs.
UNK_NRVAR_3	Variable 3 to be used for unknown eligibility status adjustment	2	N	+	Required. If more than two unknown eligibility status adjustment variables, for HH samples, must be available for all selected HHs. For registry samples, must be available for all SPs.
UNK_NRVAR_4	Variable 4 to be used for unknown eligibility status adjustment	2	N	+	Required. If more than three unknown eligibility status adjustment variables, for HH samples, must be available for all selected HHs. For registry samples, must be available for all SPs.
UNK_NRVAR_5	Variable 5 to be used for unknown eligibility status adjustment	2	N	+	Required. If more than four unknown eligibility status adjustment variables, for HH samples, must be available for all selected HHs. For registry samples, must be available for all SPs.

Note: In general, the descriptions 'Required' and 'Optional' relate to the specific sample designs as there might be different requirements for the designs (registry vs. screening)

N: numeric; C: character; BQ: background questionnaire; JRA: job requirements approach module; PSU: primary sampling unit; SSU: secondary sampling unit; NR: Nonrespondent

A '+' indicates that the country will provide these variables. A '-' indicates that the PIAAC Consortium will copy the data in or compute it from another source.

ANNEX 4-3. RESPONSE RATE AND SAMPLE YIELD COMPUTATIONAL FORMULAE

Table 1. Actual Response Rates

Stage	Actual	Description
Screener	COMPLETE / ELIGIBLE COMPLETE $=$ C^s ELIGIBLE$=$ $HH^s - I^s - U^s * (I^s / K^s)$ C^s $=$ DISP_SCR(01,02) HH^s $=$ All sampled households[13] I^s $=$ DISP_SCR(19,22,26,28) U^s $=$ DISP_SCR(04,05,17,20,21,24) K^s $=$ DISP_SCR(01,02,03,07,09,12-16,19,22,26,28)	 Completed screeners All sampled households HHs known to be ineligible HHs with unknown eligibility status HHs with known eligibility status
BQ/JRA **(For countries with screeners)**	COMPLETE / ELIGIBLE COMPLETE $=$ $C^b + LR^b$ ELIGIBLE $=$ $SP^b - D^b - I^b$ C^b $=$ DISP_CIBQ(01,90) LR^b $=$ DISP_CIBQ(07,08,09) and QCFLAG_LR = 1 SP^b $=$ All sampled persons[14] D^b $=$ DISP_CIBQ(12,13,15,16) I^b $=$ DISP_CIBQ(18,25)	 Completed BQ/JRA cases Literacy-related nonrespondents All sampled persons SPs with a disability SPs known to be ineligible
BQ/JRA **(For countries with registries)**	COMPLETE / (ELIGIBLE – EXCLUDE) COMPLETE $=$ $C^b + LR^b$ ELIGIBLE$=$ $SP^b - D^b - I^b - U^b * ((D^b + I^b)/ K^b)$ C^b $=$ DISP_CIBQ(01,90) LR^b $=$ DISP_CIBQ(07,08,09) and QCFLAG_LR = 1 SP^b $=$ All sampled persons[2] D^b $=$ DISP_CIBQ(12,13,15,16) I^b $=$ DISP_CIBQ(18,25) U^b $=$ EXCFLG(2) K^b $=$ EXCFLG(0,1,9) EXCLUDE $=$ ELIGIBLE * EXC_PROP EXC_PROP $=$ min{[(EXCFLG(1) + U^b *(EXCFLG(1)/ K^b))/ ELIGIBLE], 0.05 – EXCFRM_PROP} EXCFRM_PROP $=$ Estimated proportion of the target population excluded from the sampling frame	 Completed BQ/JRA cases Literacy-related nonrespondents All sampled persons SPs with a disability SPs known to be ineligible SPs with unknown eligibility status SPs with known eligibility status SPs excluded from response rate Provided in Sample Design Report
Assessment[15]	COMPLETE / ELIGIBLE COMPLETE $=$ $C^a + LR^a$ ELIGIBLE$=$ $C^b - D^a - I^a$ C^a $=$ DISP_MAIN(01,90) LR^a $=$ DISP_MAIN(07,08,09,14) C^b $=$ DISP_CIBQ(01,90) D^a $=$ DISP_MAIN(12,13,15,16) I^a $=$ DISP_MAIN(18)	 Completed assessments Literacy-related nonrespondents Completed BQ/JRA cases SPs with a disability SPs known to be ineligible

[13] Includes the original sample of dwelling units plus the reserve sample released as a random subset of the population.

[14] Includes the original sample of persons plus the reserve sample released as a random subset of the population.

[15] The assessment response rate with reading components can be computed by replacing DISP_MAIN with DISP_MAINWRC (see Table 4). The reading components conditional response rate is the assessment response rate with reading components divided by the assessment response rate without reading components.

Table 2. Disposition codes assignment and flags relating to registry frame situations

Description	DISP CIBQ	EXCFLG	REGFLG
Deceased	18	9	1
Moved outside country	25	9	2
Moved inside country			
Moved into institution	25	9	3
To PIAAC PSU	24	1	4
To nonPIAAC PSU	24	1	5
To Unknown PSU	24	1	6
Unknown whereabouts	24	2	7
Invalid address	24	1	8
Other	XX	0	0

NOTE: EXCFLG and REGFLG are part of the SDIF layout.

Table 3. Actual Yields

Stage	Actual
Screener	DISP_SCR(01,02)
BQ	DISP_CIBQ(01, 90) + DISP_CIBQ(07,08,09) and QCFLAG_LR = 1;

Completed Case (5000)	DISP_CIBQ(01), and meet one of the following three conditions:
	  DISP_CORE(01) and CORESTAGE1_PASS(01), or
	  PPC_SCORE <> NULL, or
	  DISP_PP(07,08,09,14), or
	DISP_CIBQ(07,08,09) and QCFLAG_LR = 1;
	DISP_CIBQ(90) or DISP_MAIN(90)

Assessment	DISP_MAIN(01,07-09,14, 90)

NOTE: Explanations of code 90 are necessary with interviewer ID, supervisor, time of the day, location, etc.

Table 4. Derivation of composite disposition codes for the BQ/JRA and assessment

Stage	Reading Components?	Derivation			
BQ/JRA	N/A	DISP_CIBQ	= DISP_BQ	if DISP_CI = 01	
			= DISP_CI	otherwise	
Assessment (first cycle of PIAAC only)	With RC	DISP_MAINWRC	= 01	if DISP_CBA(01) or DISP_PRC(01)	/* Completed computer-based assessment (CBA)*/ /* Completed reading components (RC) */
			= DISP_CBA	if DISP_CBA is non-missing	/* Reason for not completing the CBA */
			= DISP_PRC	if DISP_PRC is non-missing	/* Reason for not completing the RC */
			= DISP_PP	Otherwise	/* Reason for not completing the Core or paper-based assessment (PBA) */
	Without RC	DISP_MAIN	= 01	if [DISP_CORE(01) and CORESTAGE1_PASS(01) and CORESTAGE2_PASS(29)] or DISP_CBA(01) or DISP_PP(01)	/* Failed CBA Core Stage 2 */ /* Completed CBA */ /* Failed paper Core or completed PBA */
			= DISP_CBA	if DISP_CBA is non-missing	/* Reason for not completing the CBA*/
			= DISP_PP	Otherwise	/* Reason for not completing the Core or PBA */
Assessment (future cycles)	With RC	DISP_MAINWRC	= 01	if DISP_CBA(01) or DISP_PRC(01)	/* Completed CBA */ /* Completed reading components */
			= DISP_CBA	if DISP_CBA is non-missing	/* Reason for not completing the CBA*/
			= DISP_PRC	if DISP_PRC is non-missing	/* Reason for not completing the RC*/
			= DISP_PP	if DISP_PRC is missing and DISP_PP is non-missing	/* Reason for not completing the PBA */
			= DISP_CORE	Otherwise	/* Reason for not completing the Core */
	Without RC	DISP_MAIN	= 01	if DISP_CORE(29) or DISP_CBA(01) or DISP_PP(01)	/* Failed CBA Core Stage 2 or paper Core*/ /* Completed CBA */ /* Completed PBA */
			= DISP_CBA	if DISP_CBA is non-missing	/* Reason for not completing the CBA*/
			= DISP_PP	if DISP_PP is non-missing	/* Reason for not completing the PBA */
			= DISP_CORE	Otherwise	/* Reason for not completing the Core */

NOTE: The derivation of DISP_MAIN for the first cycle of PIAAC differs from future cycles because of the different disposition code values available for the Core (see Table 10-3).
NOTE: The derivation of DISP_MAIN without reading components can be used to compute assessment response rates that are comparable across all countries. For the purpose of sample monitoring, countries with reading components should report response rates using the derivation without reading components; however, countries should also self-check response rates computed using the derivation with reading components so as to best monitor progress over all stages of data collection.

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5. SURVEY INSTRUMENT STANDARDS

5.1 BACKGROUND QUESTIONNAIRE

Purpose

To ensure that the background questions are relevant to the PIAAC objectives and that these questions and data items are consistent across all participating countries.

Rationale

The background questions must have the same meaning for respondents in all participating countries despite differences in language and culture. A core set of questions with standard concepts and definitions related to the survey objectives is necessary to allow comparability of the survey results between participating countries. Translations and adaptations of these core questions are guided by this overarching goal in order to facilitate the comparability of core concepts and constructs assessed across countries.

Standards, Guidelines and Recommendations

Standard 5.1.1 Each participating country's background questionnaire (BQ) will include the international "core" questions, as well as the corresponding response categories and coding schemes developed by the Consortium.

> **Guideline 5.1.1A** The Consortium will develop and identify the core questions that each participating country is required to include in its BQ. The Consortium will also identify any optional questions that may be included in the BQ at the discretion of each participating country.

> **Guideline 5.1.1B** Translations must preserve the construct in accordance with the guidelines prepared by the Consortium.

> **Guideline 5.1.1C** For a few questions and response options, national adaptations are required. Countries will develop these adaptations based on the guidelines of the Consortium. These adaptations may concern the wording of questions and responses or the development of country-specific show cards for educational attainment or earnings. Adaptations of this type require approval by the Consortium. Countries administering the BQ in several languages must ensure that content-related adaptations are identical across language versions.

> **Guideline 5.1.1D** All national adaptations of a question in the BQ will be identified by the original question id (e.g. B_Q01a) followed by the country two letter abbreviation (e.g. B_Q01aCA). This new question id can be followed by a number if more than one question is needed to adapt the original question (e.g. B_Q01aCA1 and B_Q01aCA2).

Standard 5.1.2 Countries for which the sample design involves the sub-selection of a person within a selected household will require a set of questions, hereafter called screening questions, to identify the

target population members within a selected household and to facilitate the random selection of one person within the household.

> **Guideline 5.1.2A** The screening questions may be incorporated into the beginning of the BQ, or a separate screening questionnaire may be used.

> **Guideline 5.1.2B** Administration time for the screening questions under field conditions should not exceed three minutes, to ensure that administration time does not vary significantly between countries using different sets of precursor questions in their adaptations of the BQ.

Quality Control Procedures

The Consortium will prepare master versions of all instruments in English.

The Consortium will prepare a set of guidelines for translation and adaptation of the survey instruments.

The Consortium will review all final national versions of the BQ to verify adherence to the PIAAC-specified design.

Each country must submit a copy of all of its materials to the PIAAC Consortium in each of its PIAAC official languages.

For the field test, each participating country will use the Background Questionnaire Adaptation Sheet (BQAS) to specify its BQ adaptation (see Guideline 6.2.1) and will provide the BQAS to the PIAAC Consortium for review and approval. This sheet will include information about:

- Any changes to background item text (stem)
- Variation from the recommended response options
- Translation and cultural adaptation of the background item stem and response options

For the main study, countries will implement their national BQ with an authoring tool provided by the Consortium. The Consortium will check the changes and compare it with the Master version using this authoring tool.

Each participating country will provide a copy of its BQ, in each of its PIAAC official languages, to the Consortium for review and approval.

5.2 COUNTRY-SPECIFIC EXTENSIONS OF BACKGROUND QUESTIONNAIRE ITEMS

Purpose

To ensure that participating countries have the opportunity to include a limited number of items that are relevant to their own policy context.

Rationale

The country-specific extensions must be compatible with the items in the background questionnaire (BQ) and direct assessment and with the broader aims of the PIAAC project. Because of limitations to the overall assessment time, and to ensure comparability across countries, countries must follow the guidelines below when submitting additional, country-specific items.

Standards, Guidelines and Recommendations

Standard 5.2.1 A participating country may opt to include a limited number of country-specific questions in its BQ, in addition to the required core questions. The total combined duration of all such additional country-specific questions will not exceed five minutes on average.

Guideline 5.2.1A A country may include questions in the BQ to satisfy its own specific objectives, provided such questions do not jeopardize the main PIAAC objectives. These country-specific questions should be located such that they have little or no impact on the core questions. Finally, these additional questions must not extend the background interview by more than five minutes on average.

Guideline 5.2.1B All national extensions of a question in the BQ will be identified by the question id that is immediately prior to the extension (e.g. B_Q01a) followed by the country two letter abbreviation plus X (e.g. B_Q01aCAX), followed by a number if the extension takes more than one question.

Standard 5.2.2 The subject matter and placement of any country-specific BQ questions must be approved by the Consortium.

Standard 5.2.3 If it plans to include country-specific questions, the participating country will prepare a BQ adaptation plan describing how the BQ is to be developed and the rationale and formulation for any country-specific questions.

Quality Control Procedures

The Consortium will develop a Background Questionnaire Adaptation Sheet (for the field test) and a authoring tool (for the main study) that countries can use to provide detailed information about national translation and adaptation issues. (See Guideline 6.2.1.) This tool will be used to monitor and, if appropriate, approve country-specific additions to the BQ.

5.3 JOB REQUIREMENTS APPROACH MODULE

Purpose

To ensure that the job requirements approach (JRA) module questions are relevant to the PIAAC objectives and that these questions and data items are consistent across all participating countries.

Rationale

The JRA questions must allow for comparability of the survey results between participating countries.

Standards, Guidelines and Recommendations

Standard 5.3.1 The JRA items must be implemented as specified by the Consortium, including the corresponding categories and coding scheme.

> **Guideline 5.3.1A** The Consortium will develop and identify the core questions that each participating country is required to include in the JRA. The Consortium will also identify any optional questions that may be included in the JRA at the discretion of each participating country.

> **Guideline 5.3.1B** Translations must preserve the construct in accordance with the guidelines prepared by the PIAAC Consortium.

> **Guideline 5.3.1C** For a few questions and response options, national adaptations are required. Countries will develop these adaptations based on the guidelines of the Consortium. These adaptations may concern the wording of questions and responses. Adaptations of this type require approval by the Consortium. Countries administering the BQ in several languages must ensure that content-related adaptations are identical across language versions.

Standard 5.3.2 Adaptations should be restricted and should be made in accordance with the guidelines of the Consortium (see also Guideline 5.1.1.C)

Quality Control Procedures

Each participating country will provide its JRA module adaptation plan to the Consortium for review and approval.

Each participating country will provide a copy of its JRA module, in each of its PIAAC official languages, to the Consortium for review and approval.

The Consortium will develop a Background Questionnaire Adaptation Sheet that countries can use to provide detailed information about national translation and adaptation issues. (See Guideline 6.2.1.) This tool will be used to monitor and, if appropriate, approve country-specific additions to the JRA.

5.4 ASSESSMENTS

Purpose

To ensure the cross-country equivalence of the instruments used for the direct assessment.

Rationale

The credibility and comparability of the direct measurements in PIAAC depend on the use of common assessment tools by all countries. To minimise variations in respondents' interpretation and perception of the materials, the direct assessment instruments for each country must be consistent with those used by other countries in terms of content, physical appearance and administration of assessment materials.

Standards, Guidelines and Recommendations

Standard 5.4.1 Each participating country will organise the PIAAC direct assessment instruments in the same way as the master English version of the instruments provided by the Consortium. Across countries, the instruments must be equivalent in the ordering of the clusters, number of pages, numbering and order of pages, layout of stimulus material and directives, graphics, response format, text format, and print quality or screen display.

> **Guideline 5.4.1A** The graphic elements of each stimulus material must be used as provided. Text layout must follow the pattern of the master layout as far as possible (differences in word, sentence and paragraph length may lead to small deviations from the master). Typefaces should be identical, where possible, but should, at a minimum, have the same characteristics (bolding, italics, serifs and size).

> **Guideline 5.4.1B** Space for responses (number of printed lines or entry boxes) should not vary more than 10% from the space shown in the master, as respondents often use the amount of available space as an indicator of the length of the expected response. Any variance must be reported and justified. The layout and numbering of the questions must be the same as in the master document.

> **Guideline 5.4.1C** The print quality must be the same as that of the master instruments. Respondents' opportunities to demonstrate their true abilities are impaired when print quality interferes with comprehension.

> **Guideline 5.4.1D** The screen display and resolution on the computer must follow the specifications developed by the Consortium. Respondents' opportunities to demonstrate their true abilities are impaired when the screen display interferes with comprehension.

> **Guideline 5.4.1E** Translations must preserve the construct in accordance with the guidelines prepared by the Consortium.

> **Guideline 5.4.1F** The purpose of cultural adaptation is to remove construct-irrelevant variance from the assessment items. It should not add such variance. Guidelines for general cultural appropriateness have been prepared by the Consortium.

Standard 5.4.2 The translation and cultural adaptation of the direct assessment instruments must be carried out according to the guidelines prepared by the Consortium, as well as translation and adaptation guidelines. Adaptation and translation of the direct assessment materials and the background questionnaire (BQ) are crucial to the comparability and psychometric stability of the PIAAC data collection.

Guideline 5.4.2A Even with the most carefully written guidelines, the end product will be only as good as the translator(s) performing the work. Translators should be chosen with the greatest care. The ideal translator will have not only the skills required to properly translate the text from English to the target language, but also some notion of the particular challenges of assessment adaptation. The translator should likewise be familiar with the concepts surrounding the BQ.

Guideline 5.4.2B The first step in the adaptation and translation process is for the Consortium to develop clearly written assessment adaptation guidelines. These guidelines should identify all of the factors in both the stimulus material and related questions that contribute to the difficulty of the item. For instance, the guidelines should identify the presence of keywords in the question and stimulus material and, if applicable, the presence of distracters. The translator should use these guidelines to convey not only the meaning of the stimulus material and the question, and not only the complexity of the language (technical vs. mundane), but also to maintain the psychometric properties of the items. The adapted and translated stimulus material should be as close as possible to the supplied English version, regardless of the language used. Wherever possible, punctuation should be duplicated. The size of graphics, font size, the typeface of written material and the general layout should be maintained.

Guideline 5.4.2C A set of guidelines similar to the ones developed for the direct assessment should be produced to describe the concepts being measured in the BQ. Because data collection methodology differs from country to country, it is important to ensure that the manner of collecting a particular variable maintains the integrity of the concept that should be captured by that variable.

Standard 5.4.3 Each country must submit a complete set of its national versions of the PIAAC instruments to the Consortium for verification and approval.

Quality Control Procedures

The Consortium will prepare master versions of all instruments in English.

The Consortium will prepare a set of guidelines for the translation and adaptation of the survey instruments (*i.e.* cognitive tasks as well as the BQ).

The Consortium will ensure that the design of the computer-based instruments follows the guidelines and that the questions and materials are distributed to respondents according to the assessment design. (See Section 5.6.)

The Consortium will review all final national versions of the instruments to ensure that each country has followed the PIAAC-specified design standards.

Each country must submit a copy of all of its materials to the Consortium in each of the national languages being tested in PIAAC.

Using the appropriate forms submitted to the Consortium, countries must document the following:

- Variation from the recommended layout
- Any changes to assessment tasks
- Translation and cultural adaptation of the PIAAC instruments

5.5 NATIONAL OPTIONS FOR ASSESSMENTS

Purpose

To limit the extent to which national centres deviate from or add components to the international design of PIAAC and to ensure that these do not interfere with the quality of the international data.

Rationale

These standards serve to ensure that the quality of the data used for the international comparisons will not be affected by national options. Data for national options will be collected consistently across countries, and potential effects will be precluded.

Standards, Guidelines and Recommendations

Standard 5.5.1 The design of PIAAC Round 1 has three types of components: 1) Core components (*i.e.* literacy assessment, numeracy assessment and background questionnaire); 2) international options (*i.e.* reading components and problem solving in technology-rich environments); and 3) national options that are limited to supplemental samples. Starting with Round 2, the design of PIAAC has two types of components: 1) Core components (*i.e.* literacy assessment, numeracy assessment and background questionnaire); and 2) national options that are limited to supplemental samples. (See Section 4.5 for details.) The use of national options must be restricted and, when options have been approved by the PIAAC Consortium, they must not affect the quality of the international data or response rates.

> **Guideline 5.5.1A** Each country may implement only supplemental samples that have been agreed upon between the national centre and the Consortium.

> **Guideline 5.5.1B** These national options must not affect the international design of PIAAC.

> **Guideline 5.5.1C** Costs associated with national options (*i.e.* support, implementation and analysis) are the responsibility of the country implementing the options.

Quality Control Procedures

The Consortium will be responsible for approving and supervising national options.

The Consortium will provide detailed guidelines and will work with countries to ensure that national options do not affect the international portion of PIAAC.

5.6 PSYCHOMETRIC ASSESSMENT DESIGN

Purpose

To ensure that the design of the PIAAC direct assessments will generate data that are psychometrically appropriate by consistent implementation across participating countries, using sound design principles and methods.

Rationale

The PIAAC psychometric assessment design is complex because it measures four domains – literacy, numeracy, reading components and problem solving in technology-rich environments – across two modes of administration – paper-and-pencil and computer instruments. To ensure that the assessment results are comparable across participating countries, it is essential that the assessment be consistently administered in all countries. In summary, the PIAAC psychometric assessment design provides the following information:

- Component skills among lower-performing adults in each participating country, as well as among those who report not knowing how to use a computer;
- Population distributions in literacy, which can be linked to International Adult Literacy Survey (IALS)/Adult Literacy and Lifeskills Survey (ALL);
- Population distributions in numeracy, which can be linked to ALL;
- Accurate estimates of population distributions and a baseline measure of problem solving in technology-rich environments, for estimation of trends over time;
- Strategies and processes that adults use when responding to the tasks on problem solving in technology-rich environments;
- Pair-wise covariance estimates among the various measures, including the relationships between literacy and numeracy, literacy and component skills, literacy and problem solving, numeracy and component skills, and numeracy and problem solving;
- Information that can be used to analyse the relationship between the measured competencies and the PIAAC affective measures and social/economic measures (from the responses to the background questions and job requirements approach module).

Standards, Guidelines and Recommendations

The following standard (Standard 5.6.1) and the associated guidelines (Guideline 5.6.1A-5.6.1G) apply to Round 1 only:

Standard 5.6.1 The PIAAC psychometric assessment design for the <u>field test</u> must serve several purposes, including 1) to test the survey operations procedures; 2) to identify and correct items that are performing poorly, including the quality of translation and scoring procedures; and 3) to examine item characteristics for establishing comparability (*i.e.* to evaluate the equivalence of item parameters in two aspects: the linking of items from IALS/ALL to PIAAC and linking between the paper-and-pencil and computer formats).

    Guideline 5.6.1A The PIAAC psychometric assessment design for the field test is based on the assumption that each item will be answered by a sufficient number of adults, resulting in an estimated sample size of 1 500 respondents per country/per reporting language (1 100 respondents for the computer-delivered test and 400 respondents for the paper-and-pencil test). Countries that plan to report on general proficiency, regardless of the languages tested, should achieve a minimum completed

sample size of 1 500 respondents for their main language. (Also see Guideline 5.6.1C on the "200 rule.")

Guideline 5.6.1B The PIAAC psychometric assessment design for the field test is based on an assumption of an average of 60 minutes of testing time for the direct assessment per respondent. However, PIAAC is not a timed assessment and some respondents may take longer. The PIAAC field test has the following characteristics:

- The paper-and-pencil branch of the assessment will include a ten-minute Core assessment of literacy and numeracy skills, with six tasks each. Respondents who pass the Core assessment will take two 20-minute clusters of either literacy or numeracy tasks, totalling 29 tasks, plus a final ten-minute cluster of reading components skills. Four paper instruments will be designed.
- The computer-delivered branch of the assessment will include twenty-one 60-minute instruments, with two 30-minute blocks of items in each instrument. Overall, there will be thirteen 30-minute clusters that will be grouped to form the instrument (four clusters of literacy tasks, four clusters of numeracy tasks and five clusters of problem-solving tasks).

Guideline 5.6.1C The PIAAC psychometric assessment design for the field test will be implemented using the design illustrated in Figure 5-1. A total of 1 500 respondents per country/per reporting language will receive Core items on information and communication technology (ICT) skills. A small proportion of respondents without the minimum necessary ICT skills will be sent to the paper-and-pencil branch. A large majority of respondents with sufficient ICT skills will be proportionally randomly assigned to either the paper-and-pencil instrument (4/15) or the computer-delivered assessment (11/15).

To ensure that the appropriate number of respondents per item is obtained, it is important to consider the number of respondents who fail the assessment and are directed to the paper-based assessment. The original design has been modified to include a "200 rule." This rule considers, prior to the interview, the number of respondents in the country who have failed the ICT Core and proceeded to the paper-based instruments. Once 200 respondents have taken this path, additional respondents are not required to complete the cognitive portion of the assessment, and the interview will be finalised following the administration of the Core. A continuous level of communication will be needed between the national centre (or survey organisation) and the interviewers to ensure that the interviewers are up to date with the number of respondents who have taken the paper-based assessment. This rule may affect the overall sample size. Small deviations from 200 are acceptable, as long as they do not affect the number of respondents who actually pass the ICT Core and are randomly assigned to paper- or computer-based assessments.

Guideline 5.6.1D The field test paper-based instruments must be organised according to the design shown in Table 5-1, where P1 to P4 represent the four paper-based instruments, CL represents the Core literacy cluster, CN represents the Core numeracy cluster, L1 and L2 represent literacy clusters, and N1 and N2 represent numeracy clusters.
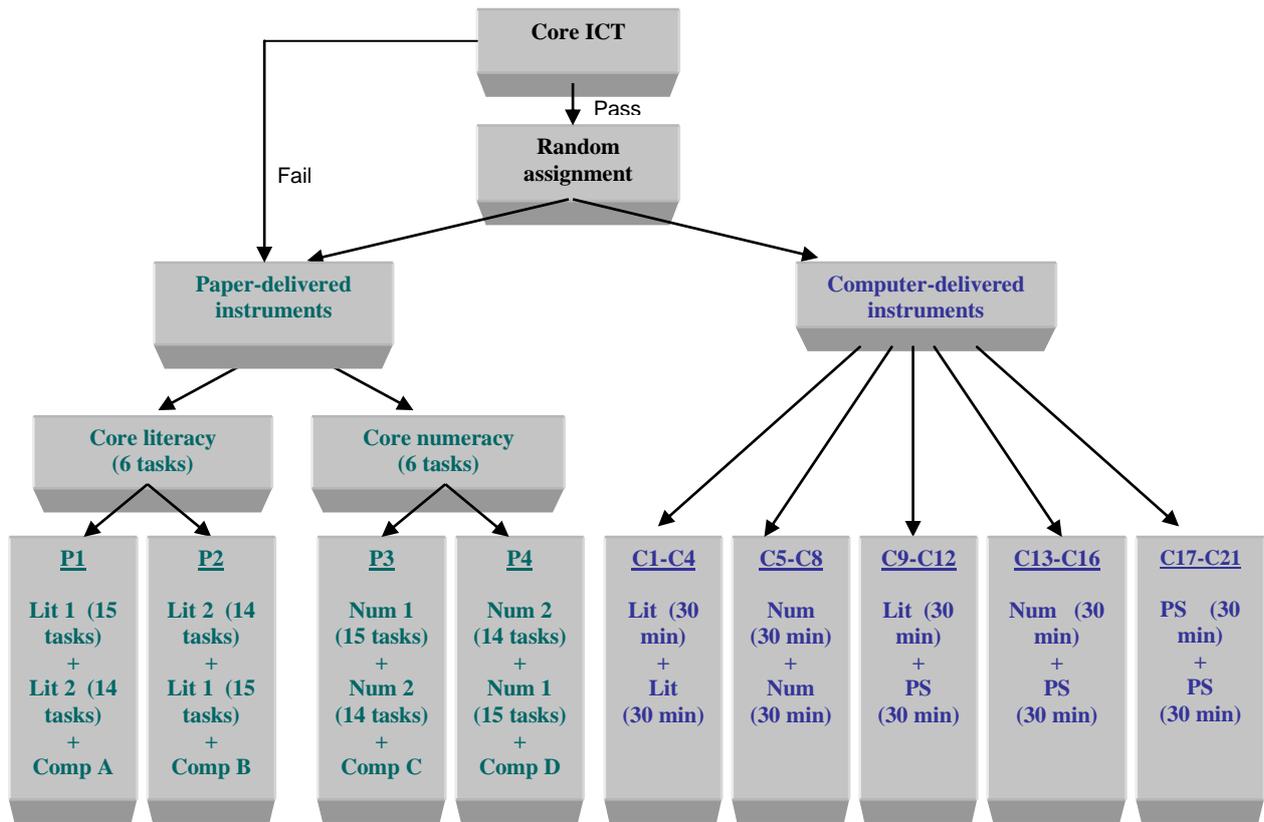
Figure 5-1. PIAAC Psychometric Assessment Design for the Field Test (Direct Assessment)

Table 5-1.   Design of the Field Test Paper-based Assessment Instruments in the Integrated Design

Paper-based Instrument	Clusters			
	Core **(10 min)**	**1** **(20 min)**	**2** **(20 min)**	**3** **(10 min)**
P1	CL (6 lit tasks)	L1 (15 lit tasks)	L2 (14 lit tasks)	Components A
P2	CL (6 lit tasks)	L2 (14 lit tasks)	L1 (15 lit tasks)	Components B
P3	CN (6 num tasks)	N1 (15 num tasks)	N2 (14 num tasks)	Components C
P4	CN (6 mum tasks)	N2 (14 num tasks)	N1 (15 num tasks)	Components D

Guideline 5.6.1E The field test computer-based instruments are organised according to the design shown in Table 5-2, where C1 to C21 represent computer-based instruments, L1 to L4 represent literacy clusters, N1 to N4 represent numeracy clusters, and PS1 to PS5 represent problem-solving clusters.

Table 5-2. **Design of the Field Test Computer-based Assessment Instruments in the Integrated Design**

Computer-based Instrument	Clusters	
	1 (30 min)	2 (30 min)
C1	L1	L2
C2	L2	L3
C3	L3	L4
C4	L4	L1
C5	N1	N2
C6	N2	N3
C7	N3	N4
C8	N4	N1
C9	L1	PS1
C10	L2	PS2
C11	L3	PS3
C12	L4	PS4
C13	N1	PS2
C14	N2	PS3
C15	N3	PS4
C16	N4	PS5
C17	PS1	PS2
C18	PS2	PS3
C19	PS3	PS4
C20	PS4	PS5
C21	PS5	PS1

Guideline 5.6.1F The PIAAC assessment design for the field test may be modified for countries that do not intend to assess reading components, according to the following characteristics:

- The computer-delivered branch will be identical to the design shown in Figure 5-1, with all subscales.
- The paper-and-pencil branch will be shortened by ten minutes as it will not include the reading component skills block. The overall assessment time for the paper version of the direct assessment will be 50 minutes.
- The sample size will decrease to 1 400 respondents per reporting language/per country, with a minimum of 1 200 respondents per language who pass the ICT core (880 respondents for the computer-delivered test and 320 respondents for the paper-and-pencil test).

Guideline 5.6.1G The PIAAC psychometric assessment design for the field test may be modified for countries that do not intend to assess problem solving in technology-rich environments, according to the following characteristics:

- The paper-and-pencil branch of the assessment will be identical to the design shown in Figure 5-1, with all subscales.
- The computer-delivered branch will include eight instruments (four literacy-only and four numeracy-only instruments).
- The sample size will decrease to 1 200 respondents who pass the ICT core per reporting language/per country (800 respondents for the computer-delivered test and 400 respondents for the

paper-and-pencil test). This sample size will allow analysis to compensate for the lack of covariance information, so each item will be answered by 200 respondents.

For Round 2 and future rounds, Standard 5.6.1 and all associated guidelines (Guideline 5.6.1A-5.6.1G) should be replaced with the following:

Standard 5.6.1A The PIAAC psychometric assessment design for the field test in Round 2 has been modified and based on the Round 1 Main Study design. This field test design still provides good item level information on the full range of direct assessment measures included in PIAAC and will be useful in addressing the other operational and psychometric issues identified above. The background questionnaire and a core set of questions focusing on information and computer technology (ICT) will ensure that respondents who have no familiarity with computers are routed to the paper-and-pencil version of the assessment. In order to link the paper-and-pencil and the computer delivery formats, the remaining adults (the majority of adults in each country who are expected to pass the core) will be randomly assigned to either the paper-and-pencil or computer-delivered branches of the field test (see Figure 5.1a below).

The BQ, including the job requirements approach, will be delivered by the interviewer using a computer-assisted format that will be administered along with the cognitive instruments.

The direct assessment is implemented following a psychometric assessment design that is based on an assumption of 60 minutes of testing time as shown in Figure 5.1a. This design has the following characteristics:

a) The <u>computer-delivered branch</u> of the assessment will first direct respondents to the CBA Core section, which is composed of two stages taking approximately five minutes each. Poor performance on either stage of the computer-based CBA Core section will result in switching over to the appropriate sections of the paper-and-pencil instruments.

b) Respondents who fail <u>CBA Core Stage 1</u> (which contains ICT-related tasks) are directed to begin the paper-based core section and proceed with the process outlined in the above bullet. Respondents who pass CBA Core Stage 1 will be randomly assigned to either the CBA or PBA.

   ▪ Thirty percent of the respondents who passed the CBA Core Stage 1 will be randomly assigned to the paper-based assessment (see more information for the paper-based assessment below).

   ▪ The remaining seventy percent of the respondents who passed the CBA Core Stage 1 will be assigned to the computer-based assessment and will take the <u>CBA Core Stage 2, which</u> contains six cognitive items.

      1. Respondents who fail CBA Core Stage 2 will be administered only the reading components tasks.

      2. Respondents who pass the CBA Core Stage 2 will be routed to the computer-based assessments from which approximately 36 percent will take literacy, 36 percent will take numeracy, and 28 percent will take problem solving. Under this

design, out of those who will be routed to the computer assessments, 54% of respondents will receive a combination of literacy and numeracy tasks, 32% will receive problem solving combined with either literacy or numeracy, and 14% will receive only problem-solving sections.

c) The <u>paper-delivered branch</u> of the assessment will include a 10-minute core assessment of literacy and numeracy skills. Respondents will be randomly assigned to either a 30-minute cluster of literacy items or a 30-minute cluster of numeracy items, followed by a 20-minute assessment of reading component skills.
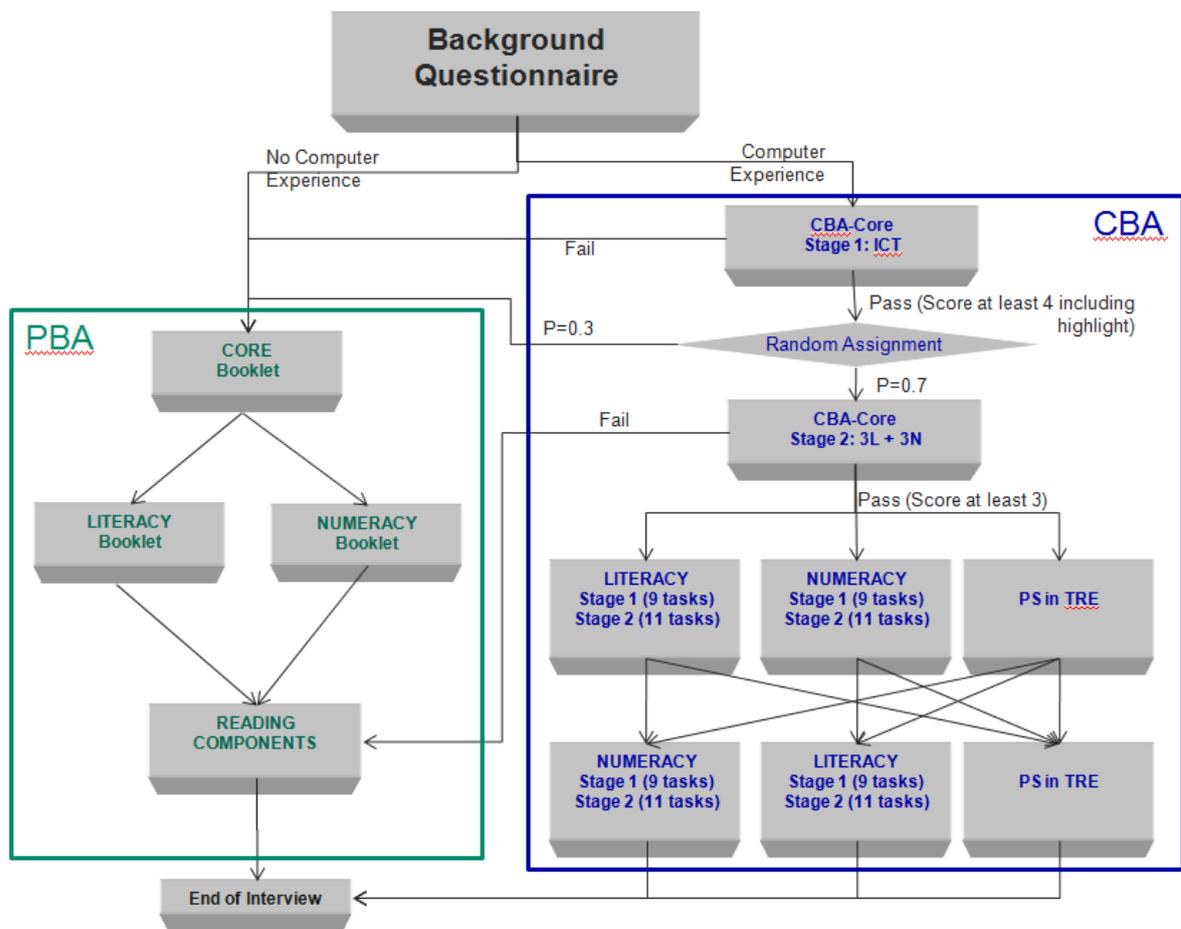
Figure 5-1a. PIAAC Psychometric Assessment Design for the Round 2 Field Test

Standard 5.6.1B PIAAC Round 2 also includes a modified paper-based option for countries that choose not to administer the assessment instruments in the survey. Under this design, the BQ, including the job requirements approach, will continue to be delivered by the interviewer using a computer-assisted format that will be administered along with the cognitive instruments.

The direct assessment is still implemented following a psychometric assessment design that is based on an assumption of around 60 minutes of testing time following the design shown in Figure 5.1b. However, PIAAC is not a timed assessment and some respondents may take longer to complete the

assessment. This design will include a 10-minute core assessment of literacy and numeracy skills. Respondents will be randomly assigned to one of the 12 booklets measuring literacy only, numeracy only or a combination of literacy and numeracy skills. These booklets are estimated to take around 35-minutes to be completed. This will be followed by a 20-minute assessment of reading component skills.
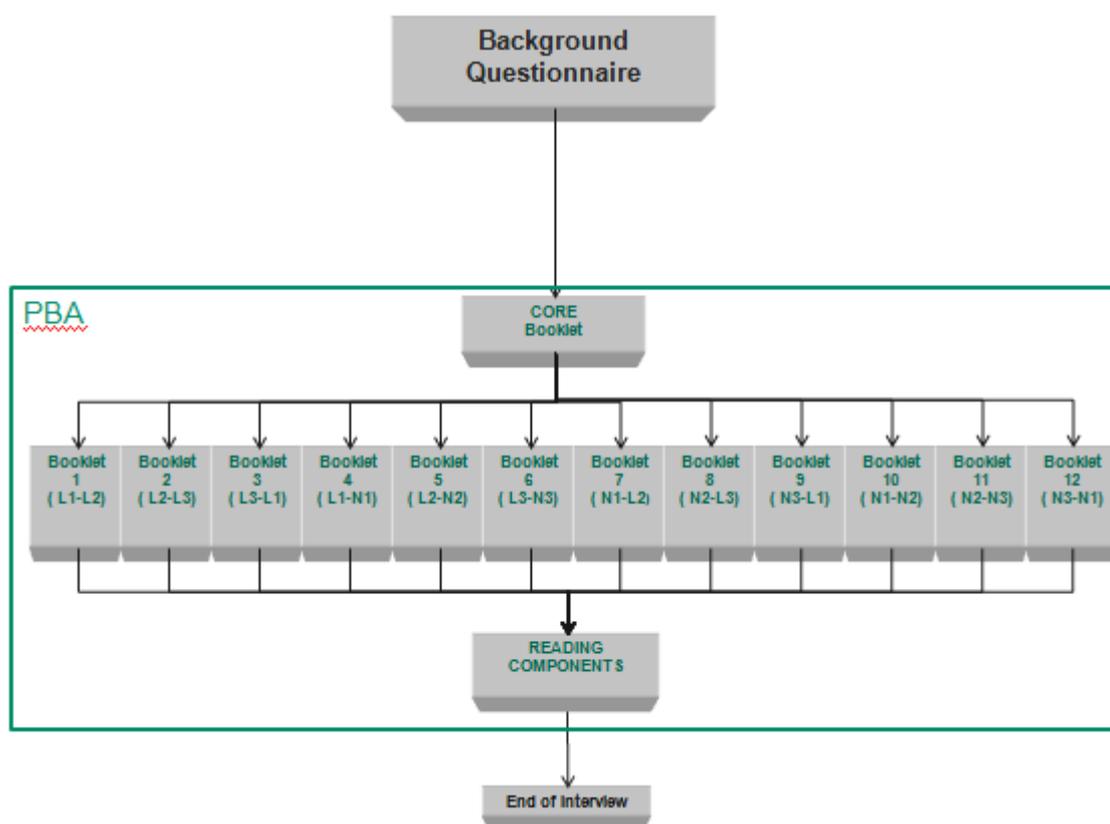
Figure 5.1b. Field Test assessment design – Paper-only design

<u>**The following is applicable to all rounds:**</u>

Standard 5.6.2 The PIAAC psychometric assessment design for the <u>main study</u> must serve several purposes, including:1) to provide good measurement of all the domains included in PIAAC and 2) to provide a baseline for assessing trends or changes over time in future rounds of PIAAC or similar assessments.

Guideline 5.6.2A The PIAAC psychometric assessment design for the main study is based on a minimum sample size of 5 000 adults per country/per reporting language. Countries that plan to report on general proficiency, regardless of the languages tested, should achieve a minimum completed sample size of 5 000 respondents for their main language.

Guideline 5.6.2B The PIAAC psychometric assessment design for the main study is based on an assumption of 60 minutes of testing time for the direct assessment. However, PIAAC is not a timed assessment and some respondents may take longer to complete the assessment. The main study has the following characteristics:

- The paper-delivered branch of the assessment will include a ten-minute Core assessment of literacy and numeracy skills. Respondents who perform at or above a minimum standard will be randomly assigned to either a 30-minute cluster of literacy or a 30-minute cluster of numeracy items, followed by a 20-minute assessment of component skills. The small proportion of respondents who perform poorly on the paper-and-pencil Core tasks will skip the literacy and numeracy items and be routed directly to the reading component skills measures.

- The computer-delivered branch of the assessment will first direct respondents to the CBA Core section, which is composed of two stages taking approximately 5 minutes each. Poor performance on either stage of the computer-based CBA Core section will result in switching over to the appropriate sections of the paper-and-pencil instruments. Respondents who fail CBA Core Stage 1 (which contains ICT related tasks), are directed to begin the paper-based Core section and proceed with the process outlined in the above bullet. Respondents who pass CBA Core Stage 1 but fail CBA Core Stage 2 (which contains six cognitive items), are then administered only the reading components tasks. Respondents who perform well on the both CBA Core sections will be routed to one of three possible outcomes (each taking approximately 50 minutes): 50% of respondents will receive a combination of Literacy and Numeracy tasks, 33% of respondents will receive Problem Solving combined with either Literacy or Numeracy and 17% of respondents will receive only Problem Solving sections.

Guideline 5.6.2C The PIAAC psychometric assessment for the main study will be implemented using the design illustrated in Figure 5-2, where L represents literacy tasks, N represents numeracy tasks and PS in TRE represents tasks involving problem solving in technology-rich environments.
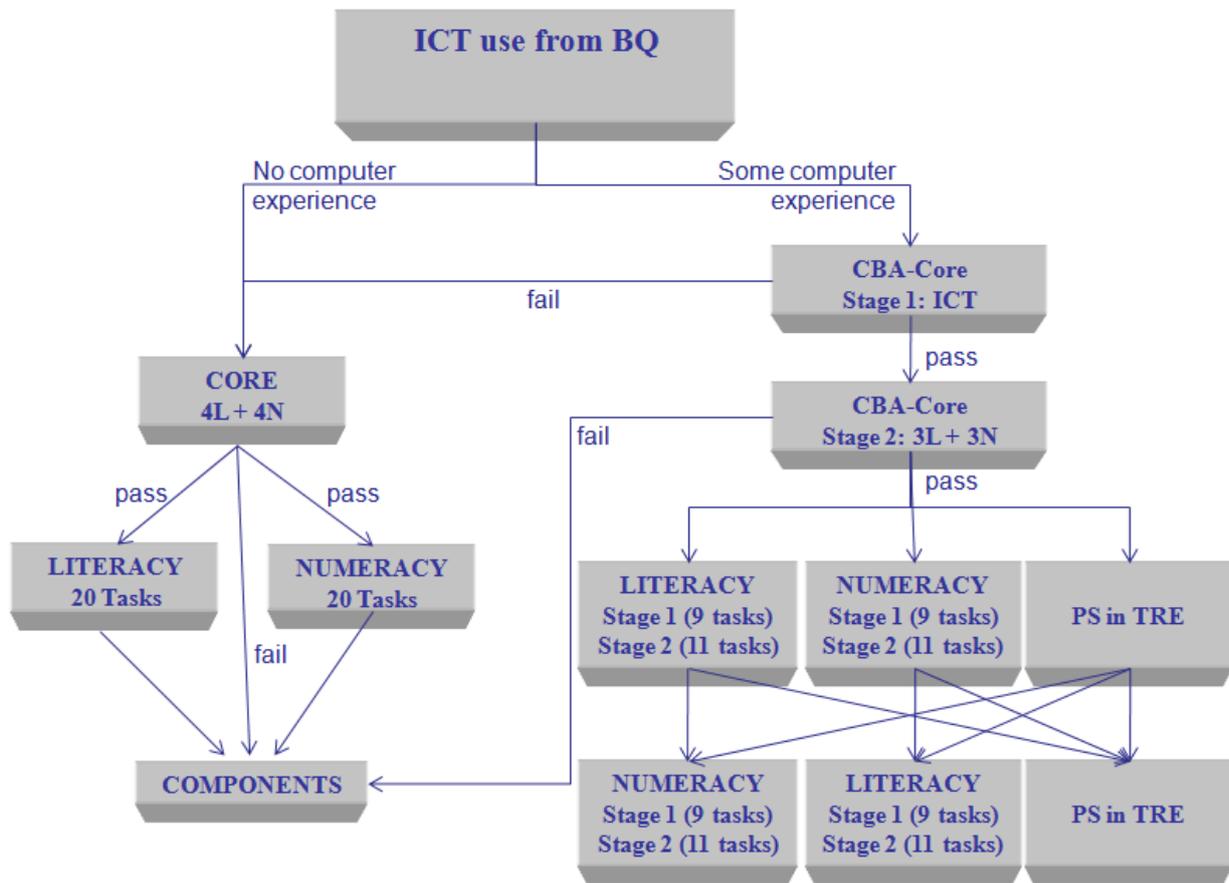
Figure 5-2. PIAAC Main Study Design for the Direct Assessment

Guideline 5.6.2D The main study computer-based assessment for literacy and numeracy, represented by each numeracy or literacy block in Figure 5-2, must be organised according to the design shown in Table 5-3. In this design, Stage 1 includes two blocks of tasks totalling 9 tasks, and Stage 2 includes two or three blocks of tasks totalling 11 tasks. Thus between stages 1 and 2, a respondent will answer 20 tasks per domain.

Table 5-3. Design of the Main Study Computer-based Assessment Instruments for Literacy and Numeracy in the Integrated Design

STAGE 1 (18 unique tasks – 9 tasks per testlet Each respondent takes 1 testlet)						
	Block A1	**Block B1**	**Block C1**	**Block D1**		
Testlet 1-1	4 tasks	5 tasks				
Testlet 1-2		"	4 tasks			
Testlet 1-3			"	5 tasks		

STAGE 2 (31 Unique Tasks – 11 tasks per testlet Each respondent takes 1 testlet)						
	Block A2	**Block B2**	**Block C2**	**Block D2**	**Block E2**	**Block F2**	**Block G2**
Testlet 2-1	6 tasks	5 tasks					
Testlet 2-2		"	3 tasks	3 tasks			
Testlet 2-3				"	3 tasks	5 tasks	
Testlet 2-4						"	6 tasks

Guideline 5.6.2E The PIAAC psychometric assessment for the main study may be modified for countries that do not intend to assess reading components, according to the following characteristics:

- The computer-delivered branch will be identical to the design shown in Figure 5-2, with all subscales.
- The sample size is unaffected by this option.

Guideline 5.6.2F The PIAAC psychometric assessment for the main study may be modified for countries that do not intend to assess problem solving in technology-rich environments, according to the following characteristics:

- The paper-delivered branch of the assessment will be identical to the design shown in Figure 5-2, with all subscales.
- The computer-delivered branch will not include the tasks involving problem solving in technology-rich environments. Respondents will be assigned to begin with either the literacy or numeracy tasks and then be routed to the alternate domain. So respondents who take literacy first will then be routed to numeracy; those who take numeracy first will then be routed to literacy.
- The sample size will decrease to 4 500 respondents.

Quality Control Procedures

The Consortium will provide all participating countries with a document explaining the psychometric assessment design and administrative procedures.

All participating countries are required to follow the international guidelines for implementing the assessment design.

5.7 INSTRUMENT REQUIREMENTS TO FACILITATE DATA PROCESSING

Purpose

To ensure that allowance has been made on the survey instruments for recording critical information (*i.e.* Sample Identification Number) for linking all survey instruments and related materials for a respondent, as well as other administrative and analytical information.

Rationale

Information for PIAAC will be collected in two modes: paper and computer. The data collected from each form should be co-ordinated and linked for later analyses. Both types of information play key roles for creating the international data file. While the computer automatically records information into a data file, paper-based instruments serve as a vehicle for recording respondent answers to questions as well as administrative information that is needed for case control purposes or that could be used for nonrespondent analyses.

Standards, Guidelines and Recommendations

Standard 5.7.1 A field for recording the respondent Sample Identification Number is required on all paper- and computer-based survey instruments (*i.e.* screening questionnaires, background questionnaires [BQs], Core and Main assessment instruments) and on any pertinent supplementary material.

> **Guideline 5.7.1A** The following information should be recorded on a paper or electronic form:
>
> - Final status code – BQ
> - Final status code – Core tasks
> - Final status code – Main tasks (paper)
> - Date of interview
> - Length of interview
>   - BQ start time and BQ end time
>   - Core tasks start and end time
>   - Main tasks start and end time
> - Language of completion for countries with more than one language
> - Interviewer Record of Contact
>   - Visit number
>   - Date
>   - Time
>   - Contact status code
> - Number of visits
>
> **Guideline 5.7.1B** The response categories for questions should be pre-coded (*i.e.* the numeric codes should be included next to each response category) to facilitate the capture of the questionnaire responses. These codes should be consistent with the codes specified on the International File Layout; otherwise, the captured data must be recoded to conform to the International File Layout.
>
> **Guideline 5.7.1C** The Record of Contact is required as a source of information for nonresponse analysis. The interviewer should record the Record of Contact information each time a contact attempt

is made to a selected household, including the attempt that results in a completed interview. The Contact Status Code will be coded using the list of final status codes.

Quality Control Procedures

The Consortium will ensure that the computer-assisted personal interviewing system that delivers the BQ addresses the requirements of data processing, identification of completed cases and nonresponse analyses.

The Consortium will provide detailed directions and information through training manuals and sessions for participating countries and their interviewers.

6. TRANSLATION AND ADAPTATION STANDARDS

6.1 NEWLY DEVELOPED COGNITIVE TEST ITEMS

Purpose

To ensure that the same skill assessment information is collected across countries, across delivery modes (paper-and-pencil vs. computer-based), where applicable, and from one PIAAC cycle to the next.

Rationale

If valid comparisons of assessment results are to be made across countries, across delivery modes and from one cycle to the next, the equivalence of different language versions of the assessment instruments is essential. For cognitive test instruments, "equivalence" refers to semantic equivalence (content), as well as equivalence in terms of register, style, readability and other characteristics likely to affect psychometric properties. Adaptations must conform to the PIAAC Adaptation Guidelines.

Standards, Guidelines and Recommendations

Standard 6.1.1 All PIAAC cognitive test instruments will be evaluated for linguistic correctness and for equivalence to the source version. Every effort will be made to produce psychometrically equivalent instruments in each national language being tested. Adaptations to the local context and/or for the mode of delivery (paper-and-pencil vs. computer-based) will be made as needed and must be documented and agreed upon.

Guideline 6.1.1 The participating countries are responsible for the translation of data collection instruments and their adaptation to national circumstances. The Consortium provides support in the form of:

- Source versions that have been reviewed for language and cultural issues.
- Translation and adaptation guidelines, both general and item specific. The item-specific guidelines will be listed in specially designed Verification Follow-up Forms that accompany each instrument throughout the translation/adaptation and verification process.
- A translation and adaptation training module.

Recommendation 6.1.1A The recommended procedure for developing the national versions is double translation by two independent translators, followed by reconciliation by a third translator.

Recommendation 6.1.1B It is also recommended that translations be reviewed by a national panel of domain and/or survey experts.

Quality Control Procedures

All national versions of newly developed materials will go through full verification before the field test, in a two-step procedure:

1. Sentence-by-sentence check of linguistic correctness, equivalence to the source version and appropriateness of national adaptations. Suggested corrections will be listed and justified in the Verification Follow-up Form.
2. Final optical check to verify the final layout of the instruments after verification, the equivalence of computer and paper forms, and the correct implementation of verifiers' crucial suggestions from the first step.

A system will be used for archiving and "locking" the national versions used in the field test, with a view to allowing main study revisions only in case of changes in the source version or to address identified residual translation or adaptation defects.

All national versions of revised materials will go through partial verification before the main study. This procedure will focus on checking whether edits made between the field test and the main study comply with the PIAAC translation and adaptation guidelines and have been correctly implemented.

A system will be used for archiving and "locking" the national versions used in the main study, with a view to their possible reuse in a future PIAAC cycle.

6.2 BACKGROUND QUESTIONNAIRE AND JOB REQUIREMENTS APPROACH MODULE

Purpose

To ensure that comparable information on respondents' background is collected across countries and, where applicable, from one PIAAC cycle to the next or in relation to previous surveys.

Rationale

If the assessment results are to be validly related to comparable background data across countries, the comparability of different language versions of the instruments is essential. For questionnaires, "comparability" refers to linguistic equivalence (content, register, style and readability), adjusted for controlled adaptations to local context.

Standards, Guidelines and Recommendations

Standard 6.2.1 Adaptations to the local context must first be documented and agreed upon, so that the Consortium can prepare a customised source version reflecting those adaptations. In particular, wherever national classifications are used to capture information such as educational attainments or occupation categories, it must be possible to map these to the appropriate international classifications. All national versions of PIAAC questionnaires will then be evaluated for linguistic correctness and equivalence to the customised source version.

> **Guideline 6.2.1** The participating countries are responsible for the translation of data collection instruments and their adaptation to national circumstances. The Consortium provides support in the form of:
>
> - Production of customised English source versions that include agreed-upon national adaptations.
> - Translation and adaptation guidelines, both general and item specific. The item-specific translation guidelines will be provided in the appropriate international questionnaire MS.
>
> **Recommendation 6.2.1A** The recommended procedure for developing the national versions of the BQ is double translation by two independent translators, followed by reconciliation.
>
> **Recommendation 6.2.1B** It is recommended that the reconciliation process include review input by national experts in survey methodology and the various domains covered by the BQ. The reconciliation procedure needs to be documented.

Quality Control Procedures

All national versions of questionnaires will go through an adaptation agreement process and a full verification before the field test, in a three-step procedure:

1. Negotiation and approval of adaptations, to ensure that, for example, national classifications can be mapped to the international classifications, using the BQAS as support. Once agreement is reached, the customised source version reflecting approved adaptations will be produced.
2. Sentence-by-sentence check of linguistic correctness, equivalence of the national version to the customised source version, and correct implementation of approved national adaptations. Suggested corrections will be listed and justified in the BQAS.

3. Final check to verify the correct implementation of verifiers' crucial suggestions from the second step.

A system will be used for archiving and "locking" the national versions used in the field test, with a view to allowing main study revisions only to address identified residual translation or adaptation defects.

All national versions of revised materials will go through partial verification before the main study. This procedure will focus on checking whether the edits made between the field test and the main study comply with the PIAAC translation and adaptation guidelines and have been correctly implemented.

A system will be used for archiving and "locking" the national versions used in the main study, with a view to their possible reuse in a future PIAAC cycle.

6.3 COGNITIVE TEST ITEMS USED FOR LINKING

Purpose

To ensure that PIAAC collects the same skill assessment information as the International Adult Literacy Survey (IALS) and the Adult Literacy and Lifeskills Survey (ALL), for the purpose of analysing trends.

Rationale

If valid comparisons are to be made between the assessment results of PIAAC and the previous surveys, it is essential to use the same instruments ("if you want to measure change, don't change the measure").

Standards, Guidelines and Recommendations

Standard 6.3.1 Test items used for linking will be administered unchanged from their previous administration. Any changes needed because of format, delivery mode or other reasons must be documented and agreed upon.

> **Guideline 6.3.1A** Participating countries that participated in IALS and ALL are responsible for the preparation of their linking items. The Consortium will provide support in the form of instructions.

> **Guideline 6.3.1B** For participating countries that did not participate in IALS and ALL, the linking test items will have the same status as newly developed test items. (See Section 6.1.)

Quality Control Procedures

For countries that participated in IALS and ALL, all national versions of linking items will be evaluated for equivalence to the PIAAC source version before the field test, in a two-step procedure:

1. Sentence-by-sentence check of linguistic correctness, equivalence to the PIAAC source version, and appropriateness of national adaptations and any changes needed because of format, delivery mode or other reasons. Suggested corrections will be listed and justified in the Verification Follow-up Form. Verifiers will receive special instructions not to make any cosmetic changes or suggestions for improvement if the country is using a previously administered version and if that country has documented changes or adaptations to that version.
2. Final optical check to verify the final layout of the instruments after verification, evaluate the equivalence of computer and paper forms, and verify the correct implementation of verifiers' crucial suggestions from the first step.

A system will be used for archiving and "locking" the national versions used in the field test, with a view to allowing main study revisions only to address identified residual translation or adaptation defects (which may sometimes be needed even though such changes interfere with the ability to analyse trends).

All national versions of revised materials will go through partial verification before the main study. This procedure will focus on checking whether the edits made between the field test and the main study are justified and have been correctly implemented.

A system will be used for archiving and "locking" the national versions used in the main study, with a view to their possible reuse in a future PIAAC cycle.

7. INFORMATION TECHNOLOGY STANDARDS

7.1 HARDWARE (LAPTOP COMPUTER) SPECIFICATIONS AND MINIMUM CAPABILITIES

Purpose

To ensure that the laptop computers used in the survey meet certain minimum requirements, thereby preventing problems with instrument delivery.

Rationale

Because the TAO platform used in the survey will be based on a virtual machine, the laptop computers must meet certain hardware requirements for functionality. In particular, the standards for CPU and memory configurations must be met to limit the possibility of software failure.

Standards, Guidelines and Recommendations

Standard 7.1.1 At a minimum, laptop computers used in PIAAC should have the following hardware configuration:

- An x86-32-based 1,5 gigahertz (GHz) Intel or AMD processor (*e.g.* Intel Pentium 4, AMD Athlon XP);
  - o NOTE: this processor speed is the absolute minimum to enable the PIAAC execution environment. It should be noted that user experience will be limited if the minimum processor speed is used or only marginally exceeded.
- At least 1 gigabyte (GB) of random access memory (RAM) (for 32-bit operating systems) or 2 GB of RAM (for 64-bit or Windows Vista operating systems);
  - o NOTE: see above: this is the absolute minimum to allow the execution of the PIAAC VM and the system will run with this amount of memory but swapping may occur (also depending on the configuration of the host system). In addition, swapping can slow down the execution of the PIAAC VM substantially.
- A 14" thin film transistor (TFT) colour screen;
  - o NOTE: A bigger screen is not necessarily better – see below note related to resolution.
- A 1 024 x 768 (XGA) resolution;
  - o NOTE: PIAAC is designed to run at exactly 1024x768 to ensure comparability. This means that any deviation from this resolution as well as from the screen size ratio (4:3) may cause problems. Therefore we strongly recommend a large screen with a 4:3 ratio and not too high a resolution.
- 10 GB of free space on the hard drive;
- Two batteries with at least two hours of run time;
- A device for storing or uploading data files, as defined in the country's specifications (*e.g.* a network connection, a USB stick or CD/DVD-burning equipment).

Guideline 7.1.1A The above-mentioned processor speed and memory size are necessary to provide a stable environment for the TAO platform. For systems equipped with less than these minimum requirements, the functionality of the software cannot be guaranteed.

Guideline 7.1.1B It is getting increasingly difficult to buy laptops with 4:3 ratio screens. If such a laptop cannot be found, the Consortium recommends a wide screen display laptop that partly matches the recommendation. An example would be 1 366 x 768 (16:9, WXGA). The Consortium recommends previewing the laptops at the 1 024 x 768 resolution prior to ordering a large number of them if at all possible. Text should be as sharp and clear as possible, with minimal fuzziness due to scaling.

Guideline 7.1.1C The laptop computers must include either a CD/DVD drive, a USB port or a network connection for software installation, uploading of data and backup.

Guideline 7.1.1D All specifications mentioned above are minimum requirements to run the TAO platform. For optimal results, the configuration described in Recommendation 7.1.1B will be preferred.

Recommendation 7.1.1A The following hardware configuration will also be beneficial for information technology operations:

- A modem, network or wireless interface (depending on the specific country management interface required);
- A network connection for uploading data files to web services or as an alternative for installing software if no CD/DVD drive can be provided;
- A CD/DVD drive for software installation;
- Alternatively, a USB interface for software installation, data file storage and backup.

Recommendation 7.1.1B The following laptop computer configuration is recommended by the Consortium for optimal performance:

- An x86-64-based multi-core Intel or AMD processor (*e.g.* Intel Core 2 Duo/Quad, Intel Core i5/i7 multicore series, AMD Turion, AMD Phenom);
- 2 GB of RAM;
- Use of a solid state drive (SSD) instead of a normal hard disk drive (HHD) for improving Virtual machine (VM) boot-up times and overall performance;
- If the laptop is using a 32-bit operating system - a maximum of 3 GB of RAM, as many laptop computer chipsets are not able to handle more memory;
  - o NOTE: Since the time of writing of the first version of the standards this seems to have changed; nowadays many laptops are sold with 4 GB of RAM. If the vendor officially supports 4 GB, full functionality can be expected. Nevertheless stability should be tested with one sample laptop to see if the notebook chipset or 32-bit Operating System can handle this amount of memory.
- A 15" or larger colour TFT screen with no glare;
  - o NOTE: 4:3 screen ratio with a resolution that is not too high. See the comments in guidelines 7.1.1B.
- A USB interface, if data are to be backed up on USB sticks;
- A CD/RW or DVD/RW drive, if data are to be backed up on CD-Rs or DVD-Rs;
- Two batteries with four or five hours of run time (or additional battery packs with less run time).

Recommendation 7.1.1C The Consortium recommends that each country use a single configuration, to reduce risks, limit the level of configuration and technical support required, and increase the overall

reliability and stability of the platform during the field period. If this approach is adopted, countries ought to use PIAAC laptop computers only for the PIAAC field test and main study and not for other surveys.

Quality Control Procedures

Before the beginning of the field test, countries will be required to document their laptop computer configuration.

7.2 OPERATING SYSTEM STANDARDS

Purpose

To ensure that the operating system on PIAAC laptop computers is compatible with the survey software.

Rationale

Because the TAO platform used in the survey is based on a virtual machine using VMware products, only operating systems that are compatible with this software can be used for PIAAC.

Standards, Guidelines and Recommendations

Standard 7.2.1 The operating system must be compatible with VMware software (*e.g.* VMware Player 3 for Windows).

Standard 7.2.2 The Consortium will support the operating systems Windows XP Professional (32-bit version), and Windows Vista Business, Enterprise, or Ultimate (32-bit or 64-bit version) and Windows 7 Business, Enterprise or Ultimate (32-bit or 64-bit version) in combination with VMWare Player 3.

> **Guideline 7.2.2** The Macintosh OS 10.x and Linux (kernel > 2.6.x) operating systems can be supported upon special request.

> **Recommendation 7.2.2** It is recommended that the Microsoft operating systems be used for the survey.

Quality Control Procedures

Before the main study, countries will be required to document the operating system to be used on their laptop computers. This documentation must be sent to the Consortium for review prior to beginning testing of national main study virtual machines.

7.3 SOFTWARE AND HARDWARE CONFIGURATION STANDARDS

Purpose

To ensure that minimum software and hardware configuration standards are met by each country.

Rationale

Because of differences in information technology configurations between countries, the Consortium cannot require a specific configuration. However, the software and hardware configuration standards described below can be considered an absolute minimum for operation.

Standards, Guidelines and Recommendations

Standard 7.3.1 On each laptop computer, participating countries must install a VMware workstation-level product such as VMware Player 3, VMware Workstation 8 or VMware Fusion (Macintosh OS only). Because the TAO platform operates within a virtual machine with its own drivers and software interfaces, there will be no limitations on the software used on the host system.

Standard 7.3.2 The user starting the virtual machine must have rights to save data into the specified data folder.

Standard 7.3.3 The delivery and data folder must be implemented with a directory structure that can be processed by VMware products.

Quality Control Procedures

Before the main study, countries will be required to document their software and hardware configurations as well as their country-specific laptop computer configuration. This documentation must be sent to the Consortium for review prior to beginning testing of national main study virtual machines.

Countries will be required to follow pre-defined test scenarios provided by the Consortium. Documentation of successful tests must be provided to the Consortium.

7.4 SOFTWARE INTERFACE STANDARDS FOR INTEGRATION WITH COUNTRY-SPECIFIC MANAGEMENT SYSTEMS

Purpose

To describe minimum standards for integration of PIAAC survey systems with country-specific management systems.

Rationale

Local information technology processes within a country, and thus the documentation of these processes, cannot be specified by the Consortium. These standards for the integration of PIAAC survey systems with country-specific management systems can be considered an absolute minimum for operation.

Standards, Guidelines and Recommendations

Standard 7.4.1 The TAO platform will deliver data files in the standard industry format XML. The PIAAC Consortium will additionally offer a data extraction tool for preprocessing and parsing the XML data files.

> **Recommendation 7.4.1** The Consortium will also offer software interface standards with embedded encryption for security reasons.

Quality Control Procedures

Before the main study, countries will be required to document the interaction of the PIAAC survey systems with their country-specific management system. This documentation must be sent to the PIAAC Consortium for review prior to beginning testing of national main study virtual machines.

Countries are required to perform tests specified by the Consortium. These include tests for installing and interacting with preliminary versions of the virtual machine to be used for instrument delivery. Test results must be provided to the Consortium.

7.5 SOFTWARE CONFIGURATION MANAGEMENT STANDARDS

Purpose

To recommend software configuration management standards that will ensure stability in the interaction between the TAO platform and the software already installed on survey laptop computers.

Rationale

Because software installation and update management will be country specific and will not be performed by the Consortium, the consortium can specify only the software configuration for the internal components of the TAO platform's virtual machine. The Consortium cannot specify standards for managing the configuration and versioning of third-party software also installed on the interviewers' laptop computers. Therefore, this section is limited to providing recommendations for countries that have not yet implemented such a system.

Standards, Guidelines and Recommendations

Recommendation 7.5.1 Even though standards cannot be specified, the Consortium recommends industry-standard procedures such as ITIL or COBIT for this purpose.

Guideline 7.5.1A Within the TAO platform, configuration management is performed according to the following workflow:

- Management and planning (the process is started by ongoing software development or update demands)
- Configuration and identification
- Configuration control
- Configuration status accounting
- Configuration verification and audit

Guideline 7.5.1B All versioning or tests will be performed within the virtual platform, so no physical testing lab is necessary. After changes have been audited and documented, updated virtual machines will be delivered to the National Information Technology Co-ordinators, who can simply exchange the former virtual machine with the new version by simply copying the virtual hard drive. In addition to exchanging the entire virtual machine, a script-based patching mechanism will be implemented for minor changes.

Quality Control Procedures

Before the main study, countries will be required to document the software configuration management procedures for their laptop computer configuration. This documentation must be sent to the Consortium for review prior to beginning testing of national main study virtual machines.

Countries are required to perform tests of the VM delivery system and of the patching system. These will be provided by the Consortium. The test status must be provided to the Consortium.

7.6 CENTRAL TECHNICAL SUPPORT STANDARDS

Purpose

To define the standards for central technical support to be provided by the Consortium through the international helpdesk.

Rationale

The Consortium will provide support for participating countries beginning at the design stage of the project and continuing through survey operations and final data delivery. Throughout the project, the National Information Technology (IT) Co-ordinator will act as the primary point of communication regarding the IT aspects of the project. The National IT Co-ordinator should be knowledgeable about IT and familiar with survey operations in his/her country.

Standards, Guidelines and Recommendations

Standard 7.6.1 The Consortium will establish a helpdesk where trained staff will triage problems as they are reported by the National IT Co-ordinators, direct the problem to the appropriate contractor or staff for resolution, and track the problems to ensure that they are resolved. The National IT Co-ordinator will therefore collect all IT-related problems within his/her country and forward to the PIAAC helpdesk problems that s/he cannot resolve.

Standard 7.6.2 Stand-by phone support will not be provided for the main study. Instead, the Consortium will replace it with phone conferences with IT-related Consortium members on individual problems. The Consortium will offer the opportunity for countries to arrange online meetings or phone conferences as countries' demand.[16]

> **Recommendation 7.6.2** Although telephone support on stand-by will not be provided in the main study, individual countries are encouraged to implement a 24/7 IT support hotline to provide first-level support.

Standard 7.6.3 The Consortium's goal will be to resolve problems as quickly as possible using a knowledgebase of previously reported problems and their solutions. Problems will be prioritised based on how critical they are to data collection. After a first automated response, the Consortium will acknowledge receipt of a problem report within one business day (Middle European Time) and provide an estimated date and time of resolution.

Standard 7.6.4 The Consortium will maintain statistics on the number and type of problems reported, as well as the length of time required to resolve reported problems. Resolution procedures may be changed according to criticality levels and measured response times for appropriate solutions.

Standard 7.6.5 All of the above-mentioned standards are to be implemented and documented on the Consortium's local Open Ticket Response System (OTRS) server, which will be available through Internet connectivity on a 24/7 basis (meaning availability 24 hours a day, seven days a week, with an industry-standard failure percentage). OTRS is an open source product and is now considered to be one of the industry standards in ticketing systems.

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[16] Eliminating stand-by phone support for the main study was agreed to by the Information Technology (IT) Co-ordinators at their Vienna meeting on 28th/29th of October 2010.

Quality Control Procedures

Before the main study, countries will be required to document their technical support procedures. This documentation must be sent to the Consortium for review prior to beginning testing of national main study virtual machine.

The Consortium will collect all problem reports in the OTRS database and prepare regular reports on the stability and reliability of the platform.

7.7 COUNTRY-SPECIFIC TECHNICAL SUPPORT STANDARDS

Purpose

To define expectations for country-specific technical support provided by each country's national helpdesk.

Rationale

The countries or their information technology (IT) contractors will be primarily responsible for resolving PIAAC-related operational issues in their countries, including hardware issues (replacing or repairing interviewer laptop computers, providing backup laptop computers), survey operations (assigning cases to interviewers, resolving interviewer questions, resetting cases to a prior state, removing or saving data from a laptop computer), resolving most questions about the content of the study, and tracking and reporting problems with the computer platform or applications.

Standards, Guidelines and Recommendations

Standard 7.7.1 The National IT Co-ordinator will be responsible for the following tasks and procedures:

- Obtaining sufficient laptop computers to support survey operations, including spare laptop computers for backup purposes in case of hardware failures;
- Configuring these laptop computers with survey software to Consortium specifications;
- Testing the TAO system on country laptop computers, as specified by the Consortium;
- Training interviewers in the operation of the laptop computers and the survey software;
- Operating a national helpdesk to provide technical support for interviewers during the field period;
- Extracting survey data from laptop computers and managing the formatting and cleaning of the data for delivery to the Consortium.

Recommendation 7.7.1 The Consortium recommends that each country have a designated PIAAC helpdesk, with contact information provided to each of its interviewers and supervisors. The country helpdesk staff must be familiar with the PIAAC computer platform, applications, and training materials. Additionally, they must be familiar with all national software, standards and procedures. Staff members working on the helpdesk should attend the interviewer training sessions so they learn to use the applications and appreciate the challenges faced by the interviewing staff.

Quality Control Procedures

Before the main study, countries will be required to document their technical support procedures. This documentation must be sent to the Consortium for review prior to beginning testing of national main study virtual machine.

Countries must document and report on the successful implementation of all steps listed above.

7.8 INFORMATION TECHNOLOGY DOCUMENTATION STANDARDS

Purpose

To ensure that information technology (IT) processes and standards are appropriately documented.

Rationale

Country-specific IT processes, and thus the documentation of these processes, cannot be specified by the Consortium. Nevertheless, the Consortium recommends that countries adopt documentation standards such as those specified in ISO/IEC 6592 or ANSI 10.3. The Consortium can specify IT documentation standards for only two processes: documentation of IT support cases and documentation of software development. Therefore, this section contains only the standards the Consortium will use internally. Participating countries are invited to follow this example.

Standards, Guidelines and Recommendations

Standard 7.8.1 All IT procedures must be documented.

> **Guideline 7.8.1A** Documentation of IT support processes will be automated through the Open Ticket Response System (OTRS). (See Section 7.6.) OTRS can be used to document all support cases, to sort them according to specified parameters and to generate reports or automated help pages. The Consortium and the National IT Co-ordinators will be able to view these reports and generate help files within the system.

> **Guideline 7.8.1B** Documentation of internal software development will be performed using the MANTIS bug-tracking system. MANTIS is a documentation system similar to OTRS, but with a stronger focus on versioning and software coding. All changes in code, remarks or versions can be followed by all participating Consortium software developers. Furthermore, the system will provide automatic reporting and change management.

> **Guideline 7.8.1C** Additional documentation for National IT Co-ordinators will be provided in HTB user manuals, which will be continuously revised during the project to reflect enhancements, and through web-based or video-based training materials.

> **Guideline 7.8.1D** The Consortium will also provide documents and procedures for using the authoring tools to develop the background questionnaire and the job requirements approach module and to handle the delivery system. These documents will include easy step-by-step (scripted) instructions. These instructions will reflect all human-computer interactions with the authoring tools and the delivery system and will include screen shots of all major interactions with these entities, as well as information about what to do in case problems emerge. These documents will be available as separate files for download and will also be included in the help system of the authoring tools and the delivery system. They will be continuously revised to reflect system enhancements and address comprehension problems. These documents will be delivered only for the specified baseline system. Countries that choose to change the baseline system will be responsible for changing the contents of the help system accordingly.

Guideline 7.8.1E All instructional materials will be documented, including a manual for data collectors and a training guide for trainers. Both will be developed in English. The training guide will include a fully scripted training programme, to ensure standardisation across training sessions and countries. A variety of approaches to training will be included (*e.g.* lectures, exercises and hands-on practice).

Quality Control Procedures

Before the main study, countries will be required to document their documentation standards. This documentation must be sent to the Consortium for review prior to beginning testing of national main study virtual machine.

8. FIELD MANAGEMENT STANDARDS

8.1 ORGANISATION OF DATA COLLECTION STAFF

Purpose

To ensure a high-calibre and well-organised data collection staff, which is of critical importance to data quality.

Rationale

Interviewers are a component of survey error which can be minimised through frequent monitoring by supervisory staff. Close supervision and mentoring of the data collection staff are required to produce the best quality study data. The supervisor-to-staff ratio should be low enough that supervisors are able to monitor whether interviewers are following all study procedures and administering the instruments as designed. Monitoring is required to uncover potential issues that may have an impact on the survey data and to allow for opportunities to provide and receive feedback at all levels of the field management structure.

Standards, Guidelines and Recommendations

Standard 8.1.1 The successful implementation of data collection requires a variety of staff – including interviewers, supervisors, field managers and a field director – with clearly defined roles and responsibilities.

> **Guideline 8.1.1A** Several factors determine the number of interviewers required for data collection (see Standard 8.3.1). The interviewer's duties should include the following:

- Completion of interviewer training (see Section 9.4);
- Location of sampled persons/households;
- Administration of survey instruments following the PIAAC procedures;
- Submission/transmission of survey data in a timely manner;
- Reporting to a supervisor on a regular basis;
- Performance of various administrative procedures.

> **Guideline 8.1.1B** There should be at least 1 supervisor for approximately 15 to 20 interviewers, making up one "region," as defined for work purposes. The supervisor's duties should include the following:

- Interviewer staffing for the region;
- Completion of supervisor training (see Section 9.3);
- Participation in interviewer training (see Section 9.4);
- Day-to-day management of the field effort for the defined region, including case assignment and reassignment among interviewers;

- Ongoing monitoring of each interviewer's work, including goal setting for each interviewer;
- Involvement in the implementation of quality control procedures;
- Weekly conference calls with each interviewer;
- Nonresponse follow-up;
- Validation of each interviewer's work (see Section 9.9);
- Reporting to a field manager on a weekly basis.

Guideline 8.1.1C There should be at least one field manager for every three to five supervisors. The field manager's duties should include the following:

- Participation in supervisor and interviewer training (see Sections 9.3 and 9.4);
- Oversight of interviewer hiring;
- Ongoing monitoring of each region's work;
- Supervision of the supervisors;
- Weekly conference calls with each supervisor in his/her assignment;
- Development and implementation of techniques for motivating interviewers, reassigning cases, converting nonresponse and related functions;
- Reporting to the field director on a weekly basis.

Guideline 8.1.1D There should be one field director overseeing the entire effort. The field director's duties should include the following:

- Development of a field plan, including determination of the number of interviewers to be hired (see Standard 8.3.1);
- Hiring of field managers and supervisors;
- Preparation of materials for and conduct of supervisor training (see Section 9.3);
- Preparation of materials for interviewer training (see Section 9.5);
- Ongoing monitoring of the entire data collection effort, including interviewer production and costs, with particular attention to quality control procedures;
- Supervision of the field managers;
- Weekly conference calls with the field managers;
- Development of various reports for project management, including production reports, as well as responses to ad hoc requests;
- Development and implementation of strategies in response to issues that arise during data collection, such as high levels of nonresponse or the need for attrition training.

Recommendation 8.1.1A To produce a strong project team, members at the upper levels of the management structure should have worked together effectively on similar projects.

Recommendation 8.1.1B The field director should be based at the survey institute's home office, while the field managers and supervisors may operate from the field.

Standard 8.1.2 Staff must remain in close, regular communication throughout the data collection period.

Guideline 8.1.2A Field supervisors should have weekly conference calls with each interviewer to discuss progress and problems, productivity and response rates, and a strategy for the completion of remaining cases in the assignment.

Guideline 8.1.2B Field managers should have weekly conference calls with each supervisor in their assignment to discuss progress toward production and cost goals, review travel plans, assess interviewer resources within the region, and identify potential problems.

Guideline 8.1.2C The field director should have weekly conference calls with the field managers to discuss data collection progress and issues that have occurred in the field and to review production and cost reports.

Guideline 8.1.2D In addition to scheduled weekly conference calls between data collection staff, the interviewers, supervisors, field managers and field director should be available on a daily basis by e-mail or telephone to provide status updates, answer questions or provide other information.

Recommendation 8.1.2 Countries should develop a monthly newsletter as a way of sharing information among the field staff and fostering concepts of teamwork. The newsletter should report regional and overall production. It can also be used as a forum for improving aspects of the fieldwork, for instance, sharing ideas for working difficult cases, new approaches to increase productivity or techniques for convincing reluctant respondents to participate.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their proposed management structure and their plan for facilitating communication at all levels.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report the status of recruitment and hiring of field staff and field management for the field test and the main study.

8.2 SUPERVISION AND MONITORING OF DATA COLLECTION STAFF

Purpose

To ensure that data collection is being conducted according to PIAAC standards and that data collection staff are administering the instruments in a manner that is consistent with the defined PIAAC procedures.

Rationale

To minimise interviewer error and to ensure the collection of high-quality data, continual monitoring of the data collection staff and the data collected at all levels of the data collection process is required. Automated reports, used in conjunction with other measures, are integral to the successful monitoring of data collection.

Standards, Guidelines and Recommendations

Standard 8.2.1 Data collection must be very closely monitored at all stages.

> **Guideline 8.2.1A** Weekly conference calls should be held between all staff working on the project. As discussed in Section 8.1, the field director should have regular discussions with each field manager, the field managers should have regular discussions with each supervisor, and the supervisors should have regular discussions with each interviewer.

> **Guideline 8.2.1B** Interviewers' work should be monitored throughout the data collection period using various methods and techniques, including review of tape-recorded interviews, validation, automated editing systems, review of completed materials, and automated reports. (See Section 10.9 for a full discussion of quality control measures.) Ongoing monitoring of each interviewer's work should assess factors such as the quality of the completed interviews, the number of completed interviews, the response rate attained, the average interview duration and interviewer costs.

> **Guideline 8.2.1C** Interviewers must transmit interview data on a daily basis to guarantee that the automated reports reflect the current status of data collection. Automated reports are a key component of the review of interviewers' work and are instrumental to the weekly report calls.

> **Recommendation 8.2.1** Supervisors or field managers should perform in-person observation of interviewers' performance, particularly staff new to interviewing or those who passed training, but experienced difficulty. (See Section 10.9.)

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their adherence to the standards and guidelines developed for data collection supervision and monitoring of the data collection staff.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the status of data collection supervision and monitoring and the techniques being used.

8.3 PREPARING FOR THE HIRING AND MANAGEMENT OF DATA COLLECTION STAFF

Purpose

To ensure that adequate time is devoted to all components of the hiring process, including locating, interviewing and hiring high-quality candidates for PIAAC.

Rationale

The quality of the data collection staff significantly affects the quality of the data collected. Therefore, ample time must be devoted to thoughtful planning of the field staff resources required for PIAAC. Consideration must be given to a variety of issues, including the size of the field staff and their desired characteristics.

It is also important to ensure that the interviewers are assigned a manageable workload and that the remuneration method is not a deterrent to data quality. Levels of interviewer pay, as well as the pay structure, can affect interviewers' motivation to work hard to enhance their response rates. If an interviewer is paid for the number of hours actually worked (*e.g.* hourly wage or weekly salary), s/he is more likely to devote time to other important aspects of data collection, such as refusal avoidance and refusal conversion. Payment on a piecework basis increases the risk that the quality of an interviewer's work may suffer.

Standards, Guidelines and Recommendations

Standard 8.3.1 Several diverse factors must be considered when determining the number of field staff required for a successful PIAAC effort.

> **Guideline 8.3.1A** Countries need to determine the number of interviewers needed to obtain the desired number of completes by estimating the number of hours required per complete based on past experience in similar national surveys. Every country has different political, economic, social, and geographical "factors/environments" which impact survey participation.
>
> For the main study, countries should use their field test experience along with other national data to estimate hours per complete. For the field test, countries should use experiences in other household surveys in the country. Countries which have little or no experience with household surveys should consult with PIAAC Round 1 or Round 2 countries with similar "environments."
>
> For a 2 hour interview, the Consortium estimates that the range of hours per complete in a given country can vary between 6 and 14 hours if a country is expected to achieve a 70 percent response rate. Factors which can affect hours per complete include: (1) having a list sample versus the need to screen (screening could add about one hour to the estimate); (2) average travel time for each case, which is impacted by the size of the primary sampling unit and the clustering of the sample design; (3) typical number of contacts necessary to obtain a complete; (4) and management style of survey organisation ("tight" vs. "loose," focus on accountability of employees, etc.).
>
> However, other factors may also impact the number of interviewers needed to conduct a successful survey. They can include: (1) number of hours the typical interviewer works each week on PIAAC (less than 20-25 will be problematic); (2) flexibility of interviewers to work evenings and weekends; (3) typical interviewer attrition; (4) wage structure (hourly pay vs. unit pay); and (5) the number of experienced vs. non experienced interviewers/supervisors hired.

Guideline 8.3.1B Based on the survey institute's staff retention experience, countries should plan to over-hire by a large enough percentage to account for attrition during all stages of the data collection effort, including training and production.

Guideline 8.3.1C Countries should hire a minimum of two interviewers per staffing area, as this ensures adequate coverage for an area and avoids the need to have interviewers travel in case of attrition, interviewer illness or vacation, or other factors.

Guideline 8.3.1D The final determination of the target number of field staff to be recruited and hired should be made at least 12 weeks before the start of data collection.

Standard 8.3.2 Adequate time must be allotted for data collection staff recruiting and hiring.

Guideline 8.3.2A To ensure the availability of sufficient staff to conduct interviewer recruiting and hiring, field managers and regional supervisory staff must be assigned to PIAAC at least 10 weeks before the start of data collection.

Guideline 8.3.2B Interviewer recruiting and hiring should commence at least 8 weeks before the start of data collection to ensure sufficient lead time to conduct all steps of the process, including identifying, interviewing and hiring candidates.

Standard 8.3.3 Countries will be responsible for hiring the required number of interviewing staff with the desired characteristics.

Recommendation 8.3.3A Countries should attempt to hire interviewers with at least two years of experience in conducting household surveys, as there is evidence that more experienced interviewers tend to achieve higher response rates. Similarly, countries should attempt to hire supervisors with interviewing experience and field managers with supervisory experience.

Recommendation 8.3.3B Other desirable interviewer characteristics include experience with literacy-related surveys, experience with surveys involving computer-assisted interviewing, and computer or typing experience.

Recommendation 8.3.3C To improve cost efficiency, interviewers should live within close proximity of the assignment location. Hiring interviewers indigenous to the area also appears to increase response rates, as local interviewers are more available to visit reluctant respondents and have a greater chance of building rapport by identifying with local interests.

Recommendation 8.3.3D In determining which language skills are appropriate for interviewers, countries should consider the languages in which the interview will be administered, as well as the languages spoken by large numbers of special populations.

Recommendation 8.3.3E Countries should consider the racial and ethnic diversity of the population, as hiring interviewers of various backgrounds may help to establish respondent rapport.

Standard 8.3.4 Countries will employ a sufficient number of interviewers so that the maximum assignment size for an interviewer is 40 completed assessments per month.

Guideline 8.3.4A Interviewers must be able to devote, on average, at least 20 hours per week to the project and must be available during a variety of hours – weekdays, weekends, daytime and evenings.

The average duration of the PIAAC interview is approximately 90 to 105 minutes, excluding the time needed to identify the respondent, explain the survey and convince the respondent to participate. It is expected that an interviewer will be able to conduct no more than two interviews per day for 20 days per month. However, such a level of productivity should be considered exceptional, especially if sustained for a long period.

Guideline 8.3.4B Countries should specify a maximum assignment size per interviewer, as response rates can be affected by the amount of work allocated to each interviewer. The interviewer must be given an assignment that is large enough to make it financially worthwhile but not so large that it is difficult to complete in a timely manner. The assignment size will affect the amount of effort an interviewer can apply to attempting contact and securing co-operation from each sampled individual. (Once an assignment has been completed, additional assignments can be made.)

Guideline 8.3.4C Beyond assignment size, countries should ensure that interviewers are not overloaded with work from other surveys or jobs with other companies. Such competing obligations may lead interviewers to give one job priority over another, in terms of completing work on time or putting in the effort to maximise response rates.

Guideline 8.3.4D In determining assignment size, it is also important to consider the number of interviews that will be required to reach the monthly targets for completed work. For example, the monthly targets for the field test may be 700 completed interviews in Month 1, 500 completed interviews in Month 2, and 300 completed interviews in Month 3. The monthly targets for the main study may be 2,300 completed interviews in the first 3 months, 1,700 completed interviews in Months 4 through 6, and 1,000 completed interviews in Months 7 and 8. Countries should plan for the fact that cases at the beginning of the field period are typically easier to work, while those at the end require additional locating and refusal conversion efforts.

Standard 8.3.5 The basis for remunerating interviewers for their work must be independent of the number of completed interviews. In other words, interviewers are not to be remunerated on a piecework basis.

Guideline 8.3.5A The pay rates for the study must be set in relation to the length and complexity of the interview, the expected difficulties of obtaining co-operation and the amount of record keeping demanded of the interviewer.

Guideline 8.3.5B The pay rate must be attractive in relation to pay on other studies. Interviewers should be paid for the number of hours worked, rather than being remunerated based on the number of completed interviews achieved. However, it may be acceptable to remunerate the interviewer on some other basis provided that steps are taken to ensure that the interviewer's work meets a consistently high level of quality.

Recommendation 8.3.5 Interviewers can be offered incentives, on a piecework basis, for completing assigned or additional cases or for completing cases on a more timely basis. If an incentive programme is implemented, countries must closely monitor both the effectiveness of the strategy in motivating the interviewers and the quality of the data collected as part of the bonus programme. The incentive plan should be in place at the start of data collection and discussed during the hiring process so that it has a positive influence on hiring, retention and production.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their interviewer employment conditions (*e.g.* pay type and assignment size) and interviewer characteristics (*e.g.* number of years of survey experience).

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the status of interviewer retention and attrition, as well as any changes to the remuneration strategy.

8.4 RECRUITING AND HIRING DATA COLLECTION STAFF

Purpose

To recruit high-quality data collectors, in accordance with each country's hiring laws and practices.

Rationale

Data quality depends on the competence of the data collection staff. Therefore, an extensive search must be conducted to identify the best-qualified candidates for PIAAC. Various characteristics have been determined to be integral in selecting candidates. Careful attention should be given to the hiring process, as the survey institute must also conform to national laws, requirements and guidelines related to hiring.

Standards, Guidelines and Recommendations

Standard 8.4.1 Potential interviewers for PIAAC should be drawn from a variety of sources.

> **Guideline 8.4.1** At a minimum, candidate sources should include:

- Files of people who previously worked for the survey institute
- Job posting on the survey institute's website
- Recommendations from experienced supervisory staff employed by the survey institute
- Local organisations such as senior centres and libraries
- Classified advertisements

Standard 8.4.2 Various applicant qualifications must be considered during the applicant selection process to ensure a qualified and competent data collection staff.

> **Guideline 8.4.2A** The following interviewer qualifications should be considered:

- Availability during the field period and training session
- Proximity to the assignment
- Skills (*e.g.* communication, computer, language)
- Experience (*e.g.* interviewing, teaching)
- Community outreach work or sales experience
- Education
- Access to transportation

> **Guideline 8.4.2B** A telephone screening interview should be conducted with potential candidates. This interview should accomplish several purposes: 1) to inform the candidate about the potential job; 2) to inform the recruiter about the applicant's demeanour, personality, coherence of speaking, general experience and other characteristics; and 3) to eliminate people who are unable to meet the minimum requirements.

> **Guideline 8.4.2C** For candidates who pass the screening call, an in-depth recruitment interview should be conducted by the supervisor or field manager.

Guideline 8.4.2D The following elements should be considered when preparing for and conducting the in-depth interview: 1) the interview should be conducted in a professional setting, 2) 30 to 40 minutes should be allotted for each interview, and 3) interviews should be conducted in accordance with the country's laws and the survey institute's policies.

Guideline 8.4.2E The following topics should be discussed during the in-depth interviews: 1) introduction to the project, 2) review of the candidate's application or resume, 3) review of the PIAAC job description, 4) review of the candidate's availability, 5) review of access to transportation, 6) level of computer experience and familiarity, and 7) need for the candidate to pass a language certification test, if required or applicable.

Guideline 8.4.2F After the in-depth interview, countries must conduct employment verification and reference checks of candidates.

Recommendation 8.4.2A The in-depth interview should be conducted in person if possible, to allow the supervisor to assess the candidate's professional/neutral appearance. The interview can be conducted by telephone if budget or time constraints preclude an in-person interview.

Recommendation 8.4.2B Countries should consider requiring candidates to conduct a practice interview (10-15 questions) as part of the in-depth interview process.

Recommendation 8.4.2C To retain interviewing staff before and through training, countries should maintain regular contact with those who have accepted the survey institute's offer.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their plans for interviewer recruiting and hiring.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the status of recruitment and hiring for the field test and the main study.

9. DATA COLLECTION STAFF TRAINING STANDARDS

9.1 TRAINING APPROACH

Purpose

To ensure that all data collection staff are thoroughly trained in PIAAC instruments and procedures and well-prepared to collect high-quality data.

Rationale

In-person training is designed to maximise trainees' involvement and participation in the training and to provide ample opportunity for supervisory staff to observe and evaluate trainee performance. Conducting a single in-person training session enables the country to use its best training staff and allows the field period to start at the same time for all data collectors.

All interviewer training sessions must be fully scripted to ensure consistency of presentation across training rooms, which is particularly important when a large number of interviewers are being trained in separate sessions across countries. Scripted materials also ensure that all training points are adequately covered, eliminating the need for training staff to speak extemporaneously, and allowing all trainers to study the training guides in advance and rehearse their roles. To maintain trainee interest and attention, the training sessions use a mixture of presentation techniques, such as demonstrations, interactive lectures and interviews, and exercises.

Standards, Guidelines and Recommendations

Standard 9.1.1 The comprehensive interviewer training package developed by the Consortium must be used by participating countries to train their PIAAC data collectors.

> **Guideline 9.1.1A** The data collector training must be conducted in person, with some elements distributed as home study materials before the in-person session. Distributing a home study packet to trainees prior to in-person training is cost-efficient and will maximise productivity at training.

> **Guideline 9.1.1B** A detailed training agenda must be developed to ensure that training covers all aspects of the data collector's job and addresses all components of the study. The training agenda must include the length of each training session, as it will be used during training to keep the sessions on schedule.

> **Guideline 9.1.1C** The training must be fully scripted and use a variety of tools, including lectures, interactive discussions, role plays and exercises. The exercises are designed to simulate situations interviewers are likely to encounter in the field and provide a means for evaluation of the interviewers by training staff.

> **Guideline 9.1.1D** The trainer guide must include all materials to be used in training, including lecture scripts, role-playing exercises, handouts, transparencies and written exercises with answer keys.

Guideline 9.1.1E An interviewer manual must be developed to provide detailed information on the background of the study, the study design and purpose, and thorough documentation of all project procedures. Interviewers will use this as a reference after training when situations arise in the field.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their proposed approach to training and their preliminary plan for conducting the session.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the status of scheduling and conducting training for the field test and the main study.

9.2 ORGANISATION AND LOGISTICS OF TRAINING

Purpose

To provide adequate training staff, space and equipment to ensure a successful data collector training.

Rationale

To ensure that the training sessions run smoothly and that trainees are effectively instructed in all aspects of the study, countries must secure appropriate meeting space, equipment, and experienced staff and make all logistical arrangements.

Trainers must be 1) very familiar with the study and the materials and 2) effective teachers with the ability to motivate and control trainees and keep the training on schedule. Adequate space, equipment and logistical planning are especially important on a computer-assisted interviewing study.

Standards, Guidelines and Recommendations

Standard 9.2.1 Countries must locate and reserve adequate space in which to conduct the training sessions.

> **Guideline 9.2.1A** The training location must have sufficient meeting space to accommodate the required number of separate training rooms, as well as additional space for an office and storage of training materials and equipment.

> **Guideline 9.2.1B** Each training room must have an adequate electrical supply to support the laptop computers and other equipment. Countries must arrange for data display machines, overhead projectors and any other technical equipment needed.

> **Recommendation 9.2.1A** All interviewers should be trained simultaneously, with approximately 15 to 20 interviewers per training room. The number of trainees and supervisory regions will determine the number of training rooms required.

> **Recommendation 9.2.1B** A hotel with adequate meeting space should be used for the training session. Holding training at a hotel allows trainees to stay overnight on site (eliminating transportation issues) and lunches to be served easily during training.

> **Recommendation 9.2.1C** Tables should be arranged in the training room in a U-shaped pattern, to allow all trainees a good view of both the trainer and each other and to permit technical staff to easily assist individuals if necessary.

> **Recommendation 9.2.1D** During interactive instrument lectures, a data display machine and laptop computer should be set up so that trainees can follow along with the trainer.

Standard 9.2.2 Countries must assemble a competent, experienced staff to conduct the training sessions.

> **Guideline 9.2.2A** The interviewer training staff must be capable of discussing all aspects of the interview work, including study overview, face-to-face interviewing, administration of the

questionnaire and assessments, contact strategies, refusal avoidance and conversion, quality control, and administrative tasks.

Guideline 9.2.2B Each training room must have a lead trainer who has training or teaching experience and who possesses the expertise required to provide training on the activities listed above.

Guideline 9.2.2C An assistant trainer must be present in each room to assist the lead trainer and the trainees. The assistant trainer must also observe and evaluate the trainees during the sessions.

Guideline 9.2.2D An individual designated as "technical support" must be assigned to every one to two training rooms to resolve any systems-related issues. The availability of technical support staff allows for the timely resolution of systems issues and thereby prevents delays in the training.

Recommendation 9.2.2A In each training room, a designated individual should operate the laptop computer that is projected on the screen for all interviewers to view (during applicable sessions).

Recommendation 9.2.2B During training, trainees should be grouped by supervisory region. The trainees' regional field supervisor should serve as the assistant trainer, so that s/he has an opportunity to evaluate the interviewers s/he will supervise during data collection.

Recommendation 9.2.2C Training staff, preferably regional field supervisors, should score the written exercises completed by trainees during training.

Recommendation 9.2.2D The field director or a field manager should be the lead trainer for general interviewing techniques training. Field supervisors should also be present during this session to evaluate the trainees. (See Section 9.4.)

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their proposed plan for scheduling and conducting training, including location, background of the lead trainers (including expertise in training and any substantive areas applicable to PIAAC) and other aspects of the training plan.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the status of scheduling training and arranging training staff for the field test and the main study.

9.3 SUPERVISOR TRAINING AND TRAIN-THE-TRAINERS

Purpose

To provide training for the staff responsible for the training and supervision of interviewers, so they can adequately train, evaluate and supervise the interviewing staff.

Rationale

Conducting a train-the-trainers session ensures standardisation of training script delivery in the interviewer training sessions and gives the training staff an opportunity to learn the PIAAC procedures and materials before interviewer training. The train-the-trainers session also serves as a dry run of the training materials, enabling countries to revise the materials as needed before interviewer training.

Supervisor training provides the field supervisors with the skills to monitor and motivate the interviewers in their region. It is crucial that supervisors are familiar with all aspects of the study procedures and materials, as they will serve as the primary source for ongoing training during data collection and will conduct quality control measures.

Standards, Guidelines and Recommendations

Standard 9.3.1 Countries must conduct a train-the-trainers session in which training staff are introduced to the training scripts and materials they will use to conduct interviewer training.

Guideline 9.3.1A All lead trainers, assistant trainers and technical support staff must attend the relevant portions of the train-the-trainers session.

Guideline 9.3.1B The train-the-trainers session must be scheduled approximately three to four weeks prior to the start of data collection, allowing sufficient time for revisions to interviewer training materials.

Guideline 9.3.1C The train-the-trainers session must be conducted by an experienced member of the PIAAC project staff.

Guideline 9.3.1D The train-the-trainers session must cover all scripts and exercises that will be used in the interviewer training so that it can serve as a dress rehearsal for the interviewer training.

Guideline 9.3.1E The train-the-trainers session will be approximately three days in length.

Guideline 9.3.1F The train-the-trainers session must immediately precede the supervisor training session.

Standard 9.3.2 Countries must conduct a supervisor training session, to be attended by all regional supervisors and field managers.

Guideline 9.3.2A Supervisor training must cover supervisory responsibilities during data collection, including report monitoring, oversight of interviewers and quality control.

Guideline 9.3.2B Supervisor training must immediately follow the train-the-trainers session.

Guideline 9.3.2C Supervisor training must be conducted by an experienced member of the PIAAC project staff, preferably the field director.

Guideline 9.3.2D Supervisors must receive a detailed supervisor manual. (See Section 9.5.)

Recommendation 9.3.2 Supervisor training should be approximately one to two days in length.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their proposed plans for the train-the-trainer and supervisor training sessions.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the status of scheduling and conducting the train-the-trainer session and supervisor training, as well as the outcome of the sessions.

9.4 INTERVIEWER TRAINING

Purpose

To provide adequate training in all aspects of PIAAC administration, as well as general interviewing techniques and administrative procedures, so that interviewers are able to collect high-quality data and obtain required response rates.

Rationale

If interviewers are to accurately follow the study procedures, collect high-quality data and achieve high response rates, they must be knowledgeable about both general interviewing techniques (GIT) and the details of PIAAC. Providing training on GIT and computer-assisted interviewing (CAI) helps to ensure that new interviewers acquire the basic skills necessary to work as an interviewer and to participate in project-specific training. Specifically addressing refusal aversion and conversion should increase response rates. Finally, the project-specific training will ensure that the interviewing staff is well trained on PIAAC concepts, instruments and procedures.

Standards, Guidelines and Recommendations

Standard 9.4.1 Each country is responsible for training its team of data collectors.

Standard 9.4.2 All PIAAC interviewers must receive a sufficient amount of in-person project-specific training.

> **Guideline 9.4.2A** The project training must take place no earlier than two weeks before, and preferably the week immediately prior to, the scheduled commencement of data collection. This will allow interviewers to immediately apply the skills developed in training and will minimise the likelihood of interviewers forgetting material learned at training.

> **Guideline 9.4.2B** The following aspects must be covered during project-specific training:

- Introduction to PIAAC;
- Review of advance materials;
- Contact strategy for contacting intended respondents;
- Gaining the co-operation of contacted respondents, avoiding refusals and converting refusals;
- Locating households and respondents;
- Study management system operation, including data transmission procedures;
- Administrative tasks, including rules on assignment of disposition codes, use of the household/case folder and completion of the record of contact;
- Administration of the background questionnaire (BQ) and job requirements approach (JRA) module;
- Administration of automated and pencil-and-paper assessment instruments;
- Quality control and monitoring of interviewer work;
- Practice interviews, in the form of role plays and/or live respondent practice;
- Question-and-answer session following the role plays and/or live respondent practice.

> **Guideline 9.4.2C** Countries can decide whether to include the following optional topics, based on each country's individual sample design and training needs:

- Demonstration of the survey;
- Screener administration.

Guideline 9.4.2D A question box should be available in each training room for trainees to submit written questions. This practice reduces interruptions caused by excessive trainee questions and provides a forum for interviewers who are reluctant to ask questions. The questions should be discussed at the evening debriefing session, and memoranda addressing the questions should be distributed to training staff the next morning for discussion with trainees.

Guideline 9.4.2E During training, countries should provide supplemental evening review sessions for interviewers who want additional practice or are identified as needing additional practice with the various study components.

Recommendation 9.4.2A Training staff should hold nightly debriefing sessions to discuss the progress of training, trainee evaluations, and any procedural or technical issues or questions that have arisen.

Recommendation 9.4.2B All interviewers should have the opportunity to conduct at least one complete unscripted practice interview with a respondent unfamiliar with the PIAAC study. The interviewer should receive feedback on this interview from training staff.

Standard 9.4.3 In countries that conduct the survey in multiple languages, interviewers must be trained in each language in which they will personally conduct interviews.

Recommendation 9.4.3A If a country chooses to conduct the survey in multiple languages, and thus will conduct interviewer trainings in multiple languages, trainings may be combined for cost-efficiency purposes. For instance, if the interviewers are bilingual, administrative portions of training could be conducted in only one language, as long as interviewers are given practice on the materials and instruments in the language(s) in which they will conduct interviews.

Recommendation 9.4.3B Countries that will collect data in only one official language, but will translate the BQ/JRA into a secondary language(s), should conduct the full project training in the primary language in which data will be collected. Bilingual interviewers should receive additional training in the secondary language. Secondary language training, which must be conducted in each additional language in which the country will collect data, should include the following components:

- Gaining the co-operation of contacted respondents (including a review of advance materials), avoiding refusals and converting refusals;
- Practice interviews and assessments, in the form of role plays and/or paid respondent practice.

Recommendation 9.4.3C Bilingual interviewer training should include an interactive lecture on the BQ/JRA, a computer-based and pencil-and-paper assessment administration, in addition to the training elements noted in Recommendation 9.4.3B.

Standard 9.4.4 Interviewers must receive home study training prior to in-person training.

Guideline 9.4.4A Home study packets will be distributed to interviewers approximately two to three weeks prior to in-person training.

Guideline 9.4.4B The home study training must include, at a minimum, an introduction to and an overview of PIAAC. A written exercise should be included to ensure that the interviewers complete

the required components of the home study packet. The written exercise must be collected and verified at in-person training.

- **Recommendation 9.4.4A** Countries may choose to include additional materials or exercises in the home study packet, such as selected procedures, administrative tasks or materials from GIT training, or a hard-copy CAI tutorial. (See Standard 9.4.5.)

Standard 9.4.5 Interviewers who are new to social science interviewing or to using the TAO platform must receive GIT training prior to project-specific training.

Guideline 9.4.5 GIT training must include the following components:

- An introduction to survey research, providing examples of types of survey questions and interviewing terminology;
- The conventions for asking survey questions and recording answers;
- Written and oral exercises on asking questions, recording responses and applying probing techniques to obtain accurate data;
- Gaining respondent co-operation, in which the following concepts are discussed:
  - o   Interviewer behaviour and style when making contact with the respondent;
  - o   The importance of making effective and fast connections with the respondent;
  - o   Methods to overcome resistance and address respondent concerns;
  - o   Written and oral exercises on refusal aversion techniques and how to answer respondent questions.
- Standards and ethics in survey research, including information on informed consent, data confidentiality, and data security and a written exercise that includes consent and confidentiality scenarios that interviewers may confront during data collection;
- Remuneration and administrative aspects of working for the survey institute;
- Laptop computer basics.

Recommendation 9.4.5A To minimise travel costs and optimise learning, GIT training should be held immediately before project-specific training.

Recommendation 9.4.5B GIT training should be conducted in person, but some components may be administered as part of the home study training, if this better suits the country's needs.

Standard 9.4.6 Interviewers who are new to CAI must receive instruction on CAI basics as part of the project-specific training session.

Guideline 9.4.6A The CAI instruction must instruct interviewers on CAI questionnaire format, question types, function keys and special commands specific to the study. This content should be incorporated into the first training session in which interviewers use the computer (screening items or BQ/JRA).

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their proposed training plans and materials, including any planned deviations from the materials developed by the Consortium.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on data collector training for the field test and the main study. The results of training must be documented and reported to the Consortium, including the number of interviewers who completed training as well as the number of interviewers who were released during or after training and the reasons for their termination.

At the conclusion of the interviewer training session, countries must complete an interviewer training report. The outline or template for the report will be provided by the PIAAC Consortium.

9.5 DEVELOPMENT OF TRAINING MATERIALS

Purpose

To ensure the production of well-developed training materials, which are essential to the successful conduct of training.

Rationale

The training materials developed by the Consortium will provide interviewers with thorough instruction on the administration of the PIAAC interview. The use of materials developed by the Consortium will ensure that staff in all participating countries receive standardised training.

Standards, Guidelines and Recommendations

Standard 9.5.1 Countries will use the training materials developed by the Consortium in conducting their interviewer trainings.

> **Guideline 9.5.1A** Training materials to be developed by the Consortium include the training agenda, the training guide, the interviewer manual and written exercises.

> **Guideline 9.5.1B** Each country is responsible for the translation of all training materials from the international PIAAC version into the country's administration language(s). (See Chapter 6.)

Standard 9.5.2 In addition to materials provided by the Consortium, each country must develop training materials on any country-specific topics, such as additional background questionnaire items, the study management system, administrative procedures, the screening questions, and procedures for locating households and respondents.

> **Guideline 9.5.2** Each country must use the Consortium's training approach and must use the training guides and manuals developed by the Consortium as a model when developing country-specific training materials. For example, the training must be fully scripted, must address all common scenarios, and must be fully reviewed and tested in advance of training.

Standard 9.5.3 A supervisor manual must be produced for all field supervisors.

> **Guideline 9.5.3** The supervisor manual must contain the following components:

- Techniques for supervising staff;
- Instructions for using the study management system to oversee production, run reports, assign and transfer cases, and perform other functions;
- Quality control responsibilities;
- Administrative procedures.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their proposed training plan and country-specific training.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the status of training for the field test and the main study. A copy of the training plans and explanations of all major revisions made to the Consortium-developed materials, as well as any newly developed materials, must be submitted to the Consortium. Any deviations from the procedures developed by the Consortium must be documented and reported.

9.6 EVALUATION OF TRAINEES

Purpose

To assess interviewers' abilities before they begin data collection and to provide feedback as needed.

Rationale

Training provides an opportunity to assess interviewers before they begin data collection. Interviewer performance – generally throughout training and specifically on scored written exercises and in role plays – demonstrates ability and allows training staff to identify weaknesses and work with the interviewers to improve their skills.

Standards, Guidelines and Recommendations

Standard 9.6.1 Countries must evaluate interviewers' performance during training.

> **Guideline 9.6.1A** Evaluation of trainees will be based on criteria developed according to the requirements of the interview instruments, materials and procedures.

> **Guideline 9.6.1B** To evaluate trainees, training staff will use the evaluation form designed by the Consortium.

> **Guideline 9.6.1C** Training staff must identify trainees with potential performance problems and discuss remedial measures.

> **Recommendation 9.6.1A** Countries should certify interviewers based on the following components:

> - A completed role-play or paid respondent interview, observed by a member of the training staff;
> - Completed exercises from general interviewing techniques training, computer-assisted interviewing training and project-specific training;
> - Language certification, as appropriate.

> **Recommendation 9.6.1B** Trainees exhibiting performance problems should be paired during the role-play interviews with a more experienced trainee or with the assistant trainer.

> **Recommendation 9.6.1C** Each country should hold nightly review sessions on an as-needed basis for trainees in need of additional help. Trainees may volunteer to attend the nightly session or be required by supervisors to attend. (See Section 9.4.)

> **Recommendation 9.6.1D** If a trainee does not successfully complete training, the country may choose to either provide the trainee with post-training remedial work or dismiss the trainee.

Standard 9.6.2 At supervisor and interviewer training, the project team must evaluate supervisors on their ability to perform their defined responsibilities.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their proposed plan for evaluating trainee performance.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the interviewer evaluation methods used at training and the results of that evaluation.

9.7 ONGOING INTERVIEWER TRAINING

Purpose

To ensure that interviewers are kept informed of new issues that arise during the field period, that their skills are maintained and that they are adequately trained in areas that need improvement.

Rationale

Through field monitoring and other forms of quality control, countries may identify issues during data collection that require additional training. Appropriate documentation of these issues and their resolution will ensure that all PIAAC interviewers receive adequate training and adhere to standard procedures.

Standards, Guidelines and Recommendations

Standard 9.7.1 Each country must, in a timely fashion, address issues that arise during data collection by providing appropriate retraining or training on new issues.

> **Guideline 9.7.1A** Interviewers must receive feedback, both individually and as a group, as follows:
>
> - Provide immediate individual feedback if there has been a critical error.
> - Provide routine individual feedback for self-improvement.
> - Offer group feedback to focus efforts on improving the data collection process.
>
> **Recommendation 9.7.1A** To ensure cost efficiency, countries should provide ongoing training in the form of training memoranda or packets that are distributed to the appropriate interviewers and discussed between interviewers and supervisors, rather than conducting additional in-person training sessions. Interviewers should be given written exercises to complete. Role-play exercises can be conducted by interviewers over the telephone.
>
> **Recommendation 9.7.1B** Supervisors should conduct conference calls with all interviewers in their regions to discuss issues that arise.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their proposed training plan, including plans for retraining as appropriate.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report ongoing interviewer training issues and resolutions for the field test and the main study.

9.8 INTERVIEWER ATTRITION TRAINING

Purpose

To ensure a sufficient data collection staff, in spite of staff attrition.

Rationale

Conducting attrition training sessions will ensure that a sufficient number of trained interviewers are available for data collection and that data collection is completed in a timely manner.

Standards, Guidelines and Recommendations

Standard 9.8.1 Countries must conduct attrition training if a significant number of interviewers do not complete the principal in-person training session or if substantial staff attrition occurs during data collection.

> **Guideline 9.8.1** During the planning process, each country should assess the need for attrition training, based on its experience with other national surveys. In most cases, countries should plan on one attrition training session.

Standard 9.8.2 All standards and guidelines associated with interviewer training apply to attrition trainings. (See Sections 9.2, 9.4, 9.5 and 9.6.)

> **Guideline 9.8.2** Materials identical to those used for the main project training must be used for the attrition training.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their proposed plans for dealing with interviewer attrition and providing attrition training.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the number of interviewers who have left the study, as well as the status of attrition trainings for the field test and the main study.

10. DATA COLLECTION STANDARDS

10.1 ASSIGNMENT PREPARATION

Purpose

To ensure that adequate numbers of the materials required for data collection are produced and distributed to interviewers before the start of the data collection effort.

Rationale

Data collection should start immediately following interviewer training, to ensure that interviewers do not forget the study procedures and to build off the interest and excitement generated during the training. All study materials required for the PIAAC interview, as well as materials needed for administrative tasks, must be available to interviewers before they work their first assignment.

Standards, Guidelines and Recommendations

Standard 10.1.1 Countries must develop and produce all interviewer materials that are required for the successful completion of the data collection effort.

Guideline 10.1.1A Interviewers should be provided with all materials required to work each assignment of cases. Assignment-specific materials include materials that are directly associated with particular cases, such as household/case folders, a log of all cases in the assignment, and materials for locating DUs.

Guideline 10.1.1B Interviewers should be provided with an adequate supply of bulk materials to be used throughout data collection. Bulk materials are not tied to a particular case or assignment and include items such as hard-copy assessment booklets, handcard booklets, administrative forms, pencils and pens, and envelopes for returning case-specific materials to the survey institute.

Guideline 10.1.1C When assigning work to interviewers and preparing materials for interviewer assignments, countries should consider a phased approach to data collection:

- Phase 1 is the initial set of assignments during which local interviewers work their assigned cases, making the required number of visits to try to complete necessary interviews. During this phase, an interviewer may receive several sets of cases or assignments.
- Phase 2 is local reassignment, during which supervisors review the details of each difficult case to determine if it is appropriate for reassignment to another nearby interviewer.

Recommendation 10.1.1 If resources allow, countries should consider travelling reassignment, where supervisors review region-level response rates and nonresponse cases to determine the productivity and cost effectiveness of sending an elite travelling interviewer or other experienced interviewer on a nonresponse conversion trip.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their plans for study preparation and distribution of materials.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the preparation and distribution of various study materials.

10.2 ADVANCE CONTACT STRATEGY

Purpose

To ease initial respondent contact, convince potential respondents of the legitimacy of the survey, motivate respondent co-operation and increase response rates.

Rationale

Respondents are usually more co-operative when they receive advance information about the survey's purpose, sponsor, use of data and other details. Through a professional, attractive advance mailing, potential respondents receive a brief introduction to the study before the interviewer's initial contact, which helps to legitimise the study, stress the importance of the effort and ease the interviewer's contact. Additionally, these advance materials serve to increase the study's response rates.

Standards, Guidelines and Recommendations

Standard 10.2.1 Introductory material, explaining the purpose of the PIAAC survey, will be provided to each selected respondent or household before the interview.

Guideline 10.2.1A When an address is available for respondents or households, a letter printed on official stationery must be mailed in advance of the interviewer's initial contact. The letter should be printed in all appropriate languages as defined by the survey institute.

Guideline 10.2.1B An attractive brochure should be developed and either mailed in conjunction with the advance letter or given to the respondent during the initial contact. This brochure should further serve to legitimise the study, stress the study's importance and motivate respondent co-operation. The following information should be included in the brochure:

- Why the study matters and why the respondent should participate
- Topics included in the survey
- How the respondent's address or name was obtained
- Why another person or household cannot be substituted for the respondent/household
- Confidentiality of the data
- Users of the data
- Length of the interview
- Toll-free telephone number
- URL of the respondent website

Guideline 10.2.1C The advance mailings must be staggered to correspond with the planned schedule of visits to the area.

Guideline 10.2.1D Any advance materials must include a PIAAC-specific toll-free telephone number and website address where potential respondents can access additional information about the survey.

Guideline 10.2.1E Interviewers must receive an adequate supply of advance materials to present when making initial and subsequent contacts with households. Providing the interviewers with additional advance materials helps to ensure that the materials reach all selected respondents.

Recommendation 10.2.1A The advance mailing should be timed to arrive approximately two to five days before the interviewer's visit.

Recommendation 10.2.1B A respondent website should be designed and available before the first advance mailing. This website should contain information about the study, including the sponsoring agency, the data collection contractor, background on PIAAC and what the study entails if the potential respondent is selected for participation.

Recommendation 10.2.1C A project logo should appear on all study materials that are presented to potential respondents. The unifying logo serves to motivate co-operation by increasing respondent recall of materials and tying introductory and other survey materials together.

Recommendation 10.2.1D If an incentive is being used, it should be mentioned in the advance letter. (See section 4.8)

Recommendation 10.2.1E Countries should consider the use of endorsement letters from well-respected organisations with cogent statements that will help to convince respondents to participate. Endorsement letters can be presented upon initial contact or during refusal conversion efforts.

Recommendation 10.2.1F Additional forms of survey promotion should be considered, including information activities directed toward the public. Activities may include newspaper articles or television and radio advertising, with references to the website established for the study.

Recommendation 10.2.1G It may be useful to notify the police station in areas in which data are being collected. It is reassuring for older or suspicious respondents to be told that the police know about the survey and that they can check with the police station. Countries should develop a letter for the police department that can either be mailed by interviewers once assignments are received or handed out to members of the police department as needed (along with information on the study, including the website address and toll-free telephone number).

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their planned strategy for promoting PIAAC.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on PIAAC promotion efforts, including all materials that will be developed and how the materials will be disseminated.

10.3 CONTACT PROCEDURES

Purpose

To improve the chances of contacting selected households and individuals, thereby maximising the survey response rate.

Rationale

A well-formulated contact strategy is important to ensure that interviewers make every effort to reach selected individuals. Such a strategy is essential to maximise response rates and thus obtain high-quality data.

Standards, Guidelines and Recommendations

Standard 10.3.1 Initial contact with sampled households or individuals should be in person, because telephone contacts are more likely to lead to refusals. However, initial contact by telephone is permissible if this is part of a country's typical survey procedure for household surveys.

Standard 10.3.2 For countries that initially contact respondents through an in-person visit, at least four contact attempts will be made before the case is coded as a non-contact. Additional efforts may be needed to keep the rate of non-contacts under a maximum of 3%.

> **Guideline 10.3.2** In cases where the first attempt to contact respondents is an in-person visit, the following should be incorporated into the contact strategy:
>
> - For efficiency purposes, all components of the interview should, ideally, be completed in the same visit. However, if the interviewer is unable to contact the sampled respondent during the first attempt, s/he should query another member of the household or contact a neighbour to establish a time when the respondent is likely to be home.
> - Subsequent contact attempts will be scheduled either 1) according to the information received during the successful contact attempt or 2) at different times of the day and on different days of the week, including at least one weekend and one evening visit.

Standard 10.3.3 For countries that initially contact respondents by telephone, at least seven attempts will be made before the case is coded as a non-contact. Additional efforts may be needed to keep the rate of non-contacts under a maximum of 3%.

> **Guideline 10.3.3** In cases where the first attempt to contact respondents is by telephone, the following should be incorporated into the contact strategy:
>
> - If, during the first attempt, the interviewer is able to contact a household member but not the respondent, the interviewer should query the household member to establish a time when the respondent is likely to be home and should schedule a call back accordingly.
> - Subsequent contact attempts will be scheduled either 1) according to the information received during the successful contact attempt or 2) at different times of the day and on different days of the week, including at least one weekend and one evening visit.

Standard 10.3.4 All PIAAC interview components – the background questionnaire, the direct assessments, and any international or national options – must be conducted in person.

Standard 10.3.5 The use of translators/interpreters is encouraged for the administration of the background questionnaire/job requirements approach module as a way to limit as much as possible the occurrence of literacy related non-response to the background questionnaire.

Standard 10.3.6 The interviewer must thoroughly document each contact attempt with the household or respondent in a Record of Contact. Interviewers must enter Record of Contact information each time a contact attempt is made to a selected household, including the attempt that results in a completed interview.

> **Guideline 10.3.6A** The information to be documented for each contact attempt should include visit number, day, date, time, contact mode and outcome, at a minimum.

> **Guideline 10.3.6B** Contact attempt information must be documented either in hard-copy format or through an automated component of the management system.

> **Recommendation 10.3.6** If the contact attempt information is documented through an automated programme, the information should be available to the supervisor, who can use the contact data to determine how to proceed with hard-to-contact cases.

Standard 10.3.7 The interviewer must thoroughly document information on each case that receives a non-interview disposition code because of refusal or other nonresponse (*i.e.* vacant dwelling, maximum calls, physical/mental disability, unavailable during field period, etc.).

> **Guideline 10.3.7A** The information collected on non-interview cases should include, at a minimum:

- Demographic data on the person who refused
- Strength of refusal
- Problems encountered
- Comments
- Likelihood of conversion

> **Guideline 10.3.7B** Non-interview data must be documented either in hard-copy format or through an automated component of the management system.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide a description of the proposed contact strategy for data collection.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report the results of contact efforts. The information to be provided should include the distribution of contact attempts by time period (*i.e.* morning, afternoon, evening, day of week), average number of contacts according to whether or not contact was made, number of non-contacts by region and by interviewer, and other relevant details.

10.4 INSTRUMENT ADMINISTRATION

Purpose

To specify the data collection procedures for PIAAC in order to ensure consistency in obtaining respondent information and to minimise the risk of bias that might be introduced if different data collection methods are used by participating countries.

Rationale

If the data collection procedures are not identical for all participants, bias could be introduced; *i.e.* the data collection procedures might affect the quality of the respondents' answers.

Standards, Guidelines and Recommendations

Standard 10.4.1 The PIAAC interview consists of the following sequentially administered components:

- **Background questionnaire/job requirements approach (BQ/JRA)**
- **Direct assessment of cognitive skills (including Reading Components and Problem solving in technology-rich environments).**

Guideline 10.4.1A All components of the interview should be administered in the same visit. In extenuating circumstances, the questionnaires and the assessments may be administered in separate sessions to accommodate family concerns or crises, but interviewers should not schedule return visits to complete assessments that were broken off before completion.

Guideline 10.4.1B The management system on each interviewer's laptop computer must control and enforce the order in which the instruments are administered.

Recommendation 10.4.1 The interview should be completed in the respondent's home. However, if the respondent prefers, the interview may be conducted at a neutral location such as a library, community centre or office.

Standard 10.4.2 Countries for which the sample design involves the sub-selection of individuals within a selected household will require a set of questions (hereafter called screening questions) to identify the target population members within a selected household and to facilitate the random selection of one or two persons within the household.

Guideline 10.4.2A If screening questions are necessary to select a respondent, a separate screening instrument should be developed, in either hard-copy or automated format.

Guideline 10.4.2B The screening questions must include all required sampling criteria, as well as other information required for subsequent contacts or analysis purposes, such as the name, age or date of birth, and gender of all household members, the number of eligible household members, number of selected household members, dwelling address confirmation, and telephone number.

Recommendation 10.4.2 Depending on the needs of the country, countries should also collect the race and ethnicity of all household members during the screening process.

Standard 10.4.3 The computer-assisted interviewing method developed by the Consortium must be used for the BQ/JRA. The direct assessments should be available in both paper-and-pencil and computer-assisted formats, consistent with the psychometric assessment design specified in Section 5.6.

Standard 10.4.4 The BQ/JRA and the direct assessments and any international or national options must be administered to the selected individual; no substitution is permitted. A proxy respondent cannot be used. However, the use of an interpreter is acceptable. The interpreter's only involvement should be in translating the question to the respondent and translating the response back to the interviewer. The interpreter cannot act as a proxy respondent.

Standard 10.4.5 Proxy respondents may not complete the direct assessments. (See Section 5.4.)

Standard 10.4.6 Interviewers must use the specific auxiliary/stimulus materials required during the interview.

Standard 10.4.7 Instruments (including the screener, background questionnaire and the direct assessment of cognitive skills) must be administered in all official languages as determined by each country, by data collection staff appropriately trained and fluent in the language of administration.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide the screening questions used to identify the target population and select persons within a household. They will also be required to specify the method and mode of data collection for each stage of the interview process.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the screening items used (if any), as well as the method and mode of data collection for each instrument.

10.5 PROMOTING SURVEY PARTICIPATION AND OBTAINING HIGH RESPONSE RATES

Purpose

To minimise the possibility of nonresponse bias and improve the overall quality of the survey data.

Rationale

Whenever there is any nonresponse to a survey, there is a possibility that bias may exist in the survey results. Although this bias can occur whenever there is any nonresponse, the risk of such an occurrence increases as the response rate decreases, *i.e.* as the number of nonrespondents increases. Therefore, each country should make all reasonable efforts to increase response rates.

Standards, Guidelines and Recommendations

Standard 10.5.1 Each country should develop a "best practices" strategy for maximising response rates.

Guideline 10.5.1A The following minimum strategy will be used by each participating country:

- Hire field staff with the experience and skills that will make them successful in convincing people to co-operate. (See Section 8.3.)
- Send advance survey information, such as a letter and brochure, to respondents. (See Section 10.2.) Include the study's website and toll-free number on all advance materials, so recipients can access more information about the study.
- Train interviewers on the importance of the study and the benefits of participation.
- Train interviewers on the importance of the initial contact with the respondent (*i.e.* how to make the best initial presentation/impression).
- Train interviewers in techniques to obtain the co-operation of individuals who initially refuse or are reluctant to participate in the survey. (See Section 9.4.)
- Train interviewers to develop effective work plans that minimise travel costs and time.
- Train supervisors and interviewers on the importance of obtaining high response rates, which are critical to obtaining high-quality data and reducing bias.
- Implement the contact procedures outlined in Section 10.3, which call for varying contacts at different times of the day and on different days of the week.
- Train supervisors to provide training and feedback to interviewers throughout the field period.
- Monitor fieldwork closely at every level. Set specific goals for all field staff (interviewers, supervisors, field managers, etc.) to promote accountability for achieving/not achieving the production targets, and give regular feedback on adequate progress.
- Train supervisors on reassignment strategies for potential refusals, actual refusals and any form of nonresponse.

Guideline 10.5.1B Interviewers should clearly display an identification badge containing their picture and signature, the official study logo, and other elements.

Recommendation 10.5.1A To encourage respondent participation, countries may choose to use some form of an incentive. (See Section 4.8.)

Recommendation 10.5.1B Countries should document any special approaches used to reduce nonresponse, so that analysts can correctly interpret the data.

Standard 10.5.2 Interviewers must attempt contact with each sampled household, even those in potentially dangerous areas or locked buildings.

Guideline 10.5.2A Countries must develop a package of materials tailored to apartment managers to be distributed as needed in the field. These materials should include information on PIAAC, as well as sources for confirming the legitimacy of the study.

Guideline 10.5.2B After repeated unsuccessful attempts by the interviewer to enter a secure building, the regional supervisor must contact the building management to explain the importance of PIAAC and to try to gain co-operation.

Guideline 10.5.2C For locked buildings, strategies such as criss-cross directories and the Internet may be used to obtain respondents' telephone numbers, in order to make initial contact by telephone.

Recommendation 10.5.2A After the interviewer has made unsuccessful attempts to contact the sampled unit, s/he should contact a neighbour to identify the best time and day to contact the household or unoccupied dwellings.

Recommendation 10.5.2B Options should be available to ensure an interviewer's safety in potentially dangerous areas. Interviewers should be permitted to hire an escort to accompany them while the interview is being conducted.

Standard 10.5.3 All countries must implement effective refusal conversion strategies.

Guideline 10.5.3A Special letters should be designed for refusals or unco-operative respondents. Several versions of the letters can be developed and tailored to the specific circumstance (*e.g.* respondents who are too busy, respondents requiring a large font, respondents concerned about being given a sales pitch). All letters should include the study's toll-free number and website (if implemented).

Guideline 10.5.3B Follow-up of refusals or unco-operative respondents may be conducted by a senior interviewer or the regional supervisor. Special travelling interviewers with demonstrated skills in gaining co-operation and nonresponse conversion may also be used.

Recommendation 10.5.3A Refusal conversion letters should be sent by priority or registered mail, to increase the likelihood of the materials being read and to reinforce the legitimacy and importance of the study.

Recommendation 10.5.3B During the data collection, countries should develop and implement an additional brochure focusing on issues of concern that were not recognised or addressed at the start of the study.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide details of the proposed response rate strategy.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the steps that have been proposed or taken to ensure that the specified response rate targets are met.

10.6 STUDY MANAGEMENT SYSTEM/SURVEY CONTROL FILE

Purpose

To enable the administration of the automated survey instruments and support the operational aspects of the data collection effort.

Rationale

Given the scope and complexity of PIAAC, each country must develop an automated study management system to enable timely management, conduct and monitoring of data collection. The system must facilitate the administration of the automated instruments, produce reports that are integral to the review and management of the data collection effort, and assist regional supervisors in their day-to-day operational tasks, such as case assignment and transfer and assignment of result codes.

Standards, Guidelines and Recommendations

Standard 10.6.1 Each country is responsible for developing an automated management system that can be used to conduct the PIAAC interview.

Standard 10.6.2 The management system developed by each country must be able to support the functions necessary for supervisory staff to manage the day-to-day operations of a data collection effort.

> **Guideline 10.6.2A** Each country's management system must be able to perform the following survey operations functions, at a minimum:
>
> - Case assignment
> - Case transfer/reassignment
> - Case reset to prior state
> - Removal of data from the laptop computer
> - Production of reports for the Consortium
>
> **Guideline 10.6.2B** The two operational identification numbers used during the PIAAC data collection are as follows:
>
> - PERSID, Person operational identification number (ID), length <=12 including the check digit, type: integer, no leading zeros
> - CASEID, Household operational ID, length <=9, type: integer, no leading zeros
>
> The variable CASEID will be mainly used by those countries that need to screen sampled households for eligible members yet is not directly used during the electronic or paper-based data collection. PERSID, on the other hand, is the main operational ID that will eventually allow the matching of the various PIAAC databases and materials, including the survey control file, the sample design international file, the responses captured during the BQ/JRA and direct assessment, any paper booklets and derived scoring/capture sheets, coding files, and eventually the weighting international file.
> With the addition of a check digit, the maximum allowed length of PERSID is 12 digits. The use of the check digit algorithm for person IDs as described in PIAAC-NPM(2009_10_22)Check digits for operational IDs.doc is mandatory for all countries.

Recommendation 10.6.2A Each country's management system should include a mechanism for documenting information related to each contact attempt that does not result in a completed interview. (See Section 10.3.)

Recommendation 10.6.2B Each country's management system should include a mechanism for tracking interviewers' time and expense data (weekly hours, weekly expenses, weekly mileage/travelling time and cost per completed interview).

Standard 10.6.3 The management system developed by each country must be able to support the production of automated reports during the data collection period. (See Section 10.8.)

Guideline 10.6.3 For countries with a household screener, the study management system must capture the screener information for each selected person, including their name, age or date of birth, and gender, the number of eligible household members, number of selected household members, dwelling address confirmation, and telephone number. See Standard 10.4.2 for more information about the household screener.

Recommendation 10.6.3A Each country's management system should contain data for use and reference by the interviewer or supervisory staff, as well as data elements for use in the production of data collection reports. (See Section 10.8.) Each management system should contain the information listed below:

- Case ID
- Geographic area (*i.e.* primary sampling unit, region, segment)
- Dwelling address information
- Case-level status and disposition code
- Task-level status and disposition code
- Date the interview was finalised or status date
- Task type (interview component)
- Interviewer name and ID
- Validation status
- Language of administration
- Assignment date and type (original vs. transfer)
- Date and time of inbound and outbound data transmissions
- ID number(s) of paper assessment booklet(s)
- Status of paper assessment booklet(s)
- Date that hard-copy materials were returned to the survey institute by the interviewer

Standard 10.6.4 Countries must assign a unique booklet ID (serial number) to each paper task assessment instrument prepared, in order to verify that instruments distributed to interviewers have been used for the respondents or returned and eventually destroyed so that all instruments are accounted for.

Guideline 10.6.4A The booklet ID would not be associated with the person ID (PERSID) until the person ID is recorded on the instrument and the booklet ID is entered into the corresponding places in the PIAAC interviewing system.

Guideline 10.6.4B The booklet ID will be of type integer with no leading zeros, i.e. it cannot include characters other than 0-9.

Guideline 10.6.4C The booklet ID will be of length 6, maximally length 8 if countries wish to deviate from the below, and composed of the following elements:

- Positions 1 will represent the assigned task instrument *type* as follows:
  1 to represent the Core booklet (PPC),
  2 to represent the Literacy Booklet (PP1),
  3 to represent the Numeracy Booklet (PP2), and
  4 to represent the Reading Components Booklet (PRC).

- Positions 2 through 5 will represent a task instrument *sequential number* starting with value 1 up to the number of task instrument expected for that type. The number will be right-aligned and positions 2 through 4 will be filled with zeros as necessary.

- Position 6 will be the PIAAC check digit (see PIAAC-NPM(2009_10_22)Check digits for operational IDs.doc) computed from positions 1-5 and used to verify that the booklet ID has been captured correctly in the interviewing, data management, and any other system.

- For example, the full booklet ID for the Core Booklet (type PPC) will have the booklet ID "100014". Here, position 1 ("1") represents type PPC, positions 2-5 ("0001") represent the first sequential number for that type, and position 6 ("4") represents the PIAAC check digit for the previous five positions.

Recommendation 10.6.4 Countries may wish to use barcodes such as Code-39 or Code-128 in addition to human readable booklet IDs. In this case, the barcode will need to encapsulate all of the above positions 1-6 as the useful component and add any barcode specific stop/end characters as well as barcode-specific check digits around this.

Standard 10.6.5 Each country must develop a survey control file to be used for the initial loading of data into the study management system.

Recommendation 10.6.5 Standard 4.6.6 and Guideline 4.6.6 provide more discussion about the survey control file. The contents of the survey control file is shown in Annex 4-1. Depending on the sampling technique used by each country, the content of the survey control file will vary. The file should include all data that must be preloaded into the system before data collection, such as participant names, addresses, sampling variables and cases pre-selected for validation.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide the specifications for their study management system and the proposed layout and contents of their survey control file.

On a monthly basis during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the specifications and capabilities of their study management system, as well as the layout and contents of their survey control file.

10.7 DISPOSITION CODES

Purpose

To ensure that all countries apply identical disposition codes and implement them according to the standard definitions.

Rationale

The use of a standard set of disposition codes is integral to the data collection, processing, delivery and analysis components of PIAAC, as well as the calculation of critical measures such as response rate and completion rate.

Standards, Guidelines and Recommendations

Standard 10.7.1 In assigning status codes at both the instrument and case levels, all countries must implement the list of approved PIAAC disposition codes shown in Tables 10-1 to 10-3.

Table 10-1. Disposition Codes for PIAAC Screener

Description	Code
Complete – 1 sample person selected	01
Complete – 2 sample persons selected	02
Partial complete[17]/break-off	03
Refusal – household member	04
Refusal – gatekeeper	05
Language problem	07
Learning/mental disability	09
Hearing impairment	12
Blindness/visual impairment	13
Speech impairment	14
Physical disability	15
Other disability	16
Other (unspecified), such as sickness, falsification or unusual circumstances	17
Complete – no eligible sample persons	19
Unable to locate dwelling unit	20
Maximum number of calls	21
Dwelling unit under construction	22
Temporarily absent/unavailable during field period	24
Vacant dwelling unit, e.g., holiday or temporary residence only (such as cabins on a lake)	26
Duplication – already interviewed	27
Address not a dwelling unit, e.g., non-residential units such as businesses, government offices, and other organisations and residential units such as institutions (e.g. prisons or sanitariums) and military barracks	28

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[17] A partial completed case is a case in which the participant started, but refused to complete, the screener.

Table 10-2. Disposition Codes for PIAAC Case Initialisation, Background Questionnaire (BQ) and Job Requirements Approach (JRA) Module

Description	Code
Complete	01
Partial complete/break-off, e.g., a paused interview that eventually cannot be completed	03
Refusal – sample person, e.g., for refusal to participate due to time constraints or lack of interest	04
Refusal – other	05
Language problem	07
Reading and writing difficulty	08
Learning/mental disability	09
Hearing impairment	12
Blindness/visual impairment	13
Speech impairment	14
Physical disability	15
Other disability	16
Other (unspecified), e.g. sickness, falsification or unusual circumstances	17
Death	18
Maximum number of calls; e.g., respondent not successfully contacted	21
Temporarily absent/unavailable during field period, e.g., travelling and will not be back during the field period or moved within the same community but not successfully located by the interviewers	24
Ineligible[18], e.g., moved outside the country	25
Duplication – already interviewed	27
Technical problem	90

Table 10-3. Disposition Codes for PIAAC Direct Assessments[19]

Assessment	Description	Code
Core	Complete – passed Core	01
Core	Partial complete[20]/break-off, e.g., a paused interview that eventually cannot be terminated	03
Core	Refusal – sample person, e.g., for refusal to participate due to time constraints	04
Core	Refusal – other	05
Core	Language problem, e.g., do not speak the assessment language	07
Core	Reading and writing difficulty	08
Core	Learning/mental disability	09
Core	Hearing impairment	12
Core	Blindness/visual impairment	13
Core	Speech impairment	14
Core	Physical disability	15
Core	Other disability	16

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[18] There is an associated mandatory write-in, e.g., DISP_CI_IN.

[19] For the first cycle of PIAAC, the only Core disposition codes available in the VM are 01, 03, and 04. Future cycles of PIAAC will use the full set.

[20] A partial completed case is a case in which the participant completed the BQ/JRA but refused to continue to the direct assessment (which will affect response rates).

Table 10-3. Disposition Codes for PIAAC Direct Assessments (Continued)

Assessment	Description	Code
Core	Other (unspecified), e.g. sickness, falsification or unusual circumstances	17
Core	Death	18
Core	Maximum number of calls; e.g., respondent not successfully contacted	21
Core	Temporarily absent/unavailable during field period	24
Core	Duplication – already interviewed	27
Core	Complete – failed Core	29
Core	Technical problem	90
Core	Missing paper booklet[21]	91
Main	Complete	01
Main	Partial complete/break-off, e.g., a paused interview that eventually cannot be terminated	03
Main	Refusal – sample person, e.g., for refusal to participate due to time constraints	04
Main	Refusal – other	05
Main	Language problem, e.g., do not speak the assessment language	07
Main	Reading and writing difficulty	08
Main	Learning/mental disability	09
Main	Hearing impairment	12
Main	Blindness/visual impairment	13
Main	Speech impairment	14
Main	Physical disability	15
Main	Other disability	16
Main	Other (unspecified), such as sickness, falsification or unusual circumstances	17
Main	Death	18
Main	Maximum number of calls; e.g., respondent not successfully contacted	21
Main	Temporarily absent/unavailable during field period	24
Main	Duplication – already interviewed	27
Main	Technical problem	90
Main	Missing paper booklet	91

Guideline 10.7.1 For further description and details on disposition codes, refer to the Interviewer Procedures Manual.

Recommendation 10.7.1 If contact does not result in a final outcome for a case, countries may choose to assign an interim status code that summarises the status of the case until a final result is achieved. All interim codes can be used for the screener, BQ/JRA and direct assessments. Recommended interim status codes appear in Table 10-4.

Table 10-4. Suggested PIAAC Interim Status Codes

Interim Code	Description
AP: Call back – appointment	You have obtained a firm appointment to return to the dwelling unit at a specific time.

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[21] The Core and Main disposition code of 91 (missing paper booklet) is not part of the VM. This code is not intended to be assigned by interviewers. The purpose of this code is to document cases where a paper booklet was administered in the interview but could not be located by the national centre.

Table 10-4. Suggested PIAAC Interim Status Codes (Continued)

Interim Code	Description
CB: Call back – no appointment	You have made contact and obtained some idea of when to return to the household but have not established a definite appointment. For example, the household's babysitter has told you that the parents are usually home by 6:30 on weekdays.
NH: Not at home	No one is at home at the time of contact.
RB: Initial refusal	A household member refused to participate or broke off the interview before it was completed.
IL: Illness/disability	The sample person is unable to complete the BQ/JRA or the assessment because of an illness or disability.
OT: Other	Any other situation that requires follow-up, such as sample person's illness, a language difficulty, a dwelling unit you cannot locate, or a locked structure.

Standard 10.7.2 Countries may develop different or additional interim and final disposition codes for their own purposes, but the final data delivery must map all disposition codes back to the list of approved PIAAC codes. Note that there can be no additions or deletions from the set of codes used in the VM for Case Initialisation, Background Questionnaire and Main Assessment.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide a full list and description of the disposition codes to be used for each instrument.

10.8 DATA COLLECTION REPORTS

Purpose

To allow the monitoring of key components of the data collection process.

Rationale

The continuous examination of the data collection effort by various levels of the project management staff is integral to the success of PIAAC. Up-to-date automated reporting systems will be critical to the management team's ability to regularly track the progress of fieldwork.

Standards, Guidelines and Recommendations

Standard 10.8.1 Each country must develop automated reports to effectively monitor the data collection. The reports must focus on the completion status of cases and the progress made to finalise work.

Guideline 10.8.1A The reports must be produced based on the data collected by and stored within the country's management system.

Guideline 10.8.1B The reports must be available to all members of the project team. The ability to hierarchically filter the report contents by level of project management (field director, regional supervisor, etc.) should be part of the report design.

Guideline 10.8.1C The reports must reflect the current status of the work and be continually updated as data are transmitted by interviewers and supervisors.

Guideline 10.8.1D The reports must show the breakdown of cases by various disposition codes, allowing supervisory staff to determine the number of cases that have complete, pending, interim refusal and other disposition codes. This breakdown should be available at different reporting levels, such as nation, region and interviewer.

Guideline 10.8.1E A sample yield report must be developed to allow the monitoring of the demographic characteristics of the sample.

Guideline 10.8.1F Countries must develop a mechanism to review unassigned cases by geographic area, to aid in the assignment of cases.

Guideline 10.8.1G To permit the review of project costs, countries must develop a report that assesses interviewer costs for hours worked, miles driven/travelling time and other expenses.

Guideline 10.8.1H To track the frequency with which interviewers transmit data, countries must produce a report that lists data transmissions by interviewer, including the most recent time and date of inbound and outbound transmissions.

Guideline 10.8.1I To review the status of the validation efforts, countries must produce a validation report, including the validation rate by field interviewer and validation outcome.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide a full list and description of the automated reports that will be produced in support of the data collection effort.

Every month during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the automated reports that will be produced in support of the data collection effort, including the purpose of the report, its content, the source of the data and the audience for the report.

10.9 QUALITY CONTROL OF FIELDWORK

Purpose

To ensure that PIAAC data are of the highest quality.

Rationale

Various forms of quality control (QC) measures must be implemented throughout the data collection period to minimise interviewer error, to ensure that the interviewer work is of acceptable quality, to uncover potential problems that may have an impact on the survey data, and to provide interviewer feedback. Interviewer error has been shown to be a considerable component of total survey error (see for example Schnell and Kreuter 2005) and QC of the field work is essential to reducing this source of error. Ganninger, Häder and Gabler (2007) discuss interviewer error as a key source of total survey error and how it interconnects with design effects, which measure the amount of variance inflation due to cluster sampling.

Standards, Guidelines and Recommendations

Standard 10.9.1 Interviewers must be made aware during training that their work will be monitored.

Standard 10.9.2 Each country must develop and implement procedures to monitor the in-field performance of the interviewers.

> **Guideline 10.9.2A** Each new interviewer and those that were identified as weakest at training must be monitored closely during the early stages of the data collection period, so that potential problems are detected as soon as possible. Monitoring can be done through methods such as in-person observation or audiotaping of the interview.

> **Guideline 10.9.2B** Countries should document their quality control procedures, as well as the outcomes of interviewer monitoring (*e.g.* falsification rates).

> **Recommendation 10.9.2** If in-person monitoring is implemented, observations should be conducted by regional supervisors or survey institute staff.

Standard 10.9.3 Each country must develop and implement procedures to verify 10% of an interviewer's finalised work, including cases finalised as nonresponse.

> **Guideline 10.9.3A** Interview validation must be conducted to verify that an interviewer has interviewed a sampled individual according to the study procedures. Cases should be randomly pre-selected for validation.

> **Guideline 10.9.3B** Interview validation must begin very early during the field period so that problems can be addressed immediately.

> **Guideline 10.9.3C** Interview validation should be conducted by supervisory staff over the telephone or in person, using a standardised form developed by the Consortium. Although not preferred, validation can be done by mail. However, mail is generally not effective for nonresponse validation.

Guideline 10.9.3D The supervisor-completed validation form will collect respondent demographic data, a few key background questionnaire/job requirements approach module items and other questions about the interviewer's visit. For countries conducting a household enumeration as part of the screening process, the household composition should also be validated.

Guideline 10.9.3E For households for which no telephone number is available, interview validation can be conducted in person by a senior interviewer, using a standardised form developed by the Consortium. This form will be different from the validation form used by supervisors.

Guideline 10.9.3F The outcome of the validation process must be recorded in variable QCFLAG in the Sample Design International File (SDIF). QCFLAG must identify cases selected for validation, cases for which a validation was actually conducted, and cases found to be falsified. (See Annex 4-2)

Standard 10.9.4 If an interviewer's work is found to be suspect, 100% validation of his/her other cases must be conducted. Any falsified work must be refielded and completed by another interviewer.

Standard 10.9.5 Countries must develop and implement procedures to review tape recordings of each interviewer's work.

Guideline 10.9.5 Interviewers will provide the survey institute with tape recordings of at least two full interviews early in the data collection period (perhaps their third and tenth interviews). Supervisors will review the tape recordings, using a standardised form developed by the Consortium, and will provide feedback as necessary.

Standard 10.9.6 Countries must develop automated reports that the field supervisor and other project management staff can use to detect interviewer behaviour that might indicate falsification.

Recommendation 10.9.6 The automated reports, produced on a weekly basis, should include information such as interview administration length, individual instrument administration time, amount of time between interviews, interviews conducted very early in the morning or late in the evening, and number of interviews conducted per day.

Standard 10.9.7 All interviewers must review their hard-copy materials before finalising a case and returning the materials to the survey institute. Similarly, interviewers must ensure that all automated components have been completed before finalising a case.

Standard 10.9.8 The survey institute must conduct an extensive review of all completed hard-copy materials and automated interview data to ensure that they meet the project standards for data quality.

Standard 10.9.9 The survey institute must develop an automated editing system for reviewing the electronic interview data. The editing system must accommodate the review of data frequencies, the review and suppression of edits, and the coding of "other-specify" responses.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide a description of their proposed procedures for ensuring quality control during the data collection phase of the project.

Every month during the survey planning and data collection period, countries will be required to complete quality control monitoring forms to report on the procedures that will be followed to ensure high data quality at all stages of data collection and data processing.

Countries must participate in monthly data collection conference calls with the Consortium throughout the critical field test and main study data collection periods. Conference call participants must include the country's National Project Manager and key English-speaking staff from the leading survey institute. Additional participants may vary somewhat from month to month, as conference call participants should include staff who can best address the activities and issues at hand. Conference calls will follow a specified agenda and will be documented using the Quality Control Meeting Minutes Report, which will summarise the items discussed, the decisions made and pending action items.

Countries must implement the interviewer debriefing questionnaire provided by the Consortium following each round of data collection to ensure that interviewer feedback is obtained.

REFERENCES

Ganninger, M., Häder, S., and Gabler, S. (2007), "Design Effects and Interviewer Effects in the European Social Survey: Where are we now and where do we want to go tomorrow?" *Prepared as the second deliverable for ESSi NA2. Current website as of February 18, 2009:* www.europeansocialsurvey.org/index.php?option=com_docman&task=doc_download&gid=197&Itemid=80

Schnell, R. and Kreuter, F. (2005), "Separating interviewer and sampling-point effects," *Journal of Official Statistics,* 21(3):389-410

11. DATA CAPTURE STANDARDS

11.1 MANUAL DATA ENTRY, VERIFICATION AND RELIABILITY

Purpose

To ensure that the capture of data from the scoring sheets derived from the paper-and-pencil assessment instruments (see Section 11.3) is conducted using uniform methods and is as free of capture errors as possible.

Rationale

In PIAAC, cognitive test instruments will be delivered in either computer-based or paper-and-pencil mode. Scoring sheets will be derived from the paper-and-pencil instruments. (See Section 11.3) Due to the nature of the stimulus and response formats, the rotation design, the need to classify different types of missing responses, and the scoring procedures used, a manual method of capturing data into computer files will be used. Manual data entry and full verification will be both feasible and advisable because it is expected that few cases will require paper-and-pencil administration of cognitive test instruments.

Standards, Guidelines and Recommendations

Standard 11.1.1 All PIAAC scoring/capture sheets will be manually captured following specifications in the corresponding operational manual, scoring guides and international record layout (codebooks).

> **Guideline 11.1.1A** The participating countries will be responsible for the capture of data from scoring/capture sheets derived from the paper-and-pencil instruments, under the supervision of a National Data Manager. The Consortium will provide support for this activity in the form of software, manuals, international codebooks and mandatory training for National Data Managers.

> **Guideline 11.1.1B** Key operators will be identified by a unique ID number which is recorded as part of the data capture and made available to the Consortium.

> **Guideline 11.1.1C** All key operators should be thoroughly trained using mock materials, followed by reconciliation and re-training where necessary.

> **Guideline 11.1.1D** Data must be entered exactly as values appear on the instruments, that is, without any undue corrections, unjustified interpretations or imputation. Before data capture, key operators must resolve any ambiguity or lack of clarity on the scoring sheets as a result of the scoring task by consulting the National Data Manager.

> **Guideline 11.1.1E** Appropriate logistics and tracking procedures must be implemented to ensure that all materials are fully captured. Until data cleaning and editing have been completed and the data have been explicitly accepted by the Consortium, the paper instruments and corresponding scoring/capture sheets must be securely stored and archived such that they can be accessed and retrieved using their

unique identifier (*i.e.* person ID) minimally until one year after the main study data collection is scheduled to end.

Guideline 11.1.1F Participating countries are expected to use the software and procedures provided by the PIAAC Consortium for data capture from scoring and response capture sheets, which will help to ensure that the operation is in full compliance with PIAAC standards and quality criteria. Manual data capture errors and mistakes (usually key-entry operator errors) are comparatively easy to identify, control and reconcile. Automated scanning methods have been found to introduce problems that differ from those created by manual data capture methods. Given the procedures in PIAAC and the goal of achieving a high quality of data capture, the use of an optical scanning method is not encouraged and must be documented to and approved by the Consortium prior to implementation.

Guideline 11.1.1G Likewise, the use of alternative data capture methods or systems is not encouraged. Where a country wishes to use such a system, plans must be fully documented in the NSDPR to the Consortium and require a priori approval.

Standard 11.1.2 To achieve maximum reliability, the data management staff and key operators will conduct 100% verification of all scoring/capture sheets (*i.e.* they will be re-entered by a second key-entry operator), followed by full reconciliation of any identified inconsistencies by consulting the original paper materials.

Guideline 11.1.2A Data capture will be performed twice by two different key operators to facilitate the detection of systematic or incidental data entry errors and ensure that the resulting database is free from data capture errors. This implies that a minimum of two individuals must be assigned to enter data from scoring and response capture sheets, regardless of the volume of work.

Guideline 11.1.2B The double data capture and its verification must involve all key operators assigned to the capture of scoring and response capture sheets. Key operators will be identified by a unique ID number which is recorded as part of the data capture and made available to the Consortium.

Guideline 11.1.2C The double data capture and its verification should begin as early as possible in the capture phase in order to detect systematic discrepancies stemming from individual key operators or general misconceptions at an early stage. The National Data Manager will conduct regular, minimally weekly, checks of double capture accuracy and once more prior to the submission of the database, each followed by full reconciliation/correction.

Quality Control Procedures

The data entry solution provided by the Consortium will require an entry for each applicable variable and restrict the entry to valid and missing values defined in the corresponding record layout (codebooks) and scoring guides. Key-entry operators will be notified if they attempt to use an already existing ID or enter a value that is undefined in the record layout and scoring guides.

The PIAAC data integration software (see Section 12.2) will verify that 100% double data entry was performed and identify any inconsistencies between the two sets of data. Reports will facilitate the look-up of original scoring and response capture sheets, as well as instruments, and the correction of values.

Participating countries will be required to report on the manual data capture operations in the National Survey Design and Planning Report and the National Monitoring Report.

11.2 CODING

Purpose

To ensure that the coding of items in the background questionnaire is performed in a uniform way within and across countries and with an acceptable quality.

Rationale

Participating countries must take steps to ensure that errors are minimised during the manual coding of data.

Standards, Guidelines and Recommendations

Standard 11.2.1 To facilitate comparability in data analysis, each PIAAC country will be required to map its national dataset into a highly structured, standardised record layout. In addition to specifying the position, format and length of each field, the international record layout (codebooks) will include a description of each variable and indicate the categories and codes to be provided for that variable. Upon receiving a country's file, the Consortium will perform a series of range checks to ensure compliance with the prescribed format and will run flow and consistency edits on the file. When anomalies are detected, countries will be notified of the problem and asked to submit cleaned files.

Standard 11.2.2 The following codebooks will be used to code education, occupation, industry, country, region and language information from the background questionnaire.

- The Consortium will develop a monitoring document (the Background Questionnaire Adaptation Sheet) that countries can use to provide detailed information on national translation and adaptation issues. This tool will be used to monitor and, if appropriate, approve country-specific additions to the background questionnaire or job requirements approach module.
- The 1997 International Standard Classification of Education (ISCED) will be used to code the education variables. All countries will pose the education related questions in a closed format using their own national classification. In that sense no actual coding will be carried out. Countries are required to deliver both the code in the national classification and the corresponding international code. The national education categories should be detailed enough to allow coding of respondent education in the following codes shown in Table 11-1A.

Table 11-1A. PIAAC Education Codes and Corresponding Codes from the ISCED

PIAAC Code	ISCED Code
01	No formal education or below ISCED 1
02	ISCED 1
03	ISCED 2
04	ISCED 3C, shorter than 2 years
05	ISCED 3C, 2 years or more
06	ISCED 3A-B
07	ISCED 3 (in the case no distinction between A-B-C, 2y+ can be made)

Table 11-1A. PIAAC Education Codes and Corresponding Codes from the ISCED (Continued)

PIAAC Code	ISCED Code
08	ISCED 4C
09	ISCED 4A-B
10	ISCED 4 (in the case no distinction between A-B-C can be made)
11	ISCED 5B
12	ISCED 5A, bachelor's degree
13	ISCED 5A, master's degree
14	ISCED 6

- Countries are required to indicate for each national education category, the minimum starting age, the minimum nominal years of schooling to complete this qualification and the minimum age upon completion. They also need to indicate whether this qualification is general or vocational. The consortium will contact each country separately to provide this information. Based on this information, the consortium will derive new variables on the years of schooling and the VET orientation of respondent's education and add this to the international dataset. This means that each national category must be detailed enough to provide an unambiguous answer to these variables.

For coding the educational attainment of parents, a distinction will be made in three levels, as shown in Table 11-1B.

Table 11-1B. PIAAC Education Codes and Corresponding Codes from the ISCED for Coding Parent Education

PIAAC Code	ISCED Code
01	No formal education, ISCED1 and 2 including 3C shorter 2 years
02	ISCED 3 + 4 excluding 3C short
03	ISCED 5 + 6

- Four-digit codes from the 2008 International Standard Classification of Occupations (ISCO-08) will be used to code the occupation of the respondent and the respondent's parents. Translations of the ISCO-08 into the 29 European languages can be found at EUROSTAT/Ramon. Countries that start coding in ISCO-88 should be aware that no automatic conversion from the ISCO88 to ISCO08 exists: certain codes in ISCO88 split up in multiple codes in ISCO08, while other codes are merged (so instead of a one-to-one the conversion is many-to-many). Therefore a manual verification of the correspondence is required for these codes. If a country codes in ISCO88 as well, this coding should be provided as well as the coding in ISCO08.
- Four-digit codes from the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4, will be used to code the sector in which the respondent is working.
- Countries will need to code the country names in various questions of the BQ using the numerical codes of UN M49. This list will be provided by the Consortium. In most cases a country-specific list of countries has been used that covers the most relevant countries plus a category 'other'. Both the 'listed' countries as the 'other' category should be converted by the countries into UM M49. The name of the country should reflect the CURRENT name, not the name of the country in the past (even though the question may be related to the past).

- Countries will need to code the languages in various questions of the BQ using alpha 3 codes of ISO 639-3. This list will be provided by the Consortium. In most cases a country-specific list of languages has been used that covers the most relevant languages plus a category 'other'. Both the 'listed' languages as the 'other' category should be converted by the countries into ISO 639-3.
- Countries are required to code the geographical region corresponding to the respondent's address at the TL2 level using the OECD classification of geographical regions, which will be provided by the Consortium. For the European Union countries this geographical coding corresponds to levels one or two of the Nomenclature of Territorial Units for Statistics (NUTS 1 or 2).

Two questions in the BQ pertaining to employment contract contain an open category 'other', which the respondent is then asked to specify in the subsequent string variable. In these cases the NPM is required to review the response strings in the national language in the result data, and if appropriate assign an existing substantive code to the preceding variable. There is no requirement to translate "other" responses for use by the Consortium, but the original strings are expected to be submitted as part of the national database.

Standard 11.2.3 Occupation and sector of industry data that have been manually coded will be 50% verified by another coder. The average error rate for manually coded data must not exceed 10% for codes at the 4 digit level.

Guideline 11.2.3A Each country should train approximately five coders. These coders should preferably have extensive experience in coding education and industry/occupation data from censuses or other large-scale surveys. Training materials should consist of a master set of descriptions with associated expert codes for the data to be coded. By the end of the coder training programme, the coder error rate for coding occupation and industry should not exceed 10% at the 4 digit level.

Guideline 11.2.3B Some countries may opt to utilise software for automated coding. However, since automated coding software is rarely able to successfully code 100% of the data, a manual coding operation will still be necessary. In this case, fewer manual coders may be required.

Quality Control Procedures

Participating countries will provide a description of their coding system and coding quality control procedures.

The Consortium will provide the international standard codebooks to be used for coding education, occupation, industry, country, region and language data and will provide a training session in an NPM meeting.

In countries that use national classifications for coding education, occupation and industry data, the country's national statistical institute will check the conversion of the national classification to the international classification. For countries using NACE as a basis for their national version, a conversion key NACE-ISIC can be provided by the Consortium.

Countries will check the quality of their coding of the respondent's highest educational level, occupation and industry against the distribution in the most recent Labour Force Survey or equivalent survey. As the field test is a non-random sample, this requirement holds only for the main study.

The Consortium will provide the international record layout specification containing the codes for each variable.

11.3 SCORING PAPER-AND-PENCIL INSTRUMENTS

Purpose

To ensure that the scoring of paper-and-pencil instruments is consistent across all scorers within a country and among countries.

Rationale

Accurate and reliable scoring is a key component of quality control for PIAAC. Scoring is required to determine whether respondents have correctly answered the questions in the core, literacy and numeracy paper-and-pencil cognitive instruments. Rescoring is required as a quality assurance measure to determine whether the scoring rubrics have been applied consistently by every scorer within the country and without bias across the country. The scoring procedures for the paper-and-pencil cognitive instruments should be set up to achieve accuracy by monitoring reliability throughout the scoring period. Achieving the goal of comparability depends on the equivalence of scoring within and between countries.

A within-country reliability study will be implemented during both the field test and main study to check the consistency of scoring. This study will require a second scorer to rescore a pre-defined number of cognitive paper-and-pencil instruments. The purposes for rescoring are to: i) document the degree to which the same scores are given to the same responses, regardless of the scorer; and ii) identify items and scorers that have low inter-rater agreement (i.e., low consistency). Items with low inter-rater reliability will be further examined for possible ways to improve scoring accuracy through improved translation, instruction and/or training for the main study. This examination may also indicate that a particular scorer's performance accounted for lower rescore reliability. Scoring resolution process WILL take place for the within-country reliability study during the field test only.

Across-country reliability study will be implemented to examine systematic scoring bias across countries. At least two bilingual scorers (fluent in the national language and English) will score English language international anchor booklets to ensure the equivalence of scoring across countries. The scores of these two bilingual scorers will be compared and evaluated against the master scores for accuracy. Inaccurate scores should be investigated as any systematic deviations may require that country scores - be corrected. However, because no resolution of differential scoring should be made on the scores of international English booklets. A scoring resolution process WILL NOT take place for the cross-country reliability study.

Standard 11.3.1 To achieve the goal of comparability, each country must score all core, literacy and numeracy paper-and-pencil cognitive instruments in a manner that is consistent within and across countries.

   Guideline 11.3.1A Scorers will use scoring sheets designed to capture the scored responses from the paper-and-pencil cognitive items.

   Guideline 11.3.1B Scoring must be performed in a centralised location, as training, quality control and communication are more efficient when all scorers are working in the same location.

Standard 11.3.2 To achieve comparability within countries, a <u>within-country inter-rater reliability</u> study will be implemented. Each country must have a second scorer rescore sets of booklets of respondents who took the core, literacy and numeracy paper-and-pencil instruments. Scoring resolution WILL take place for the booklets in this study.

> **Guideline 11.3.2A** During the field test, participating countries will check the consistency of scoring by having a second scorer rescore 100% of instruments. This <u>rescoring operation</u> must achieve a within-country inter-rater agreement of at least 95%. During the field test, 100% of the differences will be resolved by the lead scorer and reflected in the main score (i.e., score 1) while the reliability score (i.e., score 2) will not be changed during the resolution phase.

> **Guideline 11.3.2B** During the main study <u>within-country reliability study,</u> participating countries will check the consistency of scoring by having a second scorer rescore a set of booklets taken by a sample of 600 respondents (in each national language) OR 100% of the respondents (in each national language), whichever is less. To qualify for this study set, the respondent booklets **MUST** meet the design parameters outlined in Guideline 11.3.2C (see below). This rescoring operation must achieve a within-country inter-rater agreement of at least 95%. To generate enough data to evaluate the accuracy of scorers, each scorer must rescore at least 125 of each of the literacy and numeracy booklets.

> **Guideline 11.3.2C** During <u>the main study within-country reliability study,</u> the sample of respondents from which the set of booklets will be rescored **MUST** be from respondents who took the Core paper booklet. That is, it must include respondents who: *i)* entered the paper route because of lack of computer experience; or *ii)* failed the CBA Core Stage 1 (See Standard 5.6, Guideline 5.6.2C for the Psychometric Assessment Design). Thus, these respondents must have been administered one of the following during the PIAAC survey: i) core booklet only; ii) core and literacy booklets; or iii) core and numeracy booklets. That is, respondents who failed the CBA Core Stage 2 and were administered only the reading components shall NOT be considered part of the within-country reliability sample set of 600.

Standard 11.3.3. To achieve comparability across countries, a <u>cross-country reliability study</u> will be implemented. Each country must have two bilingual scorers and each of whom will score a set of English language international anchor booklets, also known as Bundle 0. Each item in Bundle 0 will be scored by these two different scorers, the lead scorer producing the "lead score" and the second scorer producing the "reliability score". The two sets of scores for Bundle 0 will be used by the Consortium to calculate inter-rater agreement across countries. There WILL NOT be score resolution for the Bundle 0 items as the Consortium will need the original scores to examine the degree of consistency among the participating countries.

> **Guideline 11.3.3A** The set of anchor booklets will consist of 60 Core Booklets, 60 Exercise Booklets 1, and 60 Exercise Booklets 2. These sets of anchor booklets will ensure 60 responses per item.

Standard 11.3.4 To achieve the goal of comparability, each country must capture responses for the <u>reading components</u> paper-and-pencil cognitive instruments in a manner that is consistent within and across countries. Each reading component response is captured by two different scorers/coders and code resolution WILL take place.

> **Guideline 11.3.4A** Scorers/coders will use capture sheets designed to capture the responses from the reading components paper-and-pencil cognitive items.

Guideline 11.3.4B The capture of responses must be performed in a centralised location, as training, quality control and communication are more efficient when all scorers/coders are working in the same location.

Quality Control Procedures

During the survey planning and data collection period, countries will be required to report, as part of the National Monitoring Report, on the status of scoring operations, including scorer reliability. As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document all aspects of their scoring operations.

11.4 QUALIFICATIONS, HIRING, TRAINING AND SUPERVISION OF SCORING STAFF

Purpose

To ensure that the scoring staff are well-qualified, are assigned manageable workloads and receive adequate training and supervision.

Rationale

Successful scoring operations are crucial to achieving good data quality in PIAAC. The number of scorers hired and trained must be sufficient both to allow the scoring operations to be conducted in a prescribed amount of time and to ensure that there are enough scorers to satisfy the rescoring requirements. Scorer training should follow the training developed by the Consortium, to ensure that scorers understand the rubrics and can apply them consistently. At least two scorers, including the lead scorer, must be proficient in English and in the language in which they are scoring, to facilitate the rescoring procedures.

Standards, Guidelines and Recommendations

Standard 11.4.1 The number of qualified scorers hired and trained by each country must be sufficient so that the scoring can be completed within three to four weeks.

> **Guideline 11.4.1A** Each country will employ a sufficient number of scorers (a minimum of three) so that the scoring can be completed within three to four weeks.

> **Guideline 11.4.1B** Scorers must be proficient in English as well as the language in which they are scoring task booklets. They should preferably be university graduates and must have at least a high school qualification. Scorers must be able to work in a team environment on the same schedule and in the same location. Each scorer should be expected to score, on average, 5 to 6 booklets per hour.

> **Guideline 11.4.1C** Scorer training will be given by each country and will follow the training developed by the Consortium. Scorer training will involve a minimum of three days of in-class training and two days of practice scoring. Scorers must be proficient in English and in the language in which they are scoring.

> **Guideline 11.4.1D** Each country will send a lead scorer to the scorer training to be provided by the Consortium at a National Project Manager meeting. This lead scorer will be responsible for training the country's team of scorers, supervising their work and communicating any scoring-related issues to the Consortium. The lead scorer will monitor each scorer's performance and overall scoring on a daily basis. The lead scorer must check 10% of each scorer's work for accuracy and retrain scorers who are not performing as necessary.

> **Guideline 11.4.1E** The lead scorer will subscribe to the PIAAC scoring listserv and will submit any scoring questions to the listserv for resolution by the PIAAC experts.

> **Recommendation 11.4.1** Each country must develop a training package for scorers, which will consist of an overview of the survey and training manuals based on the manuals and materials provided by the Consortium.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to document their strategies for hiring and training scorers.

During the survey planning and data collection period, countries will be required to report on the number of scorers hired and their qualifications. The documentation should include the number of scorers who were trained as well as the number released after training and the reasons for their termination.

A copy of the training materials for each country in each language must be submitted to the Consortium. Any deviations from the scoring procedures developed by the Consortium must be documented and reported.

Each country should also include in its field manual a description of the procedures used to monitor and support the scorers.

12. DATA FILE CREATION STANDARDS

12.1 PROCESSING AND RECORD LAYOUT

Purpose

To ensure that each country creates the necessary survey files – including sampling, status and disposition information, questionnaire and assessment responses, scores, codes, and weights – in the format and layout required for processing and analysis on the international level.

Rationale

The PIAAC data will originate from a variety of sources (*e.g.* computer-based background questionnaires and cognitive assessments or paper-based cognitive instruments). Most of the PIAAC data will be collected on the TAO platform and will be directly integrated into the country's database, using the Consortium-provided integration software (See Section 12.2.) The sample design and survey control data created by the country's study management system (see Section 10.6) must be mapped to the format and international record layout (codebook) required by PIAAC prior to integration into the country database. In addition, certain respondent information pertaining to occupation, sector of industry, region, language and country is required to be coded and must also be integrated in the national database.

Standards, Guidelines and Recommendations

Standard 12.1.1 Each country will create or transform the necessary sample design file (SDIF) according to the international record layout (codebook) specified by the Consortium and in the format required for integration.

> **Guideline 12.1.1** The participating countries are responsible for ensuring that the survey files including case information are created according to the internationally defined record layout. National Project Managers and National Data Managers should review the international layout carefully prior to implementation of their national study management systems to ensure that their survey data can be unequivocally mapped to the internationally required fields, codes and formats.

Quality Control Procedures

The Consortium offers to review a country's sample design file format and layout prior to implementation to ensure that it can conform to international requirements. (See also Section 10.6.) Deviations from the prescribed record format must be reconciled before the data can be integrated for further processing.

The data integration software (see Section 12.2) will verify the structure and values of the required files during import.

In the National Survey Design and Planning Report, the participating countries will be required to report on the processing and conversion from their study management system to the internationally required structure.

12.2 DATA INTEGRATION

Purpose

To ensure that PIAAC data from all sources are reliably and consistently integrated.

Rationale

In PIAAC, the structure of the data is complex and data will originate from a variety of sources:

- Sample design international file (SDIF) from the country's study management system (e.g. ID numbers, selection probabilities, screener disposition codes);
- Assessment design meta and workflow data from the TAO platform (e.g. random assignments, branching and redirection to paper-and-pencil mode, sequence of adaptive measures);
- Background questionnaire (BQ) responses from the TAO platform;
- Log/audit information for the background questionnaire and general workflow (e.g. time taken, validation checks, interview pauses, interviewer actions);
- Cognitive assessment responses and scores for automatically scored items from the TAO platform;
- Auxiliary and audit information from the TAO platform (e.g. time taken, number of activities,);
- Scoring of paper-and-pencil booklets (main and reliability scoring);
- Coding of education, occupation, industry, language, country and region.

The corresponding databases and files must be matched and checked for structural consistency using unique record identifiers (see Section 10.6). Because of the complexity of the different sources of data in PIAAC, and given that most data will originate from the TAO platform, it is imperative that the Consortium provide software so that the national databases can be reliably built and verified on a continuous basis as the survey progresses and so that data can be delivered on time.

"Integration," as used below, refers to the structural assembly of the above-mentioned sets/sources of variables to form the country database. "Importing," as used below, refers to the incremental addition of data for individual cases or sets of cases from a particular source to the country database.

Standards, Guidelines and Recommendations

Standard 12.2.1 All data collected for PIAAC will be imported into a national database using the data integration software (i.e., DME "Data Management Expert") provided by the Consortium, following specifications in the corresponding operational manuals and international/national record layouts (codebooks).

> **Guideline 12.2.1A** The participating countries are responsible for data integration supervised by a National Data Manager. The Consortium will provide support for this activity in the form of software, manuals, codebooks and mandatory training for National Data Managers as part of or separate from NPM meetings.

> **Guideline 12.2.1B** All data has to be verified for structural consistency within and across sources and for agreement with the internationally defined formats and record layouts. Countries are responsible for assuring that sample design and disposition data are recorded for every case (household or person), including those that do not enter the VM, and for checking that disposition codes are in agreement with the availability of BQ and assessment responses (CBA and/or PP). For all applicable cases, countries are responsible for assuring the availability and correct matching of BQ responses, computer-based

assessment responses and behavioural information, paper-and-pencil assessment scores and captured responses, and any applicable coding (education, occupation, industry, country, language, and region).

Guideline 12.2.1C Data must be imported on a regular and incremental basis as the survey progresses (*e.g.* the ongoing import of data files generated by TAO for each respondent as they are returned from the field by interviewers).

Guideline 12.2.1D Information on data missing as a result of technical problems in the VM, lost paper instruments, denied permission to share or for other reasons must be recorded and provided to the Consortium as detailed in the Data Management Manual.

Standard 12.2.2 Any national instrument adaptations, as agreed upon with the Consortium, must be reflected in the national record layout (codebooks).

Guideline 12.2.2A Adaptations to the national context must be reflected in the national record layout before data are imported, based on the corresponding documentation. (See Section 6.2.) For instance, additional values in a BQ multiple-choice question must be reflected in the national record layout and must correspond to the BQ data that are expected to be imported from the TAO platform.

Guideline 12.2.2B All adaptations must be thoroughly tested prior to the production use of the data integration software (DME).

Guideline 12.2.2C The integration of data will follow the adapted national record layout. Any necessary recoding or mapping to re-establish the international record layout will be carried out after all data have been imported and integrated according to the documentation (*i.e.* the Background Questionnaire Adaptation Sheet) as agreed upon between the country and the Consortium. Per default, the Consortium will assume responsibility to map nationally adapted and international variables.

Quality Control Procedures

The data integration software provided by the Consortium will facilitate the adaptation of the record layout to the national context, the integration and importing of data and the verification of data accuracy.

The Consortium will review national adaptations to the BQ/JRA from a data and coding perspective before they are implemented.

The software will have the capability of generating reports that provide an overview of the consistency of the entire database. Each country will be required to generate and review these reports on a regular basis, make corrections as necessary and to conduct a final review before delivering the database to the Consortium.

12.3 DATA VERIFICATION

Purpose

To ensure that the national PIAAC database accurately reflects the survey information, the respondents' answers collected in the field and any derived variables.

Rationale

The national database provided to the Consortium at the end of the data processing and integration phase will be used in subsequent steps such as weighting, scaling, estimation, analysis and reporting. It is therefore imperative that the final database incorporating all sources has been properly verified and edited to ensure that it is free of data capture errors, so that a reliable database is available for international analysis.

Standards, Guidelines and Recommendations

Standard 12.3.1 Each country will perform verifications of its national database to identify and, if necessary, resolve errors and inconsistencies in the data. Such verifications will be conducted using the data integration software provided by the Consortium and in accordance with the specifications in the corresponding operational manuals and record layouts.

> **Guideline 12.3.1A** The verification of the PIAAC database, over and above the verification checks mentioned in the context of integration above, includes the following: 1) a unique ID check, 2) a valid value check for nominal/ordinal variables, 3) a valid range check for continuous variables and 4) cross-table consistency checks..
>
> **Guideline 12.3.1B** The participating countries are responsible for performing the above-mentioned checks and for making any necessary changes or corrections to the data on a regular basis (*e.g.* weekly) and again before data delivery to the Consortium.
>
> **Guideline 12.3.1C** If systematic or incidental errors are discovered during any of these or additional checks, they will be resolved by replacing the original erroneous value either with a corrected valid value from the original instruments and/or survey documentation or with the appropriate missing value (*e.g.* "not stated").
>
> **Guideline 12.3.1D** Missing or inconsistent data may be augmented or corrected by consulting survey documentation, by looking up the original responses or by re-contacting the respondent. Statistical imputation methods must not be used to treat missing data (*i.e.* item and unit nonresponse).

Quality Control Procedures

The data integration software provided by the Consortium will generate the reports necessary to carry out the within-country verification as the survey progresses and prior to data submission. The software will further facilitate the production of frequencies and basic statistics to support the review of data.

Following data submission, the Consortium will run identical checks to identify any residual issues not previously addressed by the national centre. Additional data verification checks and cleaning logic (*e.g.* for multivariate inconsistencies) will be implemented on the international level and reported to countries for comment and/or correction based on the within- and cross-country analysis.

12.4 DELIVERY

Purpose

To ensure that a single, complete, final and verified PIAAC national database is delivered to the Consortium, including all documentation (*e.g.* Background Questionnaire Adaptation Sheets), and that any questions and queries by the Consortium are addressed in a timely way.

Rationale

The databases delivered by the national centres form the basis for the PIAAC analysis, reporting and dissemination. It is therefore of utmost importance that the Consortium receives a complete database and that any remaining queries or inconsistencies be resolved in a timely way.

Standards, Guidelines and Recommendations

Standard 12.4.1 Each participating country is responsible for delivering a single complete and documented database according to the format specified in the PIAAC operational manuals and following the schedules defined by the Consortium for the field test and main study.

> **Guideline 12.4.1A** The delivery of data should follow the adapted national record layout, *i.e.* prior to any necessary recoding or mapping to re-establish the international record layout. Working in close co-operation with the National Project Manager and the National Data Manager, the Consortium will make necessary structural adjustments following data submission unless agreed differently.

> **Guideline 12.4.1B** Any documentation specified in the PIAAC operational manuals or otherwise pertinent to the database must be submitted together with or as part of the national database.

> **Guideline 12.4.1C** Data delivery must be made through secure channels (i.e. the project's SharePoint site or a secured FTP connection), in a folder to which only the Consortium and the country have access.

Standard 12.4.2 The National Data Manager must be authorised to respond to data queries from the Consortium for a minimum of three months after database delivery, must be able to respond to queries within three working days and must be able to resolve identified data discrepancies.

Quality Control Procedures

The Consortium will verify the completeness of the delivered data, confirm and document the receipt and initiate data processing at the international level.

The participating countries will be required to provide necessary documentation with the data delivery, as well as documentation for any special aspects of the database.

13. CONFIDENTIALITY AND DATA SECURITY STANDARDS

13.1 SAMPLE DESIGN

Purpose

To gather information about the confidentiality rules for each country in a timely manner, to ensure that the sample design data are handled appropriately.

Rationale

Because confidentiality rules vary by country, it is important that countries notify the Consortium of any rules affecting the PIAAC data so that issues can be addressed accordingly. The data requested in the PIAAC standards are critical to the study; therefore, any deviation from the data-sharing assumptions will need to be addressed in such a way that data quality is not affected.

Standards, Guidelines and Recommendations

Standard 13.1.1 Each country must provide early indication of any confidentiality rules that limit the data sharing that has been specified in the PIAAC standards in the Sample Design International File Layout and the Weighting International File Layout.

> **Guideline 13.1.1** Any confidentiality edits (such as perturbation) on variables used in weighting must be done prior to providing the SDIF to ensure that the weights sum to the target population control totals.

> **Recommendation 13.1.1** Upon receiving the PIAAC standards, countries should review the national guidelines for maintaining confidential data and present concerns and recommended procedures in a memorandum to the Consortium. The Consortium will review the memorandum and contact the country representative for further discussion.

> In particular, review the Sample Design International File Layout, which requests IDs for the various stages of clustering, including primary sampling units (PSUs), secondary sampling units (SSUs), households and persons. The PSU and SSU IDs are needed to create replicate weights. An alternative to providing PSU and SSU IDs is to create the more anonymous variables variance stratum (VARSTRAT) and variance unit (VARUNIT).

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to report any confidentiality rules that limit data sharing.

13.2 INFORMATION TECHNOLOGY

Purpose

To ensure the integrity and confidentiality of all survey data stored either on the Internet or on the laptop computers of participating countries.

Rationale

The Consortium has determined that local information technology (IT) processes, and thus the documentation of these processes, should be an internal affair. Therefore, the Consortium will specify only standards for internal PIAAC server systems. The security considerations presented here are formulated as recommendations for participating countries. The National IT Co-ordinators are asked to implement similar mechanisms or to implement their own country's security strategy.

Standards, Guidelines and Recommendations

Standard 13.2.1 The Consortium will implement security mechanisms in accordance with basic IT security principles regarding data confidentiality, integrity and availability.

Standard 13.2.2 All data available on web services will be accessible only through encrypted connections (HTTPS/SSL) and access control mechanisms. Each user will have only a limited set of user rights.

Standard 13.2.3 All personal data on the Internet-based TAO development servers will be handled according to the recommendations of the German Bureau of Security in Information Technology and the requirements of the German Law of Confidentiality in Information Technology.

Standard 13.2.4 All outbound interactions with the web-based TAO development platform server will be subject to logging mechanisms.

Standard 13.2.5 All traffic coming from the Internet will be checked by the Consortium's firewall and intrusion detection system.

Standard 13.2.6 All personnel working with confidential material on the TAO development platform must sign non-disclosure agreements.

Standard 13.2.7 The TAO virtual machine running on the interviewer's laptop computer will not allow administrative control for non-IT personnel. It will operate only in kiosk mode, so that access to the virtualised operating system will be limited to the National IT Co-ordinator and Consortium IT personnel.

Standard 13.2.8 The PIAAC Consortium will implement strong folder encryption internally.

> **Recommendation 13.2.8A** Although there has been no final decision on encryption standards, the Consortium strongly recommends encrypting the virtual hard drive used in the PIAAC study to prevent analysis of the content block by block (*e.g.* using Truecrypt, Bitlocker, EFS).

> **Recommendation 13.2.8B** The data file exported from the virtual machine to the host system should be encrypted, signed by a digital certificate or placed in an encrypted folder.

Recommendation 13.2.8C All details on encryption and digital signing standards will be decided at meetings with the National IT Co-ordinators and National Project Managers, so that a common standard can be implemented for participating countries.

Quality Control Procedures

Before the field test, countries will be required to document their chosen security standards.

The Consortium has assigned two information privacy officials to document and test the handling of sensitive data.

13.3 TRANSLATIONS

Purpose

To maintain the confidentiality of both the source and translated versions of PIAAC assessment instruments.

Rationale

All staff involved in the translation processes, whether hired by the Consortium or national centres, must understand the importance of maintaining the confidentiality of both the source and translated versions of PIAAC assessment instruments.

Standards, Guidelines and Recommendations

Standard 13.3.1 All staff who handle PIAAC assessment instruments in the course of the translation process (*e.g.* translators, reviewers, members of national research teams and national expert panels, secretaries) should be made aware that these materials are under embargo and must therefore be kept strictly confidential.

Guideline 13.3.1A All staff working on PIAAC translations must sign a confidentiality agreement and/or affidavit of non-disclosure**.** Annex 13-1 provides a sample confidentiality form that can be adapted to suit national centre requirements.

Guideline 13.3.1B All staff working on PIAAC translations must exchange files containing secure materials exclusively through the secured web-based platform set up and managed by PIAAC Consortium. (Refer to Section 13.2 for specifications.)

Guideline 13.3.1C If any paper documents containing secure materials (*e.g.* source versions) are distributed to support the translation process, arrangements must be made for these to be returned for secure storage or destruction when they are no longer needed.

Quality Control Procedures

Quality control procedures will verify compliance with the above standard and guidelines.

As part of the National Survey Design and Planning Report process for the field test and main study, countries will be required to outline steps to ensure data confidentiality and security, including steps for the translation process.

13.4 DATA COLLECTION

Purpose

To maintain the confidentiality of PIAAC assessment items and respondent data.

Rationale

It is imperative that confidentiality is maintained throughout the various stages of PIAAC. Project staff, including data collectors, must understand the importance of maintaining respondent confidentiality and data security to ensure that there are no compromises to the data. Furthermore, data collectors should use their knowledge of confidentiality and data security practices to address respondent concerns about those issues.

Standards, Guidelines and Recommendations

Standard 13.4.1 All staff working on PIAAC, including field supervisors and interviewers, must understand confidentiality rules and practices in survey research.

> **Guideline 13.4.1A** All staff working on PIAAC, including field supervisors and interviewers, must sign a confidentiality agreement or affidavit of non-disclosure in which they agree that they will not:
>
> - Reveal the content of any assessment item developed for use on PIAAC;
> - Reveal the content of any secure material, including items, from PIAAC;
> - Make any improper disclosure whereby a survey respondent or his/her related data could be identified, which includes but is not limited to information collected for PIAAC;
> - Permit anyone other than the individuals authorised by the Consortium to access PIAAC items, cognitive laboratory materials, data or reports;
> - Use or reveal any individually identifying information furnished, acquired, retrieved or assembled by him/herself or others, for any purpose other than statistical or reporting purposes specified by the Consortium.
>
> **Guideline 13.4.1B** PIAAC interviewers must maintain the confidentiality of all respondent information. This includes data collected during an interview, as well as information gleaned from observation, such as observations of the interview setting, the condition of a respondent's home or interpersonal communications observed between family members.
>
> **Guideline 13.4.1C** PIAAC interviewers must receive training on confidentiality and informed consent in conducting research. (See Section 9.4.)
>
> **Guideline 13.4.1D** Authorised users of the PIAAC SharePoint site must abide by the confidentiality statement posted on the PIAAC website (https://piaac.ets.org/sites/piaac/Lists/Announcements/DispForm.aspx?ID=2) and sign a confidentiality agreement and/or affidavit of non-disclosure in which they agree that they will not:
>
> - Distribute their password to others;
> - Permit anyone to have access to PIAAC items, cognitive laboratory materials, data, reports or any other document disseminated through the SharePoint site.

Standard 13.4.2 PIAAC interviewers must be trained on the importance of data security.

Guideline 13.4.2A Interviewers must maintain the security of their laptop computers, keeping passwords separate from the laptop computer and using the laptop computer only for PIAAC-authorised activities.

Guideline 13.4.2B Interviewers must be trained to keep laptop computers and survey materials secure in participant homes, offices, hotel rooms, cars, airports and other locations, to prevent theft.

Guideline 13.4.2C Interviewers must not send secure information or respondent identifiers via non-secure communication.

Guideline 13.4.2D Interviewers must minimise the number of paper records in their possession, by returning materials with respondent identifiers to the survey institute and by shredding outdated materials.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide the details of their proposed data collection security plan to the Consortium.

During the survey planning and data collection period, countries will be required to report, as part of the National Monitoring Report, the details of the data collection security plan.

13.5. DATA CAPTURE, CODING, SCORING AND MANAGEMENT

Purpose

To maintain the confidentiality of PIAAC assessment items and respondent data.

Rationale

It is imperative that confidentiality is maintained throughout the various stages of PIAAC. Project staff must understand the importance of maintaining respondent confidentiality and the security of the assessment materials to ensure that there are no compromises to the data.

Standards, Guidelines and Recommendations

Standard 13.5.1 All staff working on PIAAC for data capture, coding, scoring and data management at the national centre or in subcontracted survey organisations must understand and obey confidentiality rules and practices in survey research.

Guideline 13.5.1A All staff working on PIAAC data capture, coding, scoring and data management, regardless of their organisational affiliation, must sign a confidentiality agreement or affidavit of non-disclosure (see also Guideline 2.2E) in which they agree that they will not:

- Reveal the content of any assessment item developed for use on PIAAC;
- Reveal the content of any secure material, including items and scoring guides, from PIAAC;
- Make any improper disclosure whereby a survey respondent or his/her related data could be identified, which includes but is not limited to information collected for PIAAC;
- Permit anyone other than the individuals authorised by the Consortium to access PIAAC items, cognitive laboratory materials, data or reports;
- Use or reveal any individually identifying information furnished, acquired, retrieved or assembled by him/herself or others, for any purpose other than statistical or reporting purposes specified by the Consortium.

Guideline 13.5.1B Data capture, coding, scoring and data management must be carried out on the premises of the NPM's organisation or contracted survey organisation in order to minimise the number of, or even rule out the possibility of, paper materials outside of the organisation's reach and control.

Guideline 13.5.1C Data management tasks must be carried out on the secure premises of the NPM's organisation or contracted survey organisation in order to maintain data security and confidentiality.

Guideline 13.5.1D Transfers of data on portable media or via electronic means between national organisations and between the country and the Consortium must be made through secure and encrypted channels.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to provide the details of their proposed data capture, coding and scoring security plan to the Consortium.

During the survey planning and data collection period, countries will be required to report, as part of the National Monitoring Report, the details of their security plans.

13.6. DATA FILE CREATION

Purpose

To ensure that the national databases – including those delivered to 1) the Consortium for internal analysis and validation after the field test, 2) the Consortium for analysis and macro-level reporting after the main study, and 3) public users as a microdata file – comply with the country's confidentiality rules and regulations.

Rationale

In PIAAC, micro-level data will be collected from households. Respondents must be assured that the information they provide will be used in such a way that their confidentiality is protected. On the other hand, confidentiality measures will affect the utility of the data to researchers.

Each participating country is expected to have its own rules for preventing the disclosure of information likely to enable the identification of a person or household. Legislative requirements for data modifications (binning, censoring, masking, suppression, etc.) are expected to vary by country and will further depend on the type of information collected in PIAAC and, for example, the observed cell sizes when cells containing potentially confidential information are cross-tabulated.

Standards, Guidelines and Recommendations

Standard 13.6.1 Consistent with Standard 13.1.1 for sample design and weighting files, each country must provide the Consortium with early notification of any rules affecting the disclosure and sharing of PIAAC data in the direct assessments, background questionnaire (BQ)/job requirements approach (JRA) module and its derived variables and codes for occupation, industry, region, language and country.

> **Guideline 13.6.1A** Countries should carefully review the information collected through the BQ/JRA and provide a description of the intended methods for disclosure avoidance and the affected variables and demographics as part of the NSDPR report to the Consortium.

> **Guideline 13.6.1B** Countries should explain whether their legislative regulations and rules affect 1) the microdata files used by the Consortium and the OECD after the field test and main study or 2) only the microdata file to be released for public use.

Standard 13.6.2 Based on the documented and agreed-upon confidentiality regulations, each country is responsible for either 1) implementing any necessary confidentiality measures in its microdata file before delivery to the Consortium or 2) instructing the Consortium on how to implement the methods and modifications in the country database before public release.

Standard 13.6.3 Pursuant to COM/DELSA/EDU/PIAAC(2009)15, one of the fundamental objectives of PIAAC is to provide data for comparative analysis. The members of the BPC re-affirmed the principal that the PIAAC public-use data files should contain Microdata from all countries that are full participants in the project (provided data quality standards are met).

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and the main study, countries will be required to report any confidentiality rules that will limit data sharing. The Consortium will review the plans and contact the country representative for further discussion.

ANNEX 13-1. SAMPLE CONFIDENTIALITY FORM

PIAAC Confidentiality Agreement

(Translators/Reviewers of OECD/PIAAC Assessment Instruments)[22]

Name: _____

Phone number: _____

E-mail: _____

Address: _____

_____

This is to certify that I, _____, have agreed to provide linguistic services[23] (translation/review of assessment instruments) within the framework of the:

OECD PROGRAMME FOR THE INTERNATIONAL ASSESSMENT OF ADULT COMPETENCIES (PIAAC)

I understand that the signing of this form is an acknowledgment of my professional responsibility to maintain complete integrity of security for this project. I declare that I will not divulge any project information, trial materials, test materials, processes, contents or results, or any other materials, documents, or information pertaining to the project, or its clients or suppliers, to any person or organisation, as directed under the terms of the project.

I understand that the above does not apply to information that is in the public domain.

I have read and accept the conditions as outlined above.

Signature _____ Date _____

---

[22] This heading should be adapted for other project staff as appropriate.

[23] This job description should be adapted as needed.

14. WEIGHTING STANDARDS

Purpose

To provide a standard weighting approach and to facilitate the production of point estimates for the target population and their associated sampling error estimates.

Rationale

Sampling weights account for differential sampling rates, differential response rates, and undercoverage and are calibrated to population control totals. They ensure that the estimates represent each country's target population and reduce the potential for bias due to nonresponse. Replicate weights are created to capture the variation due to the sample design and selection, as well as weighting adjustments. Replicate weights also account for measurement error through the processing of plausible values. The replication design must conform and adapt to the PIAAC Data Explorer, which will be used to estimate sampling errors and to analyse the data. Using the same weighting approaches will result in comparable estimates and sampling error estimates across countries.

Standards, Guidelines and Recommendations

Standard 14.1 The Consortium is responsible for deriving sampling weights for the main study for all participating countries. However, countries may opt to compute their own sampling weights.

Standard 14.2 The country is responsible for providing a file with all variables necessary for the weighting process.

   Guideline 14.2A See Standard 4.6.7 and Annex 4-2 for the Sample Design International File Layout.

   Guideline 14.2B The file should contain the final data, after all edits have been performed and confidentiality measures have been taken.

Standard 14.3 The creation of full sampling weights will involve four main stages:

1.   Base weights, reflecting the probability of selection;
2.   Nonresponse-adjusted weights, intended to reduce nonresponse bias in estimates by adjusting for nonresponse;
3.   Trimmed weights, produced by minimal trimming of extreme weights;
4.   Benchmarked weights, created by adjusting survey estimates to known population totals.

   Guideline 14.3A A final weight is required for all sampled persons with a completed background questionnaire (BQ)/job requirements approach (JRA) module. A completed BQ/JRA is one that contains at least the key background questions (age, gender, highest level of schooling and employment status).

   Guideline 14.3B If the survey involves a screener stage, then the weighting process will include the creation of both household-level and person-level weights. The household-level weights will reflect the

household selection probability and will be adjusted for nonresponse to the screener. The person-level base weights will then be derived from the final household weights and the within-household probability of selection. The final weights will be created by adjusting the person-level base weights for person-level nonresponse and benchmarking them to population totals.

Guideline 14.3C An additional weighting adjustment will be needed for cases with unknown eligibility status (i.e. whether a sampled person is part of the target population or whether a sampled dwelling unit contains a person in the target population), such as households with maximum call backs. This step will involve distributing the weights of cases with unknown eligibility to those with known eligibility.

Guideline 14.3D Trimming can be used to reduce the influence of large weights. Trimming extreme weights can introduce bias but has the benefit of reducing variance. Because of the potential for bias, countries that do their own weighting must consult with the Consortium before trimming. More information is provided in the PIAAC Weighting and Variance Estimation Plan.

Recommendation 14.3A If the country chooses to perform its own weighting adjustments, the WesVar® software can be a helpful tool and can be downloaded for free from http://www.westat.com/wesvar/.

Recommendation 14.3B For more information on weighting, refer to Appendix A of the WesVar® User's Guide (http://www.westat.com/wesvar) or the Cross-Cultural Survey Guidelines website (http://ccsg.isr.umich.edu/index.cfm).

Standard 14.4 Persons who do not complete the survey for a literacy-related reason (*e.g.* language barrier) cannot be represented by survey respondents.

Guideline 14.4A The literacy-related nonrespondents cannot be represented by survey respondents, because their reason for not completing the survey is directly related to the survey outcome. Therefore, the literacy-related nonrespondents should be excluded from the adjustment for non-literacy-related nonresponse. Literacy-related nonrespondents at the screener stage can be represented by those at later stages.

Guideline 14.4B The literacy-related nonrespondents should be included in the benchmarking adjustment with the survey respondents, because they are considered part of the PIAAC target population.

Standard 14.5 Countries need to choose variables for the nonresponse adjustment that are of high quality, are available for all eligible units, and are related to proficiency and response propensity.

Guideline 14.5A Before selecting variables for the nonresponse adjustment, countries must run an analysis of the relationship between the potential adjustment variables and response propensity. See Section 4.7 on nonresponse bias analysis standards for more information.

Guideline 14.5B Variables used for nonresponse adjustment (internal or external) must have less than 5% missing data.

Guideline 14.5C If any of the nonresponse adjustment variables used in this stage includes missing data, countries must submit plans in the National Survey Design and Planning Report for imputation of missing data.[24]

Recommendation 14.5A Registries and other frame listings may contain useful variables for weighting nonresponse adjustments.

Recommendation 14.5B Past adult literacy surveys and/or the PIAAC field test can be used to evaluate the relationship of available variables to proficiency.

Standard 14.6 At a minimum, weights must be benchmarked to control totals for age and gender. All variables selected for benchmarking must have reliable control totals available, and all countries must deliver the control totals according to the weighting file layout in Annex 14-1.

Guideline 14.6A The quality of data from external sources must exceed the quality of data from PIAAC (*e.g.* the standard errors of the external estimates must be smaller than those of the non-benchmarked estimates from the survey).

Guideline 14.6B The concepts, definitions and coverage of the data (counts) from external sources must be the same as those used by PIAAC. If not, the counts from the external sources must be adjusted to make these comparable to the survey estimates.

Guideline 14.6C A control total file is required for each variable (*i.e.* dimension, combination of variables) used in the benchmarking adjustment.

Guideline 14.6D Each control total file must have a variable that matches to a corresponding variable on the case-level Sample Design International File Layout with the exact same number of categories.

Guideline 14.6E Variables used in benchmarking (internal or external) must have less than 5% missing data.

Guideline 14.6F If any of the benchmarking variables used in this stage includes missing data, countries must submit plans in the National Survey Design and Planning Report for imputation of missing data.

Standard 14.7 If a country chooses to perform its own weighting adjustments, the weights must be delivered according to the weighting file layouts provided in Annexes 14-2 and 14-3.

Guideline 14.7A The file containing the weights at each stage (see Annex 14-2) will be used to perform quality control checks on the weighting process.

Guideline 14.7B The file containing the final weights (see Annex 14-3) will be used for data processing and estimation.

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[24] For weighting purposes, imputation can be used only on variables used in forming weighting cells, or when calibrating the weights using BQ/JRA data. The weighting variables containing imputed values and their imputation flags can be delivered in the Weighting International File; however, they should be removed from the final analysis data files.

Standard 14.8 Replicate weights will be created to facilitate the computation of sampling error estimates. To conform and adapt to the PIAAC Data Explorer, the replicate weights must be created using one of the following approaches: 1) delete-one jackknife, 2) paired jackknife, 3) balanced repeated replication or 4) Fay's method.

Guideline 14.8A Countries not conducting weighting must provide the data necessary for creating replicate weights, as specified in the Sample Design International File Layout.

Guideline 14.8B Countries conducting weighting and forming replicate weights must provide the data necessary for creating replicate weights, so that sufficient checks can be produced.

Guideline 14.8C Countries conducting weighting and forming replicate weights must deliver the replicate weights to the Consortium while adhering to the Weighting International File Layout.

Guideline 14.8D Countries conducting weighting and forming replicate weights must provide detailed specifications for the formation of their replicate weights as part of the National Survey Design and Planning Report process.

Guideline 14.8E The delete-one jackknife is also referred to as delete-a-group jackknife, random groups approach and JK1. The paired jackknife is also referred to as the stratified jackknife and JK2. The JK2 approach, with two variance units per stratum, is appropriate for sample designs in which primary sampling units are stratified or selected with systematic sampling from a sorted list. The balanced repeated replication (BRR) approach is also commonly used when strata are involved, and Fay's method is a variant of the BRR approach.

Recommendation 14.8 If sample design ID variables are protected by the country's confidentiality rules, the variance stratum (VARSTRAT) and variance unit (VARUNIT) must be supplied, as specified in the Sample Design International File Layout.

Standard 14.9 A minimum of 15 and a maximum of 80 replicate weights will be allowed.

Guideline 14.9A Although the minimum number of replicates is 15, more are needed if the country desires more accurate variance estimates with more degrees of freedom.

Guideline 14.9B A maximum of 80 replicates is specified to balance the need to allow a sizable number of primary sampling units with the need to manage the cost for increased data storage and data processing.

Guideline 14.9C If the number of replicates formed is less than 80, it is common practice to fill in the remaining replicates by setting them equal to the full sample weight. However, for PIAAC, it is best to leave the number of replicates at the original number, so that the number of degrees of freedom can be approximated in a straightforward manner.

Standard 14.10 Replicates will be formed from the full sample to facilitate sampling error estimation through the PIAAC Data Explorer.

Recommendation 14.10 Replication is adaptable to a wide variety of designs, including simple random sampling, systematic sampling, stratified designs and multi-stage cluster designs. Details on forming replicate weights will be provided to countries that are forming their own replicate weights. Another resource for guidance on how to form replicates is the WesVar® User's Guide

(http://www.westat.com/wesvar/) for guidance on how to form replicates for the JK1, JK2, BRR or Fay's approach.

Standard 14.11 All weight adjustments that are conducted for the full sample must be conducted on each replicate weight to capture the variation created, or reduced, by the weight adjustments.

Recommendation 14.11 Once replicates have been created, WesVar® can be used to conduct the nonresponse adjustments and raking adjustment on the full sample, which will adjust the replicate weights at the same time.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field test and main study, countries will be required to specify whether or not they will perform their own weighting and, if so, to provide details of their weighting and variance estimation plans. If countries prefer to form their own weights, the plan will be reviewed for adherence to the above standards before approval.

During the weighting period, countries that perform their own weighting will be required to report on their weighting process on quality control monitoring forms. Quality checks will be developed to review the weighting process and evaluate the potential for nonresponse-related bias in descriptive variables (such as region of the country and percentage of minority population in geographic areas). The quality checks will be performed after each step in the weighting process. Examples of checks include:

- Reviewing the distribution of weights at each stage to identify any missing or extreme values.
- Computing the weighted frequencies of important survey characteristics after each weighting adjustment to show how each adjustment affects the estimates for key survey variables. In addition, weighted frequencies will be compared to reliable external totals.
- Reviewing a random listing of records for abnormalities.
- Producing the mean, median, minimum and maximum and checking for each replicate weight after each weight adjustment.
- After the final weights are produced, producing preliminary standard errors and design effects on survey variables as a check on the replicate weights.

An exhaustive list is provided in the PIAAC Weighting and Variance Estimation Plan.

**ANNEX 14-1. WEIGHTING INTERNATIONAL FILE LAYOUT
FOR BENCHMARK CONTROL TOTALS**

A file is required from all countries for each dimension used in the benchmarking process (*i.e.* raking). For example, if control totals exist by age categories and by gender, two files must be delivered. If control totals exist for gender within each age category, one file is needed. Each file will have two variables and only *x*+1 records where there exist *x* categories. For example, for a variable RAKEDIM1 with four categories, the control total file would appear as follows:

```
RAKEDIM1 TOTAL
1          132940
2          128973
3          165267
4          143744
```

A further requirement is that the sum across categories of each raking dimension (*i.e.* each file) must all be equal to the same grand total. Value labels of the RAKEDIM variables must accompany the file.

These files are space delimited flat ASCII files. The following is a sample layout for the first control total file.

Variable Name	Label	Format	Type	Comments
RAKEDIM1	Raking dimension 1	2	N	Required. This variable name and number of categories matches a corresponding variable on the Sample Design International File Layout.
TOTAL	Control total for RAKEDIM1	9	N	The sum across categories of RAKEDIM1 must equal the sum across categories of RAKEDIM2 in the second control total file, and so on.

**ANNEX 14-2. WEIGHTING INTERNATIONAL FILE LAYOUT
FOR QUALITY CONTROL CHECKS**

These files must include all sample persons. In addition, they must include any prior stage without sampled persons, *e.g.* all sampled households for which a sampled person was not identified during the household screener.

This file is to be delivered to the Consortium by countries doing their own weighting. It will be assumed that the file will be delivered as a SAS or SPSS dataset. Minimally required precision is stated below. The w.d notation is that commonly used in SPSS and SAS for numbers, where w is the number of positions to be used (including the decimal separator) and d the number of digits to the right of the decimal point. If a field is blank, use SYSMISS/. (as appropriate).

Variable Name	Label	Format	Type	Data Source	Comments
CNTRYID	Country ID	3	N	+	Required; ISO 3166 3-digit numeric codes.
CASEID	Household operational ID	9	N	+	Required if household sampling; subset of PERSID that will be assigned in screening; Does not include CNTRYID; matches to other PIAAC databases when combined with CNTRYID.
PERSID	Person operational ID	12	N	+	Required; Matches to other PIAAC databases when combined with CNTRYID.
VEMETHOD	Replication Approach	1	N	+	Required; 1: JK1, 2: JK2, 3: BRR, 4: FAY
VARSTRAT	Variance stratum	2	N	-	
VARUNIT	Variance unit	2	N	-	
HHBWT0	Screener base weight	13.6	N	+	Required if households are selected.
HHNRWT0	Screener nonresponse-adjusted weight	13.6	N	+	Required if households are selected. This will be zero for households that were nonrespondents to the screener. It should include the adjustment for unknown eligibility, if applicable.
SPBWT0	Sample person base weight	13.6	N	+	Required. This will be missing for households with no sampled persons.

Variable Name	Label	Format	Type	Data Source	Comments
SPUEWT0	BQ unknown eligibility adjusted weight	13.6	N	+	Required if sampled persons with unknown eligibility status exist.
SPLNRWT0	Sample person literacy-related nonresponse adjusted weight	13.6	N	+	Required. This will be zero for literacy-related nonrespondents without age and gender collected and missing for households with no sampled persons.
SPNRWT0	Sample person nonresponse-adjusted weight	13.6	N	+	Required. This will be zero for nonrespondents to the BQ/JRA and missing for households with no sampled persons.
SPTWT0	Sample person trimmed weight	13.6	N	+	Required if any trimming was performed. This should have a positive, non-missing value for all respondents to the BQ/JRA.
SPFWT0	Final calibrated sample person weight	13.6	N	+	Required. This should have a positive, non-missing value for all respondents to the BQ/JRA.
SPFWT1 - SPFWTxx	Final replicate weight 1 through final replicate weight *xx*, where *xx* = the number of replicates	13.6	N	+	Required. This should have a non-missing value for all respondents to the BQ/JRA.

BQ, background questionnaire; JRA, job requirements approach module

A '+'indicates that the country will provide these variables. A '-' indicates that the PIAAC Consortium will copy the data in or compute it from another source (e.g. SDIF).

**ANNEX 14-3. FINAL WEIGHTING INTERNATIONAL FILE LAYOUT
FOR DATA PROCESSING AND ESTIMATION**

This file must include all persons that were assigned a final weight. Final weights are assigned to all respondents, in addition to literacy-related nonrespondents with confirmed age and gender.

This file is to be delivered to the Consortium by countries doing their own weighting. It will be assumed that the file will be delivered as a SAS or SPSS dataset. Minimally required precision is stated below. The w.d notation is that commonly used in SPSS and SAS for numbers, where w is the number of positions to be used (including the decimal separator) and d the number of digits to the right of the decimal point. If a field is blank, use SYSMISS/. (as appropriate).

Variable Name	Label	Format	Type	Data Source	Comments
CNTRYID	Country ID	3	N	+	Required; ISO 3166 3-digit numeric codes.
PERSID	Person operational ID	12	N	+	Required; Matches to other PIAAC databases when combined with CNTRYID.
IMPAGE	Person age for weighting adjustments	2	N	+	Required if any values of age were imputed
IMPFLGAG	Age imputation flag	1	N	+	Required if IMPAGE is non-missing; 1 = IMPAGE value was imputed; 0 = not imputed
IMPGNDR	Person gender for weighting adjustments	1	N	+	Required if any values of gender were imputed
IMPFLGGE	Gender imputation flag	1	N	+	Required if IMPGNDR is non-missing; 1 = IMPGNDR value was imputed; 0 = not imputed.
IMPVAR1	Imputed weighting variable 1	2	N	+	Required if imputation was done for additional weighting variables.
IMPFLG1	Imputation flag for IMPVAR1	1	N	+	Required if IMPVAR1 is non-missing. 1 = IMPVAR1 value was imputed; 0 = not imputed.
IMPVAR2	Imputed weighting variable 2	2	N	+	Required if imputation was done for additional weighting variables.

Variable Name	Label	Format	Type	Data Source	Comments
IMPFLG2	Imputation flag for IMPVAR2	1	N	+	Required if IMPVAR2 is non-missing. 1 = IMPVAR2 value was imputed; 0 = not imputed.
IMPVAR3	Imputed weighting variable 3	2	N	+	Required if imputation was done for additional weighting variables.
IMPFLG3	Imputation flag for IMPVAR3	1	N	+	Required if IMPVAR3 is non-missing. 1 = IMPVAR3 value was imputed; 0 = not imputed.
IMPVAR4	Imputed weighting variable 4	2	N	+	Required if imputation was done for additional weighting variables.
IMPFLG4	Imputation flag for IMPVAR4	1	N	+	Required if IMPVAR4 is non-missing. 1 = IMPVAR4 value was imputed; 0 = not imputed.
IMPVAR5	Imputed weighting variable 5	2	N	+	Required if imputation was done for additional weighting variables.
IMPFLG5	Imputation flag for IMPVAR5	1	N	+	Required if IMPVAR5 is non-missing. 1 = IMPVAR5 value was imputed; 0 = not imputed.
VEMETHOD	Replication Approach	1	N	+	Required; 1: JK1, 2: JK2, 3: BRR, 4: FAY
VARSTRAT	Variance stratum	2	N	-	
VARUNIT	Variance unit	2	N	-	
SPFWT0	Final full sample weight	13.6		+	Required; This should have a non-missing value for all respondents to the BQ/JRA.
SPFWT1 - SPFWTxx	Final replicate weight 1 through final replicate weight *xx*, where *xx* = the number of replicates	13.6	N	+	Required; This should have a non-missing value for all respondents to the BQ/JRA.
VEFAYFAC	Fay's K factor used in creating replicate weights	4.2	N	+	Required if VEMETHOD = 4.
VENREPS	Number of replicate weights created	2	N	+	Value is between 15 and 80, inclusive

BQ, background questionnaire; JRA, job requirements approach module
A '+'indicates that the country will provide these variables. A '-' indicates that the PIAAC Consortium will copy the data in or compute it from another source (e.g. SDIF).

15. ESTIMATION STANDARDS

Purpose

To ensure that point estimates and associated sampling error estimates reflect the sample design and selection and to provide a standard approach for ensuring comparability across countries.

Rationale

The use of sampling weights allows for estimation of the target population parameters. Replicate weights capture the variation due to the sample design and selection, as well as weighting adjustments. Using the same estimation approach reduces error due to differential weighting and variance estimation procedures when making comparisons between countries.

Standards, Guidelines and Recommendations

Standard 15.1 Estimates produced using PIAAC data will be weighted population estimates that use the final sample weights.

Standard 15.2 The sampling error measures for PIAAC population estimates – such as variances, standard errors and coefficients of variation – will be computed using the replication method.

Quality Control Procedures

Checks on the weights and replicate weights are provided in Chapter 14.

16. DOCUMENTATION STANDARDS

Purpose

To document PIAAC practices in each participating country to inform data users, create a reference for future surveys and provide an evaluative summary of all aspects of PIAAC survey practices.

Rationale

Data users need to be informed of the PIAAC concepts, definitions and survey design in order to conduct a meaningful analysis of the data. Furthermore, thorough documentation of PIAAC can aid future designers of similar surveys.

Standards, Guidelines and Recommendations

Standard 16.1 Each country will prepare components of a final survey report after the completion of data collection, which will be compiled into a full written report by the Consortium.

Guideline 16.1A The final survey report should thoroughly document the actual survey experiences in each country. The report should identify the aspects of the survey that worked well and also include an explanation of problems encountered.

Guideline 16.1B The Consortium report will include the following topics:

- Major Analytic Objectives of PIAAC
  - o Country-Specific Objectives
- Special Population Subgroups
- Sample Design and Selection
  - o Target Population
  - o Sampling Frame
  - o Sample Size
  - o Sample Design
  - o Sample Selection
  - o Response Rates
  - o Respondent Incentives
  - o Sample Monitoring
- Survey Instruments
  - o Country-Specific Supplemental Background Questionnaire Items
  - o Selected National Option for the Assessment
  - o Translation, Adaptation and Verification

- Information Technology
- Field Management
  - o Organisation of Data Collection Staff
  - o Supervision and Monitoring
  - o Recruitment and Hiring of Data Collection Staff
- Data Collector Training
  - o Supervisor Training
  - o Interviewer Training
- Data Collection
  - o Contact Procedures
  - o Promoting Respondent Participation and Obtaining Specified Response Rates
  - o Study Management System
  - o Quality Control of Fieldwork
- Data Processing
- Confidentiality and Data Security
- Estimation
  - o Weighting
  - o Variance Estimation
- Nonresponse Bias Analysis
- Quality Assurance Procedures
- Findings

Standard 16.2 PIAAC documentation must be compiled and retained by countries. Documentation must include copies of the background questionnaire in each language tested in each country, all operations manuals (interviewer manual, supervisor manual, etc.), the final record layout and the editing specifications.

Guideline 16.2 An electronic version of these items should be kept for future reference.

Quality Control Procedures

Countries must report to the Consortium on their progress in completing the components of the report.