CYCLE 2 PIAAC TECHNICAL STANDARDS AND GUIDELINES

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PIAAC TECHNICAL STANDARDS AND GUIDELINES

INTRODUCTION TO THIS DOCUMENT

The Programme for International Assessment of Adult Competencies (PIAAC) has established 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) for the implementation of Cycle 1, and includes the survey design and implementation changes incorporated in Cycle 2. 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: *Laura Halderman, PIAAC Project Co-ordinator, Educational Testing Service, E-mail: lhalderman@ets.org, Telephone:+ 1- 609-734-5996.*

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.

The first cycle of PIAAC ensured continuity with these previous surveys but also sought to extend what was measured beyond literacy and numeracy by including the domain of problem solving in technology-rich environments and by assessing reading component skills to provide more information about individuals with low literacy proficiency. 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.

Thirty eight countries participated in the first cycle of PIAAC, making it the largest international survey of adults ever conducted. The data collection was carried out in three rounds.

- Round 1 – Twenty four countries participated in the 2012 data collection: Australia, Austria, Belgium (Flanders), Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Japan, Korea, Netherlands, Norway, Poland, Russian Federation, Slovakia, Spain, Sweden, UK (England), UK (Northern Ireland), and United States.

- Round 2 – Nine countries participated in the 2014 data collection: Chile, Greece, Indonesia, Israel, Lithuania, New Zealand, Singapore, Slovenia and Turkey.

- Round 3 – Five countries participated in the 2018 data collection: Ecuador, Hungary, Kazakhstan, Mexico, and Peru.

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; the GESIS – Leibniz Institute for the Social Sciences, 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 implemented via processes designed to maximize cross-cultural, cross-national and cross-language validity and comparability. 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 adaptive problem solving)

A computer-assisted data collection method must be used at all stages of the data collection, including completion of the background questionnaire.

The direct assessment will be available in a tablet-based format using the same tablet delivery system that will be used to collect the background questionnaire data. Countries may choose to include the cycle 1 paper-based assessment in the main study for respondents who are unable to take the direct assessment on the tablet. New countries may opt to conduct an operational test of the paper-based assessment in the field trial in preparation for the main study.

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, as guided by the Total Survey Error (TSE) concept. The standards and guidelines 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, valid, and comparable across countries.

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, following the TSE framework.

> **Guideline 1.1** The Consortium must establish a clear QA process for each facet of the project, including the design of the field trial and main study; the development and validation of the background questionnaire and direct assessment instruments; the development and testing of the delivery system; 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.

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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 trial 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 PIAAC Consortium must provide for ongoing communication, via the PIAAC Portal, 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 from the design of the study through implementation, dissemination, and reporting.

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/index.php/chapters 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** Adhere to ethical business practices in bidding, contracting, and project management.

> **Guideline 2.1E** Fulfill ethical responsibilities to employees (e.g. fair hiring practices, an objective performance evaluation process, and a commitment to employee safety).

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

> **Guideline 2.1G** Ensure that interviewers are aware of their ethical responsibilities and instruct interviewers on the limits of their ethical responsibilities.

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

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

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

Guideline 2.1K Monitor possible ethics violations, such as interviewer falsification or plagiarism during the design, data collection, and analyses phases.

Guideline 2.1L Make interpretations of research results that are consistent with the data.

Standard 2.2 Research organisations have a responsibility to respect and safeguard the rights of free will, privacy, confidentiality, and well being of survey participants, and minimize the burden of study participation to the greatest extent possible, adhering to both ethical and legal obligations toward participants.

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.)

  — sponsor, purpose and duration of research

  — explanation of how the respondent was selected for the study

  — interview procedures to be followed by the respondent

  — voluntary nature of participation

  — expected risks and benefits

  — compensation (if included)

  — maintenance of confidentiality

- — right to withdraw from the study at any time without penalty

- — 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 audio 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 on hard copy materials, as well as data stored on interviewer tablet computers including 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 including respondent identifying details and survey data in a confidential manner.

Standard 2.4 Researchers must maintain sensitivity to cultural and social differences when designing study protocols in order to build trust and gain cooperation.

Standard 2.5 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 2.6 Researchers have a responsibility to the public to ensure that findings released are an accurate portrayal of survey data and provide appropriate access to study data.

> **Guideline 2.6A** Researchers must be clear and honest when interpreting and reporting data.

> **Guideline 2.6B** 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 2.6C** Results must be reported accurately, even if they are not the anticipated or desired results.

> **Guideline 2.6D** Researchers must not place undue confidence in any conclusions drawn based upon the data collected.

> **Guideline 2.6E** Researchers must not condone unethical, incompetent or careless practices conducted during any aspect of the survey process.

> **Guideline 2.6F** 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 2.6G** 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 2.7 Materials and procedures related to the ethical conduct of the study and ethics committee reviews must be documented.

> **Guideline 2.7** 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.

Standard 2.8 Institute and follow appropriate quality control procedures

Guideline 2.8 Development and implementation of quality control procedures is necessary to ensure that the procedures that have been developed meet standards for ethical research and are being carried out appropriately.

- Monitor implementation of confidentiality protocols and procedures

- Securely store pledges of confidentiality

- Recontact a sample of cases for each interviewer to verify that screening and interview procedures were appropriately followed

- Use analyses of paradata to assess survey quality

- Conduct disclosure analysis

- Investigate any deviation from ethical protocols and take appropriate action

Quality Control Procedures

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

3. SURVEY PLANNING STANDARDS

> **Annex 3-1 (NSDPR) will be updated with questions to reflect Cycle 2 changes.**

3.1 Qualifications of National Project Manager

Purpose

To ensure that the National Project Manager (NPM)[1] 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

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[1] The NPM is ultimately responsible for all tasks. However, any reference to NPM throughout this document should be understood to mean "the NPM and his/her delegate(s)".

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[2] 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 arranging meetings of these groups to develop stimulus materials and items for the cognitive instruments and to prepare the country's official response to the materials reviewed.

Guideline 3.1.3C The NPM must attend the nine NPM meetings scheduled from 2018 to 2023. Based on the agenda for each meeting, the NPM will be asked to bring additional national personnel with expertise as identified by the Consortium. These meetings are 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 a wider variety of issues including the cognitive assessment and background questionnaire frameworks and instruments, indicators, sampling requirements, survey administration, data management and confidentiality, monitoring and quality control plans, status reports, and dissemination of results; (2) to provide training for NPMs and team members on instruments, translation, sampling tasks, operational procedures, response rates, scoring paper-based items (as needed), coding responses in the questionnaire, 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 trial and main study, including detailed reports of sampling plans, adaptation and translation of survey instruments,

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[2] The expression "survey institute" is used throughout this document to refer to the entity carrying out data collection. The exact division of responsibilities between the NPM and the survey institute may vary across countries.

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 portal for communications on all project-related activities.

- Prepare summaries of data file layouts and country-specific additions to BQ coding schemes.

- Prepare reports documenting scoring activities for countries that choose to include the paper-based option for the direct assessment in the main study.

- 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 English.

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 specifications provided by the Consortium.

- If a country chooses to conduct the weighting step (currently a Consortium task), monitor the weighting process according to specifications provided by the Consortium.

- Monitor the nonresponse bias analysis conducted primarily by the Consortium.

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

- Conduct training sessions for supervisors and interviewers (i.e., approve data collector training materials and monitor the quality of data collector training).

- Ensure that procedures for administering the questionnaires and cognitive instruments are thoroughly understood by the field supervisors and interviewers.

- Monitor the production, dispatch and receipt of materials to and from interviewers.

- Monitor progress and track production throughout the field period.

- Submit Data Collection Quality Control Forms to the Consortium on the agreed schedule.

- Participate in Data Collection Quality Control calls with the Consortium on the agreed schedule.

- Communicate with the Consortium on issues related to field operations as necessary.

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

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

- Supervise training of scorers and monitor all scoring operations according to international requirements for countries that choose to include a paper option for the cognitive instruments in the main study.

- Supervise training of coders and monitor all coding operations according to international requirements.

- Explain data entry procedures and supervise data entry operations.

- Co-ordinate and oversee the central data integration from different sources and related data flows with different systems (CMS, DME, Dashboards).

- 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 tablet computers to support survey operations. These tablet computers must meet the minimum technical requirements established by the Consortium and approved by the BPC and OECD.

- Configure these tablet computers with survey software to Consortium specifications.

- Configure the international Case Management System (CMS) or integrate an existing national CMS.

- Train interviewers in the operation of the tablet computers and the survey software.

- Along with the NPM and related staff, receive training on the survey software from the Consortium, prior to data collection in a "train the trainer" method.

- Operate a national helpdesk to provide technical support for the interviewers during the survey administrations.

- Extract survey data from tablet 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;

- Experience with conducting quality control monitoring of interviewer activities;

- 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[3] and item nonresponse;[4] and employment of a sufficient number of interviewers to conduct more than the required number of interviews (see Standard 4.3.1) within the PIAAC data collection timeframe;

- The scoring of the paper-and-pencil version of the assessment for countries conducting an operational test of the paper-based instrument in the field trial and/or including the paper-based instrument in the main study;

- The set up and maintenance of the tablet computers 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, adaptive data collection, weighting, and nonresponse bias analysis.

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

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

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:

- Advanced statistical training and knowledge;

- Experience in sample design and selection of household samples;

- Familiarity with weighting and nonresponse bias analysis procedures;

- Proficiency in English.

Guideline 3.3.1A The NSM will have responsibility for the following activities:

- Develop the national sampling plan.

- Select a probability-based sample.

- Monitor the sample throughout data collection to detect possible errors in the within-household selection process (if applicable), shortfalls in yields, or nonresponse bias.

- Apply adaptive data collection approach as specified by the Consortium to reduce bias due to nonresponse during the data collection period.

- Perform a basic nonresponse bias analysis to select variables for weighting adjustments.

- Provide the sampling information (sampling probabilities, strata, etc.) and other data needed for weighting and nonresponse bias analysis, using the Sample Design International File layout specified by the Consortium.

- Review the national weights created by the Consortium.

- Review the extended nonresponse bias analysis results produced by the Consortium.

- Ensure quality control measures are implemented throughout the sample design, sample selection, sample monitoring and adaptive data collection, weighting, and nonresponse bias analysis process, using Consortium-developed forms.

- Submit quality control forms to the Consortium on the agreed schedule.

- Communicate with the Consortium on issues related to sampling as necessary.

Guideline 3.3.1B The NSM needs to be 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. The NSM must be able to attend sampling workshops conducted by the Consortium (typically held at the time of an NPM meeting).

Guideline 3.3.1C The position of NSM will ideally involve a full-time contract under stable conditions, to ensure continuity of activities over time i.e., be the same person throughout the project, including the field trial, main data collection and the subsequent post-collection phase.

Quality Control Procedures

Each country must specify an NSM contact and ensure quality control measures are implemented throughout the sample design, sample selection, sample monitoring and adaptive data collection, weighting, and nonresponse bias analysis process, using Consortium-developed forms.

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 tablet computers used for PIAAC, training interviewers, installing and updating PIAAC software, repairing interviewers' tablet 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 with installing and configuring software systems;

- Experience in troubleshooting web-based or web services problems;

- Experience with the operating system specified for use by that country (e.g., Windows);

- Experience in extracting survey data from tablet computers and managing the formatting and cleaning of data for delivery;

- Experience using trouble ticket systems and/or providing first- and second-level support;

- Familiarity with survey operations.

Guideline 3.4.1 The position of IT Co-ordinator will ideally involve a full-time contract under stable conditions, to ensure continuity of activities over time i.e., be the same person throughout the project, including the field trial, main data collection and the subsequent post-collection phase.

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

- Experience training interviewers to operate tablet 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);

- IT certifications that are support centred (e.g., ITIL Foundation).

Quality Control Procedures

Before the field trial, 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 background questionnaire, the computer-based cognitive instruments, and where appropriate, the paper-based version of the cognitive instruments);

- 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 field trial, main data collection and the subsequent post-collection phase;

- Should work, if possible, within the same organisation as the NPM;

- Is the main contact person to the IEA 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 For countries that choose to use the paper-based instruments in the main study, 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. Staff should be selected with care and provided with comprehensive training.

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 trial 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 trial will follow the same outline (see Annex 3-1) as the main study NSDPR but will cover only those topics applicable to the field trial 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 trial and the main study to the PIAAC Consortium at least nine months prior to the commencement of field trial data collection (for countries with a multi-stage area sample) or at least six months prior to the commencement of field trial 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 trial 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 trial and main study NSDPR before the field trial 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 Trial

Purpose

To provide data that can be used to inform the evaluation of all key aspects of PIAAC: the assessment and questionnaire items, the tablet mode of administration, translations, sample design and selection, data collection procedures, data capture and scoring, and data processing and delivery. To establish minimum requirements for the number of completed cases for each country, in order to meet the analysis goals of the field trial of PIAAC.

Rationale

The field trial 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 and that information will be used to assemble the final main study instruments. The field trial is also critical for conducting an operational test of the tablet delivery platform and estimating the portion of the population that is unable to use the tablet to respond to the survey and to test all survey operations procedures.

The minimum number of completed cases required for the field trial is based primarily on psychometric considerations. Adequate numbers of completed cases are needed to properly estimate item

parameters for all newly developed items and to test the stability of the trend item parameters for each tested language in a participating country. The ability to properly estimate the new and trend item parameters in the field trial will allow for the best selection of items to maximise efficiency of the adaptive design used in the main study. In order to achieve these goals, the definition of a completed case and the required number of completed cases in the field trial is different than what is required in the main study.

Standards, Guidelines and Recommendations

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

> **Guideline 3.7.1A** The field trial will, to the extent possible, serve as a dress rehearsal for the main study. The field trial 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 trial. Participating countries should include any experimental plans in the field trial 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 trial 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 trial will be used to evaluate automated scoring procedures for the tablet-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 trial, 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 minimum number of required completed cases is 1 500 per country/per reporting language for the target population. Countries that plan to report on general proficiency, regardless of the languages tested, should achieve a minimum sample size of 1 500 completed cases for their main language.

Guideline 3.7.2 A sample size of more than 1 500 may be necessary in order to achieve the required minimum number of completed cases of 1 500.

Standard 3.7.3 A completed case is one that includes the following criteria (Please see Section 5.6 for the Psychometric Design of the field trial):

- Responses to key background questions in the full BQ, including age, gender, highest level of schooling, employment status and native/non-native status; and

- The Tablet Tutorial is completed or at least attempted (not refused); and

- The Components are completed or at least attempted (not refused); and

- The Locator is completed or at least attempted (not refused); and

- A block of Cognitive items is started (not refused).

Guideline 3.7.3 The field trial sample should include all major analytic subgroups (age, gender, education, urban/rural) and needs to contain a geographic spread across the nation.

Standard 3.7.4 As part of the National Survey Design and Planning Report process, each country must specify sample size goals for each stage of data collection (screener if applicable, BQ, and assessment). Each country must also specify its assumptions about nonresponse and ineligibility rates.

Standard 3.7.5 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.

Standard 3.7.6 The standards and guidelines in this document must be followed for the field trial, with the following exceptions.

Guideline 3.7.6A A representative sample is not required for the field trial, but the field trial 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 trial.

Guideline 3.7.6B The sampling frame used for the field trial 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 3.7.6C No increase in the field trial sample size is required for oversampling of subgroups within the core PIAAC target population.

Guideline 3.7.6D There is no minimum response rate goal for the field trial, but countries should use the field trial to evaluate their procedures for obtaining high response rates.

Guideline 3.7.6E No weighting or nonresponse bias analysis is required for the field trial. However, countries are still required to deliver a sample design file (Standard 4.6.6).

Guideline 3.7.6F Countries that did not participate in any rounds of PIAAC cycle 1, and that will include a paper-based option in the main study, may choose to conduct an operational test of the paper-based administration in the field trial. (See Guideline 5.6.1C for additional information.)

Quality Control Procedures

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

During the survey planning and data collection period for the field trial, countries will be required, as part of the country planning reports, 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 trial report which will examine the results of the field trial 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 organised 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 organised 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, 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 trial and 4 000 to 5 000 (depending on your sample design) completed cases for each reporting language in the main study (4 500 if you do not participate in the assessment of adaptive problem solving).

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, Adaptive Problem Solving, 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 (Tablet 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 Portal.

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 (tablet 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 telephone number, Newspaper articles, Television advertising, Radio advertising, Social media outreach, 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 tablet 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? Audio 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 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 trial 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 centre, 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 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 tablets in your country in one or two paragraphs (e.g., Do you use an encryption software on your tablets? Are there group policies which limit user access? Does the interviewer have administrative control over the tablet? How is security on folder level realised in the host operating system of the tablets?)

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 organisation 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 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[1] (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. 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 countries with registries (given day of birth is available), 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. For surveys with a screener stage, age is defined as the day the screener is conducted.

Guideline 4.1.1D Adults who are unable to complete the BQ or assessment because of a hearing impairment, blindness/visual impairment, physical disability, unaccommodated language in the Doorstep Interview (see Section 5.3) or assessment, learning/mental disability,

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[1] 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.

or reading/writing difficulty are considered in-scope. See Guideline 4.7.1D for the treatment of such cases in response rate calculations.

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, 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 PIAAC target population. That is, the undercoverage rate, combined over all stages of sampling, should not exceed 5%.

> **Guideline 4.2.1A** Any exclusions to the PIAAC target population (including the opt-out populations in registry frames), whether or not they exceed the threshold, must be reviewed and approved by the Consortium.

> **Guideline 4.2.1B** 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 4.2.1** Countries should provide population control totals that 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 (e.g., approximately within a year) 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 necessary for implementing the planned sampling design (e.g., 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 population registry is not being used, countries must have a frame of dwelling units within the selected geographic clusters. To achieve a high quality frame of high coverage, the list of dwelling units must be accurate and current. If an address registry is not available, then options include conducting a listing procedure, using maps with indications of dwelling units, or conducting a mini-census within the geographic clusters.

Guideline 4.2.2D For countries with screeners, to address undercoverage in the local area sampling frame of dwelling units, missed structure and hidden dwelling unit[2] procedures should be implemented. The missed structures procedure needs to be employed to ensure that newly constructed dwelling units, or those accidentally excluded during the listing phase, are eligible for the data collection effort. In a subsample of clusters, a complete canvas needs to be completed and missed dwelling units found during the missed structure procedure should be added to the sample following established procedures. See Standard 10.X.X on the hidden dwelling unit procedure. In addition, consult with the Consortium to obtain more information on how to reduce undercoverage of missed units.

Guideline 4.2.2E The owners of central population registers might have a *sampling coordination* strategy in place to spread the response burden more equally across the population. For instance, if a persons was selected for a surveys it is blocked from being sampled for others surveys for the next 2 years. Thus, countries that use central population registers as sampling frames should state if sampling coordination is used and how this effects the PIAAC sample. Countries should state how many people are blocked from being selected

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[2] A dwelling unit 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)

and if certain groups are underrepresented in the frame because of recent surveys that specifically targeted them (e.g., migrant surveys).

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., electoral register that exclude non-nationals/non-citizens), complicating their use as a sampling frame. Others may have outdated information, where it may require transforming the person registry into a dwelling unit registry for sampling purposes (see Hsu, Mohadjer and Krenzke (2013)). 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 Consult with the Consortium to obtain more information about procedures to create local area frames of dwelling units, including listing procedures, the use of maps, and a mini-census. Conditions that are conducive to a mini-census include small geographic clusters, no list of dwelling units, and outdated maps.

Recommendation 4.2.2D 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, 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;

- Variables on the frame needed for sample design and selection;

- 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 person stage (for person registries) or at the DU stage (for area samples or household registries).

4.3 Sample Size

Purpose

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

Rationale

The minimum sample size required for the main study is based primarily on psychometric considerations. 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 is between 4 000 and 5 000 completed cases[3] per reporting language for the PIAAC target population, with the specific requirement depending on the design effect for the country. Countries that plan to report on general proficiency, regardless of the languages tested, should achieve a minimum sample size of 4 000 to 5 000 completed cases for their main language.

Guideline 4.3.1A The minimum sample size requirement will consider countries' stages of sampling, primary sampling unit (PSU) design (number and size of PSUs), as well as costs to countries (for increasing the sample size) to arrive at a recommendation that balances sample efficiency and costs to countries. Table 4-1 provides a simple illustration of target sample size by the number of stages in the sample.

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[3] A completed case is as defined in Standard 4.3.3.

Table 4-1. Illustration of assignment of the minimum number of completes

Design type	Minimum number of completed cases
Unclustered – 1-stage (persons) registry with equal probabilities of selection	4 000
Clustered – 2-stage (PSUs and persons), that is, an area sample with many PSUs; or 2-stage (DUs and persons)	4 500
Clustered – 3-stage (PSUs, DUs, persons); 3-stage (PSUs, secondary sampling units (SSUs), and persons); or 4-stage (PSUs, SSUs, DUs, and persons)	5 000

Guideline 4.3.1B 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). 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. 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 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 outside the scope of the sample size guidelines provided here and requires consultation with the Consortium.

Standard 4.3.2 As part of the National Survey Design and Planning Report process, each country must specify sample size goals for each stage of data collection (screener if applicable, BQ, and assessment). Each country must also specify its assumptions about nonresponse and ineligibility rates.

Guideline 4.3.2 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.

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 50% 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 150% 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. See Li, Krenzke and Mohadjer (2014) for more information.

Standard 4.3.3 A completed case is one that meets the following criteria for two different scenarios (refer to 5.6 for the Psychometric Design of the main study):

- Responses to key background questions in the full BQ, including age, gender, highest level of schooling, employment status and country of birth (native/non-native); and

- The Tablet Tutorial is refused AND the PBA Core is attempted.

OR

- Responses to key background questions in the full BQ, including age, gender, highest level of schooling, employment status and country of birth (native/non-native); and

- The Tablet Tutorial is attempted; and

- The Locator is attempted.

In addition, the minimum number of completed cases, according to Table 4-1 under Standard 4.3.1, is either 4 000, 4 500, or 5 000 depending upon the sample design. The maximum number of completed doorstep interviews counting toward the minimum number of completed cases is 100. Because completed assessment items are most critical, we have set a limit on the number of Doorstep interview cases to count toward the completed case total. It is important however, to work as many Doorstep interviews that come about naturally during the survey process. Suppose a country's goal is 5 000 completed cases, and five percent are expected to complete the Doorstep interview, then the country must have a minimum of 4 900 cases that satisfy the above conditions, and the country is expected to attain about 258 Doorstep interviews by working through all selected cases thoroughly during the data collection process. As another example, suppose one percent are expected to complete the Doorstep interview. Then the country must have a minimum of 4 950 cases that satisfy the above conditions, and the country is expected to complete about 50 Doorstep interviews.

Guideline 4.3.3A Each country must verify that its sample data are consistent with the definition of a completed case. The country must also check disposition codes against available interview data to ensure consistency before delivering the data. Countries must strive to have a high rate of completeness among assessment items. Unexpected low rates of completed assessment items will be scrutinised and could contribute significantly to bias due to nonresponse.

Guideline 4.3.3B The number of completed Doorstep interviews will be monitored as compared to the expected number provided by the country prior to data collection.

Guideline 4.3.3C The computations for the completed case are provided in Table 4-2, with definitions of flags in Table 4-3 and other derived disposition codes in Table 4-4 (see Annex 4-1).

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 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, is a collective dwelling unit 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 dwelling unit that contains its own kitchen and for which the student pays a realty company or landlord.

This recommendation only applies to student group quarters (as they have the problem of access) and no other group quarters. Any other living arrangements that are not run by the universities (e.g., rooms rented to students) should be considered as group quarters or dwelling units, and listed (separately as much as possible) and sampled as group quarters or dwelling units.

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[4] and the random route approach,[5] are not allowed at any sampling stage.

Guideline 4.4.2 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, 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.

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 can be used to reduce the sampling variance associated with the resulting survey estimates, if 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

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[4] 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.

[5] 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.

outcome. Examples of stratifiers related to proficiency are geography, urbanicity, education, income, age, language, country of birth, employment status and gender.

Standard 4.4.3. The core design is a self-weighting design of persons or households. A self-weighting design is one that is proportional to the population across the country and is typically achieved when each sample person or household 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.

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 person stage (for countries with population registries) or household stage (for other countries). Then the final stage of persons or households is selected with a probability assigned to arrive at self-weighting persons (for countries with population registries) or households (for other countries), as described in Kish (1965). When constant or near-constant variance across sampling strata is expected, the goal of a self-weighting design is expected to be optimal or near optimal.

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. 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 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. 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) because of the household burden associated with the length of the interview and assessment.

Recommendation 4.4.4 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

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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.

Quality Control Procedures

As part of the National Survey Design and Planning Report process, 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 International and National Sampling Options

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 their transition from education to work, PIAAC includes an international option for oversampling of youth 16 to 29 years of age. In addition, countries have the option of oversampling immigrants or other subpopulations within the PIAAC target population. Countries will also have national options to include additional subpopulations in their PIAAC target population (adults 66- to 74-years old, for example).

Countries will need to increase the sample size to obtain reliable estimates for groups of special interest beyond the minimum of 4 000 to 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.

Oversampling which leads to twice the required sample size and sampling of populations that are outside the target population of PIAAC Cycle 2 must be approved by the Consortium. In addition, countries are required to cover the associated costs of this oversampling and must negotiate and agree on a budget for the work with the Consortium.

Standards, Guidelines and Recommendations

Standard 4.5.1 PIAAC includes an international option for oversampling youth 16 to 29 years of age, immigrants, or other individuals who are within the scope of the PIAAC target population.

> **Guideline 4.5.1** The minimum sample size for the core self-weighting design (ages 16-65) is 4 000 to 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 national option to select individuals outside the PIAAC target populations (e.g., ages 66 and older).

> **Guideline 4.5.2A** The minimum sample size for the core design (ages 16-65) is 4 000 to 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 national options are the responsibility of the country. The Consortium will review the national 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 PIAAC target population.

> **Guideline 4.5.4** When computing response rates, countries must exclude cases that are outside the scope of the 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, each country will be required to outline any special circumstances that deviate from the PIAAC 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 before continuing with the next stage.

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[6] (addresses) 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. We can relax this standard for PSUs in case of natural disaster or war, if countries ask for a derogation from this standard. There will be no substitution allowed as a result of nonresponse. If the selected person is unavailable, the interview may not be conducted with a non-selected family member, neighbour or anyone else.

> **Recommendation 4.6.2** In some countries, a sample of individuals is provided by the local governments from local registries. If it is possible to predetermine the localities that will not provide the registry sample, another possibility is to exclude such localities from the PSU frame. This will be treated as undercoverage. Please note that the total undercoverage/ exclusion rate must stay below the 5% total threshold. Another option is to treat these municipalities as nonresponding units, and therefore they would count against the response rate, and a weight adjustment would be conducted to account for their corresponding population. Another possible procedure for localities that refuse to give the registry sample is to select sub-areas within the locality and do a listing of dwelling units in those areas. This approach, or other alternative approaches, could be evaluated during the field trial. Other approaches would need further discussion with the Consortium.

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 birth month and the eligible-person

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[6] 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)

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]).

Guideline 4.6.3C The screener enumeration and selection procedures will be included in the international Case Management System (CMS) (or another system that supports a computer-assisted administration of the screener). Countries not using the international CMS should include the screener instrument in their automated CMS. A simple random sample or a systematic sample from a sorted list can be implemented in the CMS. During the screener administration at each sampled household, the random selection algorithm will select the sample person (or persons) from the list of eligible household members. The sort order of the list of eligible persons, if a systematic random sample is conducted, should be in descending order by age.

Guideline 4.6.3D Once one or two persons are selected (see Standard 4.4.4), the date of birth (month and year) should be collected for the sampled person(s) as required for case initialisation.

Recommendation 4.6.3 Once one or two persons are selected (see Standard 4.4.4), a question related to education attainment can be asked. This data would be used during nonresponse adjustment weighting steps to reduce bias due to nonresponse.

Standard 4.6.4 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. The country should not proceed with the next stage of selection until the Consortium has completed their review.

Standard 4.6.5 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 person if persons are selected directly from a population registry, and will have a record for each sampled household for countries with household samples.

Guideline 4.6.5A The Survey Control File must include Country ID, IDs of sampling units at each stage of selection, Interviewer ID (if pre-assigned), selection probabilities at each stage of selection (see the sampling plan for the selection process for certainty PSUs) sampling strata at each stage of selection, name, age, and gender of sampled person (for registry countries), address (and phone number, if available) of sampled person or dwelling unit, PSU and SSU names (optional), group quarter flag, quality control flag, and subsample flag. *The full layout of the Survey Control File is in a separate file from this document in the PIAAC portal.*

Guideline 4.6.5B The Survey Control File contents will need to be loaded into the Case Management System (Section 10.6) to support the data collection effort and the post-data collection activities.

Guideline 4.6.5C A subset of all selected cases in the Survey Control File will be loaded into the Case Management System (Section 10.6) for each country. The subset should only include the released cases. Prior to data collection, the country should load the initial release (random sample). If during data collection, the country determines that the reserve or a random portion of the reserve is needed, then the additional cases should be loaded at that time.

Standard 4.6.6 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.

Guideline 4.6.6A 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.

Guideline 4.6.6B The contents of the Sample Design International File will consist of common identifiers (Country ID, Household operational ID (if applicable), Person operational ID), data from the Survey Control File (IDs, selection probabilities, strata, and flags – see Guideline 4.6.5A), data from the Sample Design International File PLUS, and data that the PIAAC Consortium data controller copies in or derives from another source, including Interviewer ID, disposition codes and flags (disposition code for each stage of data collection, attempt flags and locator result flag), Screener data (for screener countries) (within-household selection probabilities and stratifiers, number of eligible and sampled persons within the household, age or age category of sampled person), CI/BQ data (age, gender, date of birth), quality control validation results, hidden DU flag, derived variables (overall selection probabilities and theoretical base weights, resolved age and gender), and completed case flag. *See the Sample Design International File layout in a separate file from this document in the PIAAC portal.*

Guideline 4.6.6C A supplemental file (called Sample Design International File PLUS) will be provided by countries with oversample flags, registry and exclusion flags, frame exclusion rate, technical problem flag, trimming domains, raking dimensions, auxiliary variables for nonresponse bias analysis or weighting adjustments, and imputation flags for weighting variables. *See the Sample Design International File PLUS layout in a separate file from this document in the PIAAC portal.*

Guideline 4.6.6D All required data will be imported by the country into the national database managed by the data management software ("DME") provided by the Consortium**.**

Recommendation 4.6.6 Throughout the data collection period, it is recommended that countries perform edit 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, 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,[7] 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. All personally identifiable information (PII) must be removed from the listing.

- The SDIF variables will be reviewed through edit checks to ensure all sampling and weighting variables are provided prior to the start of the weighting process.

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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[7] 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 and re-emphasised in Brick and Tourangeau (2017), that raising response rates can potentially help reduce the impact of nonresponse bias in estimates. 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. 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 adaptive survey design procedures and weighting adjustments for the purpose of reducing nonresponse bias. The demand for adaptive data collection strategies was formulated by Groves and Heeringa (2006), where the objective was to reduce bias due to nonresponse and obtain a representative sample. Section 4.9 emphasises the implementation of adaptive survey design strategies.

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 (Full BQ or Doorstep Interview)

- Assessment

A Complete Case rate will also be computed to monitor the completed case requirements.

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 Table 4-5, with definitions of supporting variables in Table 4-6 (see Annex 4-1).

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

Guideline 4.7.1C In the case of countries that select a sample from a population registry, some sample cases may be inaccessible (moved within the country or had an invalid address). A proportion of the inaccessible cases may be classified as "excluded" and removed from response rate computations, as long as the exclusion rate (see Standard 4.2.1) for the country does not exceed five percent of the target population (including other reasons for exclusions).

Guideline 4.7.1D Because the Background Questionnaire and assessment do not accommodate adults who are unable to complete the Background Questionnaire or assessment because of a hearing impairment, blindness/visual impairment or physical disability, they are excluded from PIAAC response rate calculations. Similarly, adults who are unable to complete the Background Questionnaire because of an unaccommodated language in the Doorstep Interview, learning/mental disability, or reading/writing difficulty are excluded from PIAAC Background Questionnaire response rate calculations, where the exclusion will be capped based on the expected percentage of unaccommodated language-related nonresponse within the country.

Guideline 4.7.1E The Complete Case rate uses the PBA Core disposition codes provided in Section 10.7 (for countries with a paper assessment option) and flags indicating whether a BQ respondent attempted the Tutorial and Locator. The detailed formula is given in Table 4-5 in Annex 4-1.

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

Standard 4.7.2 Two overall response rates will be computed.

Guideline 4.7.2A Overall Response Rate 1 (ORR1) will align with the Completed Case definition in Standard 4.3.3. ORR1 will be computed as the product of the BQ rate and Complete Case rate. For countries with a screener questionnaire, the overall response rate is the product of the Screener rate, BQ rate and Complete Case rate.

Guideline 4.7.2B Overall Response Rate 2 (ORR2) will align with completed assessments. ORR2 will be computed as the product of the BQ rate and Assessment rate. For countries with a screener questionnaire, the overall response rate is the product of the Screener rate, BQ rate and Assessment rate. From prior PIAAC data collections, ORR2 should be about two percentage points lower than the ORR1 result.

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 or assessment response rate or Complete Case 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% based on ORR1 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.

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.

> **Recommendation 4.7.5C** Countries may consider collecting data from using the curbside observation instrument (discussed in Section 5). Such data may provide useful information about each sample person's dwelling unit. Select curbside observation items may be useful for nonresponse bias analysis and/or nonresponse weighting adjustments. However, the observations need to first be evaluated as to (1) completeness, (2) accuracy, (3) variation due to interviewer, and (4) association with response propensity or proficiency. If considered for nonresponse adjustment, the items must satisfy the requirements in Standard 14.5.

Standard 4.7.6 A more extensive nonresponse bias analysis is required for countries with:

- All stages of data collection (screener, background questionnaire and assessment) with less than an 80% response rate;

- The overall sample if the overall response rate (ORR1) is less than 70% or ORR2 is less than 67%.

Guideline 4.7.6A The Consortium is responsible for performing these additional analyses, unless the country opts to do so. Countries are responsible for providing the Consortium with the necessary data to complete the analysis.

Guideline 4.7.6B 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.);

- Analysis of the Interviewer observation module (ZZ) items.

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), Nishimura, Wagner, and Elliott, M. (2015), and the PIAAC Cycle 1 Technical Report (OECD 2016) for examples of unit nonresponse bias analyses.

Standard 4.7.7 Background questionnaire items with response rates below 85% will be identified and given cautionary remarks about potential bias.

Quality Control Procedures

As part of the National Survey Design and Planning Report process, 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 basic nonresponse bias analysis, with the Consortium conducting a more extensive 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.

> **Recommendation 4.8.1** Due to the challenges foreseen in achieving response rate goals in the main study, countries are encouraged to conduct an incentive experiment to determine the most impactful incentive during the field trial.

Quality Control Procedures

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

4.9 Sample Monitoring and Adaptive Survey Design

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 adaptive survey design 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. Rosen et al (2014) discussed targeting low propensity cases as an effort to reduce nonresponse bias. Chapman (2014) and Tourangeau et al (2017) also discussed other ways to target cases to reduce bias. Beaumont et al (2014) emphasised call prioritisation to minimise the variance of a nonresponse-adjusted estimator. 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 Adaptive survey design is required to achieve the goals for number of completed cases and to reduce bias due to nonresponse.

> **Guideline 4.9.1A** Completed case projections will be computed before data collection and continuously updated during data collection to estimate how many completed cases are expected at the end of data collection. The projections will help to inform whether or not additional sample releases are needed during the data collection period.

> **Guideline 4.9.1B** Case prioritisation will be conducted to provide guidance to the field management staff to help interviewers focus on completing higher priority cases. Cases are to be prioritised in two phases. In Phase 1, the first few priority groups are derived from whether or not cases are meeting established contact attempt protocols (Standards 10.3.2 and 10.3.3). By fully meeting the contact attempt protocols, the case prioritisation process will be indirectly reducing bias due to nonresponse. In Phase 2, for cases meeting the contact protocols, a

statistical-based ordering is to be assigned to each case. The objective of the statistical-based ordering is to reduce bias due to nonresponse.

Recommendation 4.9.1A The complete case projections should depend on assumptions on completion rates for each interim disposition code, as well as number of unworked cases remaining, which will be provided by the country through a Sample Monitoring Parameter file to use in the Consortium's Case Management System. The layout of the Sample Monitoring Parameter file will be provided in a separate document.

Recommendation 4.9.1B 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.

Recommendation 4.9.1C Phase 2 (see Guideline 4.9.1B) can be addressed through statistical modeling. One approach is 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). The priorities for Phase 2 cases can be input to the CMS.

Recommendation 4.9.1D A simplistic ranking of Phase 2 nonfinalised cases will be implemented as a default in the Consortium Case Management System. Rankings for current Phase 2 cases will be created using what will be generated in the sample monitoring reports. An index will be based on the actual-to-expected ratios categories relating to gender, age groups, region, education attainment, and country of birth. The index will be sorted in ascending order and form four equal-sized priority groups.

Standard 4.9.2 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 4.9.2A The forms will follow the format of the sample monitoring reports provided by the Consortium Case Management System.

Guideline 4.9.2B 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 4.9.2C Response rates must be computed for each data collection stage. (See Section 4.7 for guidelines on response rate calculations.). Response rates include actual and target unweighted response rates by demographics, geographic area and data collection stage, and weighted response rates by data collection stage.

Guideline 4.9.2D Response rates and sample yield must be monitored according to key subgroups, including Region (up to 9 levels), Urban/Rural, Age groups (10 year intervals), Gender, and Language (where applicable). This will help countries identify potential shortfalls for specific subgroups, which could result in biased estimates.

Guideline 4.9.2E The distribution of assessment instruments must be monitored to ensure that the assignment will meet the needs of the psychometric testing.

Guideline 4.9.2F Toward the end of data collection, after the standard data collection protocol has been exhausted for all cases, a more extensive sample monitoring report should be generated to identify subgroups with low response rates.

Quality Control Procedures

As part of the National Survey Design and Planning Report process, 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. SAMPLE YIELD AND RESPONSE RATE COMPUTATIONAL FORMULAE

Table 4-2. Actual Yields

Stage	Actual
Screener	DISP_SCR(01,02)
BQ	DISP_CIBQ(01, 90) + DISP_DS(01,90);
Completed Case (Countries without a paper assessment)	{ATTMPTTUT(1) + ATTMPTLOC(1)} ε (C[b]), or Max(100,DISP_DS(01,90)}, or DISP_CIBQ(90) or DISP_MAIN(90)
Completed Case (Countries with a paper assessment)	{ATTMPTTUT(1) + ATTMPTLOC(1)} ε (C[b]), or DISP_PC(01) ε (C[b]), or Max{100,DISP_DS(01,90)}, or DISP_CIBQ(90) or DISP_MAIN(90)
Assessment	DISP_MAIN(01,07-09, 90)

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

NOTE: DISP_PC is the disposition code for the PBA Core

Table 4-3. Attempt Flags and Pass/Fail Flags

Flag	Possible values
Tutorial attempt (ATTMPTTUT)	Attempted (1), Not attempted (0)
Locator attempt (ATTMPTLOC)	Attempted (1), Not attempted (0)
Locator result (RSLTLOC)	Fail (1), Pass Low (2), Pass High (3)

Table 4-4. Derivation of Composite Disposition Codes for the BQ and Assessment

Stage	Paper assessment?			Derivation
BQ	N/A	DISP_CIBQ	= DISP_BQ = DISP_CI	if DISP_CI = 01
				otherwise
Assessment	Countries without a paper assessment	DISP_MAIN	= 01	if DISP_CBA(01) or RSLTLOC(01) and DISP_CMP(01) — /* Completed CBA */ /* Failed locator and completed components*/
			= DISP_CBA	if DISP_CBA is non-missing — /* Reason for not completing the CBA */
			= DISP_CMP	if DISP_CBA is missing and DISP_CMP is non-missing — /* Reason for not completing the components */
			= DISP_LOC	if DISP_CBA and DISP_CMP are missing and DISP_LOC is non-missing — /* Reason for not completing the locator */
			= DISP_TUT	if DISP_CBA, DISP_CMP, and DISP_LOC are missing and DISP_TUT is non-missing — /* Reason for not completing the tutorial */
	Countries with a paper assessment	DISP_MAIN	= 01	if DISP_CBA(01) or RSLTLOC(01) and DISP_CMP(01) or DISP_PP(01) — /* Completed CBA */ /* Failed locator and completed components */ /* Completed PBA */
			= DISP_CBA	if DISP_CBA is non-missing — /* Reason for not completing the CBA*/
			= DISP_PP	if DISP_CBA is missing and DISP_PP is non-missing — /* Reason for not completing the PBA */
			= DISP_CMP	if DISP_CBA and DISP_PP are missing and DISP_CMP is non-missing — /* Reason for not completing the components */
			= DISP_LOC	if DISP_CBA, DISP_PP, and DISP_CMP are missing and DISP_LOC is non-missing — /* Reason for not completing the locator */
			= DISP_PC	if DISP_CBA, DISP_PP, DISP_CMP, and DISP_LOC are missing and DISP_PC is non-missing — /* Reason for not completing the PBA Core */
			= DISP_TUT	if DISP_CBA, DISP_PP, DISP_CMP, DISP_LOC, and DISP_PC are missing and DISP_TUT is non-missing — /* Reason for not completing the tutorial */

NOTE: The derivation of DISP_MAIN differs for the Field Trial. See chapter 3.

Table 4-5. Actual Response Rates

Stage	Actual	Description
Screener	COMPLETE / ELIGIBLE[1] COMPLETE = C^s ELIGIBLE = $HH^s - I^{VA} - U^{VA} * (I^{VA} / K^{VA}) - I^{Age} - [U^{VA} * (1 - I^{VA} / K^{VA}) + U^{Age}] * (I^{Age} / K^{Age})$ C^s = DISP_SCR(01,02) HH^s = All sampled households[2] I^{VA} = DISP_SCR(22,26,28) U^{VA} = DISP_SCR(05,20,21) K^{VA} = DISP_SCR(01,02,03,07,09,12-16,17,19,22,24,26,28) I^{Age} = DISP_SCR(19) U^{Age} = DISP_SCR(04,17,24) K^{Age} = DISP_SCR(01,02,03,07,09,12-16,19)	Completed screeners All sampled households HHs known to be unoccupied HHs with unknown occupied status HHs with known occupied status HHs known to be age ineligible HHs known to be occupied with unknown age eligibility status HHs with known age eligibility status
BQ **(For countries with screeners)**	COMPLETE / ELIGIBLE COMPLETE = $C^b + DS^b$ ELIGIBLE = $SP^b - D^b - LRN^b - I^b$ C^b = DISP_CIBQ(01,90) DS^b = DISP_CIBQ(07) and DISP_DS(01,90) SP^b = All sampled persons[3] D^b = DISP_CIBQ(12,13,15,16) LRN^b = DISP_CIBQ(07) and DISP_DS(07) or DISP_CIBQ(08,09) I^b = DISP_CIBQ(18,25)	Completed BQ cases Doorstep Interview respondents[4] All sampled persons SPs with a disability Unaccommodated literacy-related nonrespondents (LRNR) with no Doorstep Interview[4] SPs known to be ineligible
BQ **(For countries with registries)**	COMPLETE / (ELIGIBLE − EXCLUDE) COMPLETE = $C^b + DS^b$ ELIGIBLE = $SP^b - D^b - LRN^b - I^b - U^b * ((D^b + LRN^b + I^b)/ K^b)$ C^b = DISP_CIBQ(01,90) DS^b = DISP_CIBQ(07) and DISP_DS(01,90) SP^b = All sampled persons[3] D^b = DISP_CIBQ(12,13,15,16) LRN^b = DISP_CIBQ(07) and DISP_DS(07) or DISP_CIBQ(08,09) I^b = DISP_CIBQ(18,25) U^b = EXCFLG(2) K^b = EXCFLG(0,1,9) EXCLUDE = ELIGIBLE * EXC_PROP EXC_PROP = $\min\{[(EXCFLG(1) + U^b *(EXCFLG(1,9)/ EXCFLG(1,9))/ ELIGIBLE], 0.05 - EXCFRM\_PROP\}$ EXCFRM_PROP = Estimated proportion of the target population excluded from the sampling frame	Completed BQ cases Doorstep Interview respondents[4] All sampled persons SPs with a disability Unaccommodated LRNR with no Doorstep Interview[3] 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

Table 4-5. Actual Response Rates (continued)

Stage	Actual	Description
Completed Cases (Countries without a paper assessment)	COMPLETE / ELIGIBLE COMPLETE = [{ATTMPTTUT(1) + ATTMPTLOC(1)} ε (Cᵇ) or DISP_CIBQ(90) or max{100,DSᵇ} or DISP_MAIN(90) ELIGIBLE = Cᵇ +max{100,DSᵇ}– Dᶜ – Iᶜ ATTMPTTUT(1) = Flag triggered by attempt of the tutorial ATTMPTLOC(1) = Flag triggered by attempt of the locator Cᵇ = DISP_CIBQ(01,90) DSᵇ = DISP_CIBQ(07) and DISP_DS(01,90) Dᶜ = DISP_TUT(12,13,15,16) or DISP_LOC(12,13,15,16) Iᶜ = DISP_TUT(18) or DISP_LOC(18)	Tutorial attempt Locator attempt Completed BQ cases Doorstep Interview respondents SPs with a disability SPs know to be ineligible
Completed Cases (Countries with a paper assessment)	COMPLETE / ELIGIBLE COMPLETE = {ATTMPTTUT(1) + ATTMPTLOC(1)} ε (Cᵇ) or DISP_PC(01) ε (Cᵇ) or DISP_CIBQ(90) or max{100,DSᵇ} or DISP_MAIN(90) ELIGIBLE = Cᵇ + max{100,DSᵇ} – Dᶜ – Iᶜ ATTMPTTUT(1) = Flag triggered by attempt of the tutorial ATTMPTLOC(1) = Flag triggered by attempt of the locator Cᵇ = DISP_CIBQ(01,90) DSᵇ = DISP_CIBQ(07) and DISP_DS(01,90) Dᶜ = DISP_TUT(12,13,15,16) or DISP_LOC(12,13,15,16) or DISP_PC(12,13,15,16) Iᶜ = DISP_TUT(18) or DISP_LOC(18) or DISP_PC(18)	Tutorial attempt Locator attempt Completed BQ cases Doorstep Interview respondents SPs with a disability SPs know to be ineligible
Assessment[5]	COMPLETE / ELIGIBLE COMPLETE = Cᵃ + LRᵃ ELIGIBLE = (Cᵇ) – Dᵃ – Iᵃ Cᵃ = DISP_MAIN(01,90) LRᵃ = DISP_MAIN(07,08,09) Cᵇ = DISP_CIBQ(01,90) Dᵃ = DISP_MAIN(12,13,15,16) Iᵃ = DISP_MAIN(18)	Completed assessments Literacy-related nonrespondents[4] Completed BQ cases SPs with a disability SPs known to be ineligible

[1] Excludes screener cases with EXCFLG = 1. These are rare occurrences and permission is needed from the Consortium in order for screener countries to use EXCFLG.

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

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

[5] 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 4-6. 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	23	1	4
To nonPIAAC PSU	23	1	5
To Unknown PSU	23	1	6
Unknown whereabouts	22	2	7
Invalid address	22	1	8
Other	XX	0	0

NOTE: EXCFLG and REGFLG are part of the SDIF layout. In rare circumstances, EXCFLG might also be used by registry countries or screener countries to indicate that a case was inaccessible because of a natural disaster or safety concerns. Such situations should be discussed with the Consortium.

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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 should focus on both comparability and validity of the constructs among the participating countries.

Standards, Guidelines and Recommendations

Standard 5.1.1 Each participating country's background questionnaire (BQ) will include the international 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 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 and adaptations must preserve the construct in accordance with the guidelines prepared by the Consortium. More specific information on this process is provided in Section 6.2.2.

> **Guideline 5.1.1C** For a few questions and response options, national non-linguistic adaptations are required. Countries will develop these adaptations based on the guidelines of the Consortium. More specific information on this process is provided in Section 6.2.1.

> **Recommendation 5.1.1** Countries may consider using interviewer observations to gather information about the sampled person's dwelling units on a small number of items (e.g., type of dwelling unit). Under certain conditions (see Section 4.7), the observations have the potential to reduce bias due to nonresponse and/or to help evaluate the potential for bias. Countries are encouraged to collect the information to evaluate its value. Because the observations are made on all sampled units prior to contact with the household, they are referred to as Curbside Observations. The information is obtained prior to making contact with anyone in the household to result in comparable data among both survey respondents and nonrespondents. There may be more potential value for countries without a detailed population registry, where very little information is known about nonrespondents to the screener and the BQ.

Standard 5.1.2 Countries for which the sample design involves the sub-selection of a person within a selected household will require the administration of the Screener instrument, a set of questions to identify the target population members within a selected household and to facilitate the random selection of one person within the household.

Quality Control Procedures

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

The Consortium will prepare two sets of guidelines: one for translation and (linguistic) adaptation of the survey instruments, and one for non-linguistic adaptations (both structural and non-structural) to national circumstances.

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

Each country including paper-based cognitive instruments in the Main Study must retain final copies of those materials in each of its PIAAC official languages to be shared with the PIAAC Consortium upon request.

For the field trial, 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 with respect to the item stem text in the international Master BQ,

- Any changes with respect to the response options in the international Master BQ. This includes the specification of country-specific coding of formal education participation and attainment, for which a centralised consultation process has been set up between the Consortium and countries (see Guideline 6.2.1),

- Translation and cultural adaptation of the background item stem and response options.

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.

For the main study, each participating country will use the BQAS to specify any necessary changes made based on the experiences gained from the field trial and will provide the updated BQAS to the PIAAC Consortium for review and approval. Countries will then implement these changes using the authoring tool. The Consortium will again check the changes and compare them with the Master version using the 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 required BQ 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., B2_Q01a) followed by the country two letter abbreviation plus X (e.g., B2_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 (BQAS) and an authoring tool for the field trial and the main study that countries can use to provide detailed information about national translation and adaptation issues. (See Guideline 6.2.1.) The BQAS will be used to monitor and, if appropriate, approve country-specific additions to the BQ. The authoring tool will be used to implement the approved changes.

5.3 Doorstep Interview

Purpose

The Doorstep Interview is a short version of the BQ designed to obtain key information on characteristics of respondents who would have been classified as literacy-related non-respondents in the first cycle. These individuals are essential to the population model for the estimation of proficiencies and some information related to their background characteristics will help improve the population model and contribute to the analysis and reporting of key findings.

Rationale

The occurrence of literacy-related non-response is obviously not random, but is thought to be largely concentrated among migrants with low literacy in the official survey languages within a country, and perhaps with low literacy in general. However, the extent of this concentration is currently unknown due to the lack of further information on these groups. By providing a short/succinct version of the BQ translated into a range of languages, we expect that more can be learned about this population. The Doorstep Interview should by no means be regarded as a substitute for the full BQ and should not be taken if a respondent would otherwise have taken the full BQ.

This version of the BQ will be introduced as a short at-the-doorstep instrument (between two and four minutes) with a decision rule to direct the respondents concerned to complete a short series of questions in the appropriate language. These questions will be self-administered as they will most probably be in a language the interviewer cannot speak. The consequence is that if a respondent cannot read, he or she cannot complete the short version of the BQ.

Countries will be responsible for translating the questions included in the doorstep interview into their testing language(s). In the case of languages shared by multiple countries (e.g., German, French, Spanish, English), only one country (determined by the Consortium) will translate the doorstep interview. For up to eight prioritised languages not covered by existing national questionnaires, the international master of the doorstep interview will be centrally translated.

Standards, Guidelines and Recommendations

Standard 5.3.1 The Doorstep Interview questions will be administered as translated. National adaptations or extensions of these questions will not be possible.

> **Guideline 5.3.1** Countries should use information from recent national surveys or similar reliable sources in order to determine the minority languages that are prevalent within the country.

> **Guideline 5.3.2** If a country determines that a minority language is critical to include in their Doorstep Interview, and that language is not covered by the eight centrally translated languages or other existing national questionnaires, it is the country's responsibility to provide the minority language translation.

5.4 Direct Assessment

Purpose

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

Rationale

The comparability of the direct assessments in PIAAC depends on the use of common instruments 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 implement the PIAAC direct assessment instruments in the same way as the master English version of the instruments provided by the Consortium.

> **Guideline 5.4.1A** (Paper instruments only) The print quality must be the same as that of the master instruments and equal the specifications provided by the Consortium. Respondents' opportunities to demonstrate their true abilities are impaired when print quality interferes with comprehension.

> **Guideline 5.4.1B** (Tablet instruments only) The screen display and resolution on the tablet used to administer the assessment must follow the specifications developed by the Consortium. Respondents' opportunities to demonstrate their true abilities are impaired when the screen display interferes with understanding the stimulus or the questions and directions.

> **Guideline 5.4.1C** (Tablet and paper instruments) Translations must preserve the construct in accordance with the guidelines prepared by the Consortium.

> **Guideline 5.4.1F** (Tablet and paper instruments) 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 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.

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 including paper-based cognitive instruments in the Main Study must retain final copies of those materials in each of its PIAAC official languages to be shared with the PIAAC Consortium upon request. Using the appropriate forms submitted to the Consortium, countries must document the following:

- Variation from the recommended layout,

- Any changes in the wording (adaptations) of stimulus materials and items of the direct assessment, and

- The rationale for making layout or wording changes (adaptations).

5.5 International and National Options for the Assessments

Purpose

To define the scope for national centres to deviate from or add components to the international design of PIAAC and to develop national options associated with the administration of PIAAC Cycle 2.

Rationale

These standards serve to ensure that the quality of the data used for the international comparisons by maximizing the degree of commonality in the content of data collection instruments forming part of the international design across countries while providing some scope for countries to adapt the design to national needs. Additionally, these standards serve to ensure that the quality of the data used for international comparisons will not be affected by national options.

Standards, Guidelines and Recommendations

Standard 5.5.1 The design of PIAAC Cycle 2 assumes the following international core components: background questionnaire, literacy assessment, numeracy assessment, adaptive problem solving assessment, and the assessment of reading and numeracy components.

Guideline 5.5.1A The core international BQ contains the sections shown below. It is recommended that participating countries administer all sections of the core international BQ.

Section	Construct
A	Personal characteristics
B	Education and training
C	Current status and work history
D	Current work
E	Last job
F	Literacy, numeracy, and ICT practices at work

Section	Construct
G	Literacy, numeracy, and ICT practices in everyday life
H	Working environment
I	Non-economic outcomes
J	Background
K	Social and emotional skills

- Countries may implement one or both of two 'extensions' to the international BQ. Extension A adds additional items in Section K, in order to cover the three constructs of the Big 5 instrument that are not included in the core BQ. Extension B includes additional questions regarding the working environment (Section H). The content of the extensions is detailed in the document prepared for the PIAAC [BPC COM/DELSA/EDU/PIAAC(2018)13].

- The final content of the international BQ, including the extensions, will be determined following the field trial.

Guideline 5.5.1B It is recommended that participating countries administer all four domains that make up the PIAAC cognitive assessment: the assessments of literacy, numeracy, adaptive problem solving (APS) and components (reading and numeracy).

- Countries may choose not to administer the APS and the components assessment with the agreement of the OECD.

- PIAAC also includes an international option to administer a paper-based cognitive assessment in the main study. Countries may choose to administer a paper-based version of the literacy and numeracy assessment, using the items administered in cycle 1. Decisions to adopt the paper-based assessment in the main study will be based on results of the field trial. It should be noted the components (reading and numeracy) will be administered only on the tablet in cycle 2. See Section 5.6.2C for more detail about the main study paper-based assessment.

Standard 5.5.2 In addition to the international options noted above, participating countries may choose to include national options that could impact their national survey design.

Guideline 5.5.2A To ensure that national options do not affect the data used for the international comparisons, all proposals for national options must be discussed and agreed upon with the Consortium. Some national options may result in additional costs for the National Centre as well as for the Consortium, as per the examples below. In these cases, a national option contract will need to be established between the participating country and the Consortium to cover these additional costs.

- Countries may choose to collect data for groups of special interest or for particular geographic regions. As noted in Section 4.3.1B and further specified in Section 4.5, such studies have sampling implications. In addition, there may be implications for data cleaning and analysis. Therefore countries will need to consult with the Consortium for guidance and approval in planning such national options.

- Oversampling that results in twice the required sample size within the target population and/or sampling of populations that are outside the target population of PIAAC Cycle 2 must be approved by the Consortium. In addition, countries are required to cover the associated costs of this oversampling and must negotiate and agree on a budget for the work with the Consortium. See Standard 4.5 for additional information.

Quality Control Procedures

The OECD and Consortium will collect information from countries regarding their intention to adopt the international options for both the field trial and main study so that national computer systems can be properly configured by the Consortium prior to the assessment. Additionally, the Consortium will consult with countries interested in including any national options or special studies as part of PIAAC and provide advice about such studies as needed to ensure that national options do not affect the data required for PIAAC's international comparisons.

5.6 Psychometric Assessment Design

Purpose

To ensure that the design of the PIAAC direct assessments will generate data that are appropriate for addressing the goals of PIAAC Cycle 2 by consistent implementation across participating countries, using sound design principles and methods.

Rationale

The PIAAC psychometric assessment design focuses on the measurement of four domains: literacy, numeracy, components (both reading and numeracy) and adaptive problem solving. The design for cycle 2 assumes that the direct assessment will be delivered only on tablets, with an option for countries to reuse the cycle 1 paper-based instruments in the main study should the field trial data identify significant numbers of adults who are unable to complete the assessment on a tablet. The benefits of tablet delivery include:

- Increasing the number of respondents able to take the technology-based assessment;

- Allowing both low- and high-proficiency adults to respond to the full set of tasks on a single platform; and

- Increasing scoring efficiency and accuracy, thereby improving the quality of the PIAAC data.

The PIAAC psychometric assessment design provides the following information:

- Component skills among lower-performing adults in each participating country and a random sample of higher performing adults so that results can be generalized to the total population in each participating country;

- Population distributions in literacy, which can be linked to the PIAAC Cycle 1 results, the International Adult Literacy Survey (IALS), and the Adult Literacy and Lifeskills Survey (ALL);

- Population distributions in numeracy, which can be linked to the PIAAC Cycle 1 results and the Adult Literacy and Lifeskills Survey (ALL);

- Accurate estimates of population distributions and a baseline measure of adaptive problem solving;

- Timing information, as well as information about the strategies and processes that adults use when responding to literacy, numeracy and adaptive problem solving tasks;

- Pair-wise covariance estimates among the various measures, including the relationships between literacy and numeracy, literacy and component skills, literacy and adaptive problem solving, numeracy and component skills, and numeracy and adaptive problem solving; and

- 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).

Standards, Guidelines and Recommendations

Standard 5.6.1 The PIAAC psychometric assessment design for the <u>field trial</u> must serve several purposes, including:

1. Testing the appropriate functioning of the tablet delivery platform, along with the tablet tutorial and selected background information, to determine if there are a significant number of adults in participating countries who are unable to use the tablet;[1]

2. Collecting item-level data that will be used to select final units/items and develop adaptive testlets for the main study;

3. Confirming item parameters for the trend items;

4. Determining cut points for the locator test, which will be used to route respondents to one of three available paths in the main study (see Figure 5-2);

5. Identifying and correcting any items that are performing poorly due to translation errors or incorrect scoring definition; and

6. Testing survey operations procedures.

Guideline 5.6.1A The PIAAC psychometric assessment design for the field trial is based on the assumption that each item will be answered by a sufficient number of adults, resulting in 1 500 completed cases per country/per reporting language. Countries that plan to report on general proficiency, regardless of the languages tested, should achieve a minimum number of 1500 completed cases for their main language. The definition of a completed case for the field trial is provided in Standard 3.7.3.

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[1] Note that in order to meet this goal, the design does not include a paper-based option in the field trial. Should data show that the proportion of respondents who are unable to use the tablet is unacceptably high in some countries, the cycle 1 paper booklets can be used in the main study. New countries that believe they may need to include the paper option in the main study may opt to do an operational test of the paper administration in the field trial, as explained in Guideline 5.6.1C.

Guideline 5.6.1B The PIAAC psychometric assessment design for the field trial 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 trial has the following characteristics, as shown in Figure 5-1:

- Overall, the field trial item pool for the direct assessment will include 32 locator items (16 literacy + 16 numeracy), five 25-minute literacy and numeracy clusters (including about 15-16 items per cluster) and five 25-minute adaptive problem solving clusters (including about 14 items per cluster).

- All respondents will take the Background Questionnaire (BQ), a tablet tutorial and a subset of the locator items (e.g., 4 literacy and 4 numeracy items out of the complete pool of 16 items per domain).

- All respondents will take 3 minutes of reading and 3 minutes of numeracy components.

- Respondents will be randomly assigned to take one of the three cognitive domains and will take two 25-minute clusters of items within that domain.

- As shown in Table 5-1, each cluster within a domain will be paired with every other cluster and the order of those clusters will be balanced, resulting in 20 possible pairs of clusters in a domain.
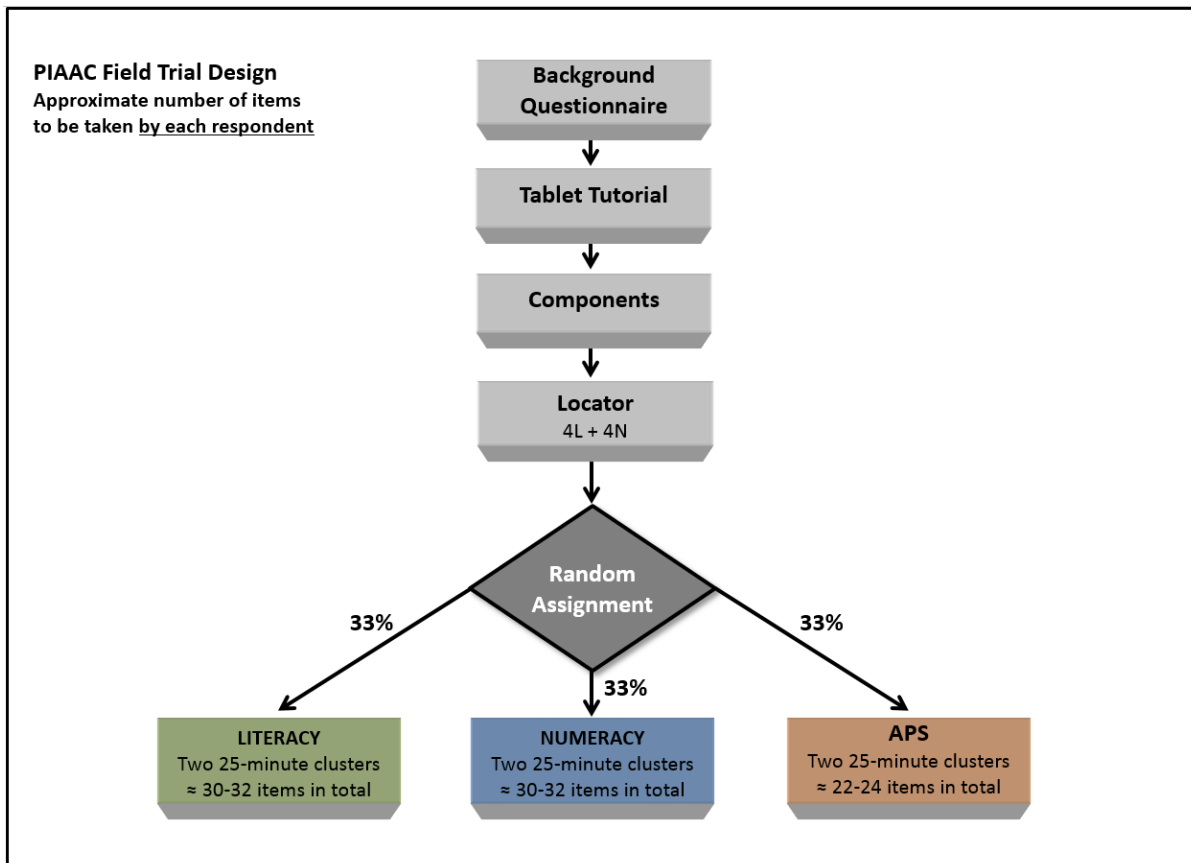

Figure 5-1. Field Trial Assessment Design

Table 5-1. Field Trial Cluster Pairing

		Cluster in Second Position				
		1	**2**	**3**	**4**	**5**
Cluster in First Position	**1**		X	X	X	X
	2	X		X	X	X
	3	X	X		X	X
	4	X	X	X		X
	5	X	X	X	X	

Each 25-minute cluster appears with every other cluster and appears in both the first and second position.

Guideline 5.6.1C (Note that this guideline applies <u>only to new countries</u> that opt to include an operational test of the paper-based instrument in the field trial.) Pending the outcomes of the field trial, a paper-based assessment for literacy and numeracy may be included in the PIAAC main study. The paper-based instrument will consist of trend items from cycle 1 and is expected to be the same instrument as the one used in the first cycle. Administration procedures will be similar to those employed in the first cycle. While all respondents will be strongly encouraged to attempt the tablet-based assessment, those who are unable to perform the tasks included in the tablet tutorial may be offered the paper option, should countries choose to include that as a national option in the main study.

New countries that did not participate in any rounds of PIAAC cycle 1 and believe they may want to include a paper-based option in the main study will need to translate the paper-based trend literacy and numeracy instruments as part of the specified translation process and in the same timeframe as translation for the computer-based direct assessment. New countries may opt to do an operational test of the paper-based instrument in the field trial. The operational test of the paper-based instrument in the field trial will have the following characteristics:

- Countries will need to expand their number of completed cases from 1 500 to 1 800 in the field trial. The additional 300 completed cases will allow new countries to test the operational procedures associated with the PBA instruments.

- Of the 1 800 respondents, every 6th person will be randomly assigned to take the paper-based instrument. The remaining respondents will only be offered the tablet instrument, similar to the field trial tablet-only design. This design will make it possible to still collect the data required to evaluate the psychometric properties of the cognitive items delivered on the tablet as well as estimate the proportion of the population who may be unable to take the test on the tablet.

- Scoring training will be provided to participating countries and they will need to assemble scoring teams for the field trial.

There will be no analyses conducted for the data collected as part of the operational field trial.

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 past and 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 4 000 - 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 4 000 – 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, as shown in Figure 5-2:

- All respondents will take the Background Questionnaire (BQ), which will include a set of questions dealing with their familiarity with electronic devices.

- After agreeing to continue with the survey, each respondent will receive a tutorial that will introduce the tablet response modes and provide an opportunity to practice.

- This will be followed by a locator measure that includes 8 literacy and 8 numeracy items.

- Respondents will be directed to one of three paths depending on their responses to relevant background items and their performance on the set of locator tasks. Decision points around the locator items will be determined based on data obtained in the Field Trial.

  — Respondents who fail the locator will follow path 1 and receive the reading and numeracy components only.

  — Respondents who pass the locator, but perform relatively poorly, will follow path 2 and receive the components plus an easier and somewhat shorter set of the adaptive literacy, numeracy and APS testlets in a randomised sequence.

  — Respondents who do well on the locator test and report experience using electronic devices will proceed along the third path shown in Figure 5-2. A small randomly selected proportion of these respondents (25%) will receive the set of reading and numeracy components before moving on to the two-stage adaptive modules of literacy, numeracy, or adaptive problem solving (APS), while the majority of these respondents (75%) will proceed directly to the two-stage cognitive modules.
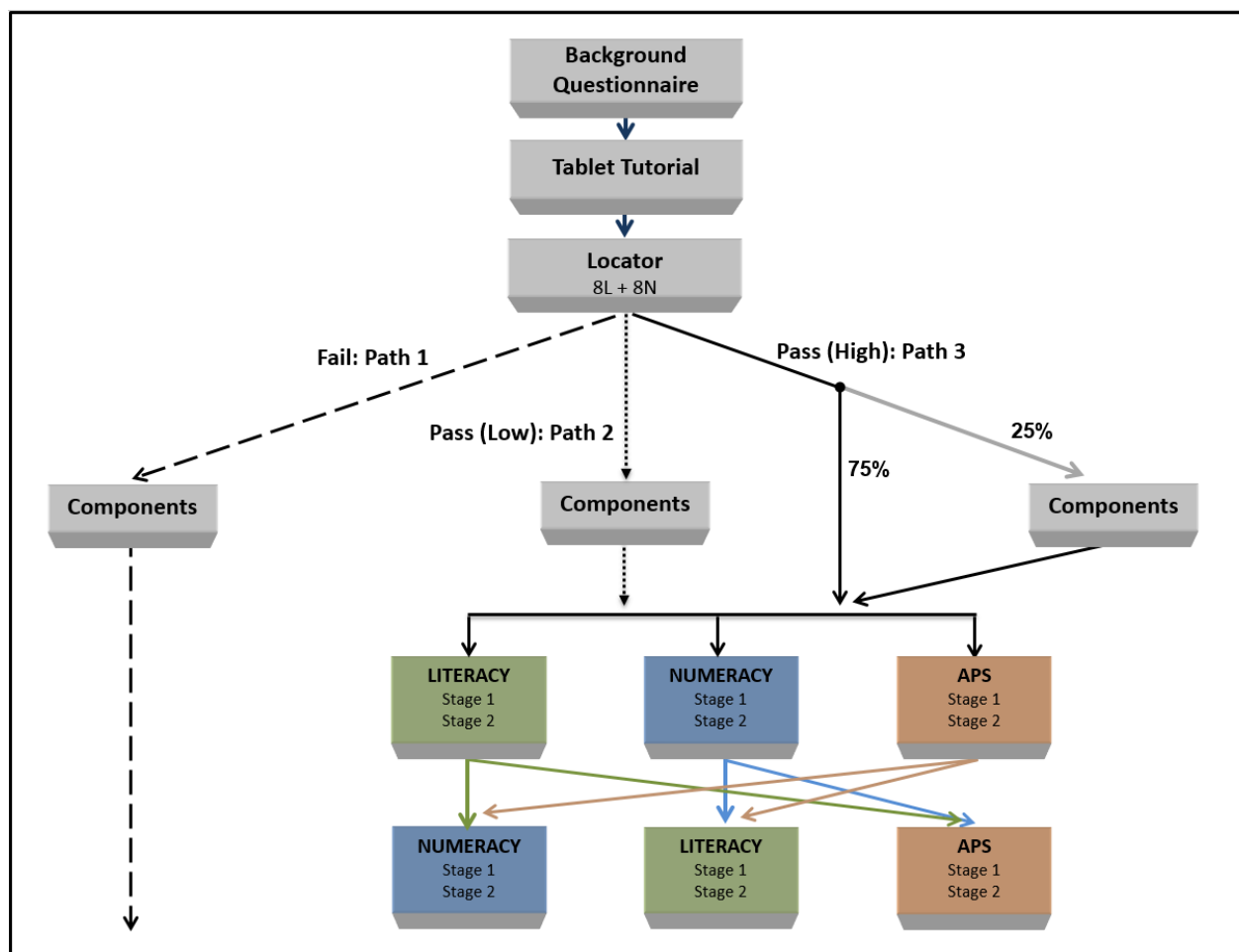
Figure 5-2. Main Study Assessment Design

Guideline 5.6.2C While not illustrated in Figure 5-2, pending the outcomes of the field trial, countries can choose to include a paper-based assessment for literacy and numeracy in the PIAAC main study.[2] The paper-based instrument will include the trend cognitive items from cycle 1. It is expected that the cycle 1 Core, Literacy and Numeracy booklets will be used, with a few possible minor revisions. Note that for cycle 2, the assessment of reading and numeracy components will be delivered on the tablet only. Administration procedures will be similar to those employed in the first cycle. While all respondents will be strongly encouraged to attempt the tablet-delivered assessment, those who are unable to perform the tasks included in the tablet tutorial may be offered the paper option, should countries choose to include that as a national option.

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[2] As noted in Guideline 5.6.1C, countries that are new to PIAAC and believe they may need to include the paper option in the main study may opt to do an operational test of the paper administration in the field trial.

The main study paper-based instrument will have the following characteristics:

- The instrument will be based on the cycle 1 Core booklet with 4 literacy items and 4 numeracy items, Exercise Booklet 1 (Literacy) and Exercise Booklet 2 (Numeracy).

- The literacy and numeracy booklets will each include the 20 trend items from cycle 1 and will be expected to take 30 minutes.

- Scoring training will be provided to participating countries and they will need to assemble scoring teams for the main study.

Quality Control Procedures

The Consortium will provide all participating countries with a document explaining the psychometric assessment design and administrative procedures as well as face-to-face training at NPM meetings.

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

For the Main Study, all countries will collect information using tablets and some countries may opt to include a paper option as well. 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. If countries choose to use a tablet-only design in the Main Study, paper-related data processing is not relevant.

Standards, Guidelines and Recommendations

Standard 5.7.1 A field for recording the sampled person's identification number (PERSID) is required on all paper- and computer-based survey instruments (i.e., screener, background questionnaire [BQ],doorstep interview, and assessment) 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 – screener (if applicable)

- Final status code – BQ

- Final status code – assessment

- Final status code – doorstep interview

- Date of interview

- Length of interview

  — BQ start time and BQ end time

  — Assessment tasks start and end time

- Language of completion for countries with more than one language

- Interviewer Record of Contact

  — Visit number

  — Date

  — Time

  — Disposition 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 document 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 results of the contact are documented using interim and final disposition codes. Refer to Section 10.7 for information on the available disposition 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 and from one PIAAC cycle to the next.

Rationale

If valid comparisons of assessment results are to be made across countries 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 will be made as needed and must be documented and agreed upon.

> **Guideline 6.1.1A** 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 and text, the typeface of written material and the general layout should be maintained.

> **Guideline 6.1.1B** The participating countries are responsible for the translation and linguistic adaptation of data collection instruments. 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 management platform, translation tools and workflow definitions for carrying out the translation and adaptation process and for previewing the test items in their final layout.

- A translation and adaptation training module, as well as support in terms of translation queries arising in the process.

Recommendation 6.1.1A The strongly recommended procedure for developing the national versions of the cognitive test items is double translation by two translators working independently from each other, followed by reconciliation performed by a third translator. 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. That is, the translators should be skilled translation practitioners who either have experience in translating cognitive test items or who have been briefed or trained on the particularities of this type of translation materials. Translators will translate into their strongest language (mother tongue).

The reconciler, ideally the most experienced translator in the team of three translators, should be responsible for the overall consistency within the materials, and for processing the verification feedback later in the process.

Guideline 6.1.1C In general, countries that have participated in PIAAC Cycle 1 must use their Cycle 1 translations for trend items 'as is' unless serious mistakes in these have been identified; for changing trend items, the Consortium will set up a change management process (see Section 6.3).

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

Recommendation 6.1.1C It is encouraged that countries 'sharing' a language (i.e., translate into the same language) collaborate, e.g., by "borrowing" a verified translation and adapting it to their national context, or by having discussions, exchanging draft translations or harmonizing their translation versions to the extent possible.

Guideline 6.1.1D The translation and review/reconciliation process should be documented according to guidelines that will be provided by the Consortium and which will emphasise translation challenges and key decisions.

Quality Control Procedures

All national versions of newly developed materials and all paper-based materials for countries new to PIAAC will go through full verification before the field trial, in a three-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 check to verify the correct implementation of verifiers' crucial suggestions from the first step as well as the correct implementation of any layout issues identified during the first step.

3. Centralised transfer of the finalized computer-based content to paper-based format when the same item is administered in both delivery modes, to ensure consistency of the two versions of the item.

A system will be used for archiving the national versions used in the field trial, 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.

Verification for the main study consists of the verifier checking that any linguistic and content-related changes requested by national team are linguistically correct and in line with the PIAAC translation and adaptation guidelines. If yes, they will be implemented by the verifier in the national version, i.e., the national team does not have access to the content prior to the main study.

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

6.2 Background Questionnaire

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 provide valid and comparable data across countries it is essential that the different language and country versions be linguistically equivalent. For questionnaires, "comparability" refers to linguistic equivalence (content, register, style and readability), adjusted for controlled (non-linguistic) adaptations to local context.

Standards, Guidelines and Recommendations

Standard 6.2.1 Non-linguistic adaptations are necessary for questionnaire items and/or response options where translation (alone) does not lead to comparability, such as education or wage categories. These adaptations must first be agreed upon and documented between countries and the Consortium, so that the Consortium can prepare a "country-specific source version" reflecting those adaptations. In particular, wherever national classifications are used to capture information such as formal education or occupation categories, it must be possible to map these to the appropriate international classifications.

Guideline 6.2.1A The participating countries are responsible for the structural adaptations to national circumstances. The Consortium provides support in the form of:

- PIAAC Cycle 2 Background Questionnaire Harmonization and Extension Guidelines, which explain in detail how countries should deal with non-linguistic adaptation;

- A dedicated consultation process for the measurement and internationally comparative coding of formal education.

Guideline 6.2.1B Countries administering the BQ in several languages must ensure that content-related adaptations are identical across language versions.

Guideline 6.2.1C Information on occupation and industry will be solicited via open questions, lookup lists or the confirmation of relevant register information. Countries should apply a set of standard questions that is appropriate for coding occupations and industry in their country. The resulting responses need to be coded into international standard categories (for details, see Section 11.2).

Guideline 6.2.1D Information on countries and languages will be solicited via semi-open questions, using partly pre-coded country-specific lists of countries and languages that are expected to be reported frequently in their country, plus an "other" category. Lookup lists may be used for country names if countries so wish. The names of countries should reflect the CURRENT name, not the name of the country in the past (even though the question may be related to the past). In most cases, country-specific lists of countries and languages will be used that covers the most relevant countries and languages plus a category 'other'. The resulting responses need to be coded into international standard categories (for details, see Section 11.2).

Guideline 6.2.1E Information on education will be solicited via closed country-specific questions, lookup lists or the confirmation of relevant register information. The resulting responses need to be mapped to international standard categories (for details, see Section 11.2). This mapping of national education categories to the international coding scheme, as well as the mapping of the minimum normal cumulative years of education to complete the respective qualifications, will be achieved via a centralised consultation process between the Consortium and countries using the Education Measurement and Coding Template (EMCT).

Recommendation 6.2.1 For the education consultation process, countries are encouraged to involve an expert with extensive knowledge of the educational system, qualifications and pathways through education of the country as well as the relationship between formal education, skills and the labour market. Expertise in international education classification, especially the application of ISCED in the country, is desirable but not necessary.

Standard 6.2.2 The use of registry information to pre-fill responses or the use of national look-up lists to facilitate response process in the background questionnaire is restricted to questions pertaining to highest educational qualification (B2_Q01), occupations (D2_Q01a/b, E2_Q01a/b), sectors of industry (D2_Q02a/b, E2_Q02a/b), country of birth (A2_Q03b) and country in which the highest educational qualification was obtained (B2_Q03b). Any pre-filled response needs to be confirmed by the respondent in a follow-up question.

Standard 6.2.3 In case registry information is used to pre-fill responses for questions about job title or industry sector (which will be used to code into ISCO/ISIC classifications, see Chapter 11), the standard open-ended questions (D2_Q01a/b, E2_Q01a/b, D2_Q02a/b, E2_Q02a/b) about actual tasks of the respondent/the firm must still be presented to the respondent. The information provided by the respondent must be taken into account for the manual double coding operation (see Standard 11.2.3).

Standard 6.2.4 Each participating country prepares the "country-specific source versions" for their country, with the support of the consortium. These source versions then serve as the

basis for translation and linguistic adaptation. All national versions of PIAAC questionnaires will ultimately be evaluated for linguistic correctness and equivalence to the "country-specific source version".

Guideline 6.2.4A The participating countries are responsible for the translation and linguistic adaptation of data collection instruments The Consortium provides support in the form of:

- Review of source versions with respect to language and cultural issues (translatability assessment).

- Translation and adaptation guidelines, both general and item-specific.

- A translation management platform, translation tools and workflow definitions for carrying out the translation and adaptation process.

- A translation training module, as well as support in terms of translation queries arising in the process.

Guideline 6.2.4B In general, countries that have participated in PIAAC Cycle 1 must use their Cycle 1 translations for trend items unless serious mistakes in these have been identified; for changing trend items, the Consortium will set up a change management process.

Guideline 6.2.4C As a minimum, the translation and adaptation process needs to include a thorough review of the translated and adapted questionnaire by experts with specific knowledge of the subject matter or domain and familiarity and expertise in the translation of survey instruments.

Recommendation 6.2.4A The strongly recommended procedure for developing the national versions of the BQ for new items (and for revised items in case of substantial changes) is double translation by two translators working independently from each other, followed by reconciliation. 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 questionnaire translation. That is, the translators should be skilled translation practitioners who either have experience in questionnaire translation or who have been briefed or trained on the particularities of questionnaire translation. Translators will translate into their strongest language (mother tongue). For new PIAAC countries, the recommendation of double translation applies to the BQ as a whole.

Recommendation 6.2.4B The reconciliation process should include a review by national experts in survey methodology, specifically questionnaire design, and the various domains covered by the BQ. It is strongly recommended that the reconciliation process be implemented as a team reconciliation, including the translators and national experts.

Recommendation 6.2.4C It is encouraged that countries 'sharing' a language (i.e., translate into the same language) collaborate, e.g., by having discussions, exchanging draft translations or even harmonizing their translation versions to the extent possible.

Guideline 6.2.4D The translation and review/reconciliation process should be documented according to guidelines that will be provided by the Consortium and which will emphasise translation challenges and key decisions.

Quality Control Procedures

All national versions of questionnaires will go through an adaptation agreement process and (a) a full verification for all items that are new in PIAAC Cycle 2 and (b) a focused verification of changes only for items coming from PIAAC cycle 1 countries before the field trial, 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 country-specific source version reflecting approved adaptations will be produced.

2. For new items, 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. For trend items coming from PIAAC Cycle 1, only a focused verification of changes will be undertaken (see Section 6.3).

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

For countries that did not participate in Cycle 1, all items are considered as new and will undergo full verification.

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

Verification at main study consists of the verifier checking that any linguistic and content-related changes requested by national team are linguistically correct, in line with the PIAAC translation and adaptation guidelines, and conform with what was approved by the Consortium. If yes, they will be implemented by the verifier in the national version, i.e., the national team does not have access to the content prior to the main study.

A system will be used for archiving 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 Measuring Trends

Purpose

To ensure that PIAAC Cycle 2 cognitive trend items are psychometrically equivalent to the identical items used in Cycle 1 and previous adult surveys.

Rationale

If valid comparisons are to be made between the assessment results of PIAAC Cycle 2 and the previous administrations of the PIAAC survey, 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 measuring trends 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 PIAAC Cycle 1 are responsible for reviewing their C1 trend items using the previews on the PIAAC portal, as well as documenting any change requests to correct outright errors in them. Agreed change requests will be implemented centrally by the Consortium. The Consortium will provide support in the form of instructions.

> **Guideline 6.3.1B** For participating countries that did not participate in PIAAC Cycle 1, the trend items will have the same status as newly developed test items. (See Section 6.1.)

Quality Control Procedures

For countries that participated in PIAAC Cycle 1, all national versions of trend items will undergo a change request process whereby:

1. Countries will review their national version of the trend items using portal previews, and document any change requests to correct outright errors (text or layout) in a change request form.

2. Requests for change are verified for linguistic correctness, compliance to general and item-specific guidelines as well as consistency across the instruments. Agreed changes are centrally implemented.

3. Final optical check is performed to verify the correct implementation of layout changes and (when necessary) for the implementation of additional changes.

All national versions of revised materials will go through a similar change request process before the main study with a view to allowing main study revisions only to address identified residual translation or adaptation defects.

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

6.4 BQ Items Used for Measuring Trends

Purpose

To ensure that PIAAC Cycle 2 background questionnaire trend items are psychometrically equivalent to the identical items used in Cycle 1 and previous adult surveys.

Rationale

If valid comparisons are to be made between the results of PIAAC Cycle 2 and the previous administration of the PIAAC survey, it is essential to use the same instruments ("if you want to measure change, don't change the measure").

Standards, Guidelines and Recommendations

Standard 6.4.1 Items used for measuring trends will be administered unchanged from their previous administration. Any changes needed because of mistakes or other reasons must be documented and agreed upon.

> **Guideline 6.4.1A** Participating countries that participated in PIAAC Cycle 1 are responsible for reviewing their BQ as well as documenting any change requests to correct outright errors. Agreed change requests will be implemented centrally by the Consortium. The Consortium will provide support in the form of instructions.

> **Guideline 6.4.1B** For participating countries that did not participate in PIAAC Cycle 1, the trend items will have the same status as newly developed items. (See Section 6.2.)

Quality Control Procedures

For countries that participated in PIAAC Cycle 1, all national versions of trend items will undergo a change request process whereby:

1. Countries will review their BQ, and document any change requests to correct outright errors in a change request form.

2. Requests for change are verified for linguistic correctness, compliance to general and item-specific guidelines as well as consistency across the instruments. Agreed changes are centrally implemented.

All national versions of revised materials will go through a similar change request process before the main study with a view to allowing main study revisions only to address identified residual translation or adaptation defects.

A system will be used for archiving 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 (Tablet Computer) Specifications and Minimum Capabilities

Purpose

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

Rationale

Because the PIAAC delivery system used in the survey will be running locally on the interviewer's tablet, the tablet 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, tablet 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);

  — 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 2 gigabyte (GB) of random access memory (RAM) (for 32-bit operating systems) or 3 GB of RAM (for 64-bit Windows 7, 8 or 10 operating systems);

  — NOTE: see above: this is the absolute minimum to allow the execution of the PIAAC delivery system 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 delivery system substantially.

- A 11.5" thin film transistor (TFT) colour screen;

- A 1 024 x 768 (XGA) resolution;

  — NOTE: PIAAC is designed to run at 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 checking the screens closely for clarity when running at this resolution.

- 30 GB of free space on the hard drive;

- Battery with at least four hours of run time;

- A device for storing or uploading data files, as defined in the country's specifications (e.g., a network connection, or a USB stick.

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

Guideline 7.1.1B It is difficult to buy tablets with 4:3 ratio screens. It is acceptable to use a wide screen display tablet that partly matches the recommendation. An example would be 1 366 x 768 (16:9, WXGA). The Consortium recommends previewing the tablets 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. Font sizes can be increased to allow the items to fill the screen in at least one dimension (usually height).

Guideline 7.1.1C The tablet computers must include either 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 PIAAC delivery system. For optimal results, the configuration described in Recommendation 7.1.1B will be preferred.

Guideline 7.1.1.E A stylus must be available for each tablet. All respondents must be offered the option of responding on the tablet with a stylus. The stylus offered must be an active stylus, not a capacitive stylus.

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;

- Alternatively, a USB interface for software installation, data file storage and backup.

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

- An x86-64-based multi-core Intel or AMD processor (e.g., Intel Core i5/i7 multicore series, AMD Turion, AMD Phenom);

- 4 GB of RAM;

- Use of a solid state drive (SSD) instead of a normal hard disk drive (HHD) for improving overall performance;

- A 12" or larger colour TFT screen with no glare;

  — NOTE: 4:3 screen ratio. See the comments in guidelines 7.1.1B.

- A USB interface, if data are to be backed up on USB sticks;

- An internal battery with 8 hours of run time, or replaceable batteries and an additional battery 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 tablet computers only for the PIAAC field trial and main study and not for other surveys.

Quality Control Procedures

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

7.2 Operating System Standards

Purpose

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

Rationale

Because the PIAAC delivery system used in the survey runs locally on the tablet computer, only operating systems that are compatible with this software can be used for PIAAC.

Standards, Guidelines and Recommendations

Standard 7.2.1 The Consortium will support the operating systems Windows 7 Business, Enterprise or Ultimate (32-bit or 64-bit version), Windows 8 and Windows 10.

Quality Control Procedures

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

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 tablet computer, participating countries must install and configure the PIAAC delivery system in the manner prescribed by the relevant documentation. This includes respecting requirements for directory names and locations and any required supporting software packages.

Standard 7.3.2 The user operating the PIAAC delivery system must have rights to save data into the specified data folder(s).

Quality Control Procedures

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

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 delivery 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 delivery systems with country-specific management systems can be considered an absolute minimum for operation.

Standards, Guidelines and Recommendations

Standard 7.4.1 The PIAAC delivery system 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 delivery 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 delivery systems.

Countries are required to perform tests specified by the Consortium. These include tests for installing and interacting with preliminary versions of the delivery system 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 PIAAC delivery system and the software already installed on survey tablet 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 PIAAC delivery system. The Consortium cannot specify standards for managing the configuration and versioning of third-party software also installed on the interviewers' tablet 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 PIAAC delivery system, 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 After changes have been audited and documented, updated software releases will be delivered to the National Information Technology Co-ordinators, who can simply update the system on the tablets with the new version. In addition to exchanging the software installation 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 tablet computer configuration. This documentation must be sent to the Consortium

for review prior to beginning testing of national main study delivery systems. Countries are encouraged to also submit this documentation before the field trial for review by the Consortium.

Countries are required to perform tests of the PIAAC 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 those problems that s/he cannot resolve.

Standard 7.6.2 Stand-by phone support will not be provided for the PIAAC 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.

> **Recommendation 7.6.2** Although telephone support on stand-by will not be provided by the Consortium, individual countries are strongly 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 (U.S. Eastern Time) and provide an estimated date and time of resolution.

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 delivery systems.

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 tablet computers, providing backup tablet computers), survey operations (assigning cases to interviewers, resolving interviewer questions, resetting cases to a prior state, removing or saving data from a tablet 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 tablet computers to support survey operations, including spare tablet computers for backup purposes in case of hardware failures;

- Configuring these tablet computers with survey software to Consortium specifications;

- Testing the PIAAC delivery system on country tablet computers, as specified by the Consortium;

- Training interviewers in the operation of the tablet computers and the survey software;

- Operating a national helpdesk to provide technical support for interviewers during the field period;

- Extracting survey data from tablet computers and coordinating with the National Data Manager on 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 delivery systems.

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

> **Guideline 7.8.1B** The Consortium will also provide documents and procedures for using the authoring tools to develop the background questionnaire 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 7.8.1C** 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 delivery systems.

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:

- Completing interviewer training (see Section 9.4);

- Locating of sampled persons/sampled addresses;

- Introducing the survey and gaining cooperation;

- Administering survey instruments following the prescribed PIAAC procedures;

- Submitting/transmitting survey data in a timely manner;

- Reporting to a supervisor on a regular basis;

- Performing 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;

- Completing 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;

- Implementing required quality control procedures;

- Weekly conference calls with each interviewer and ongoing communication as needed;

- Determine nonresponse follow-up strategies;

- 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 staffing;

- 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 determining the number of interviewers to be hired and timeline thereof (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 interviewer attrition.

Standard 8.1.2 Staff shall 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.

Guideline 8.1.2E Countries subcontracting data collection to a commercial survey organisation or other external organisation should plan to have weekly communication with representatives from this organisation to discuss progress of fieldwork and any other issues that may arise.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial 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 report on the status of recruitment and hiring of field staff and field management for the field trial 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 shall be very closely monitored at all stages.

> **Guideline 8.2.1A** Interviewers' work should be monitored throughout the data collection period using various methods and techniques, including review of audio-recorded interviews (and/or in-person observation), validation (call-backs), automated consistency checks, review of completed materials, and automated reports. (See Section 10.9 for details 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 types of contact attempts (daytime, evening, weekday, weekend), the response rate attained, the average interview duration and interviewer costs.

> **Guideline 8.2.1B** 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 the information will help facilitate the weekly report calls.

> **Recommendation 8.2.1** Supervisors or field managers should perform in-person observation of interviewers' performance, particularly those new to interviewing or those who completed 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 trial 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 report on the data collection quality control activities.

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. Payment on a piecework basis increases the risk of compromising the quality of an interviewer's work.

Standards, Guidelines and Recommendations

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

> **Guideline 8.3.1A** Countries should determine the number of interviewers needed to obtain the desired number of completes by estimating the number of hours required per complete based on PIAAC Cycle 1 or 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 trial experience along with other national data to estimate hours per complete.
>
> For a 2 hour PIAAC 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 registry sample versus the need to screen households (screening can 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; and (4) management style of the survey organisation.
>
> 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 or salary vs. piece rate); 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.

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

Guideline 8.3.2A Due to the need to begin planning and preparation for various aspects of field operations of the PIAAC survey, countries should identify the entity responsible for data collection well in advance of the field trial/main study. Countries using a commercial survey organisation to conduct the field data collection should ideally have a finalised contract with the agency no later than nine months prior to the start of data collection activities.

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. 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, and experience with surveys involving computer-assisted interviewing.

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 When recruiting interviewers, countries should consider the languages in which the interview will be administered, as well as the languages spoken by large numbers of minority groups in the area, so that interviewers who speak these languages are available for interview administration.

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 trial 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.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial 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 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.

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 recruitment interview should be conducted by PIAAC qualified staff.

Guideline 8.4.2C Interviews should be conducted in accordance with the country's laws and the survey institute's policies.

Guideline 8.4.2D 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 8.4.2E Countries must conduct employment verification and reference checks of candidates.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial 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 report on the status of recruitment and hiring for the field trial 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 interviewers' involvement and participation in the training and to provide ample opportunity for supervisory staff to observe and evaluate interviewer performance. Conducting all in-person training sessions on the same schedule allows the field period to start at the same time for all data collectors.

The Consortium will provide a comprehensive international training package that includes

- a training guide with scripted training sessions, lectures, handouts, role plays and exercises with answer keys;

- a home study package with an introduction and general overview of PIAAC, the interviewer's role in PIAAC, information on survey basics, data confidentiality and data security, gaining respondent cooperation, exercises for interviewers to complete; and

- an interviewer procedures manual documenting the PIAAC study design and purpose, and including a complete documentation of all PIAAC study procedures.

All interviewer training sessions will be fully scripted to ensure consistency of presentation 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 interviewer interest and attention, the training sessions use a mixture of presentation techniques, such as demonstrations, training videos, interactive lectures and practice interviews, and exercises.

Standards, Guidelines and Recommendations

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

> **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 home study materials to interviewers prior to in-person training is cost-efficient and will maximise productivity at training.

Guideline 9.1.1B A <mark>detailed training agenda must be developed to ensure that training covers all aspects of the interviewer'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 facilitate keeping the sessions on schedule</mark>.

Guideline 9.1.1C Countries using a commercial survey organisation to conduct field work must ensure that appropriate personnel from the <mark>data collection agency will attend the international training provided by the Consortium prior to the field trial and the main study</mark>.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial 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 report on the status of scheduling and conducting training for the field trial and the main study.

Training materials adapted and/or translated by the country will be uploaded to the PIAAC portal.

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 interviewers 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 communicators 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 shall 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.

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

Recommendation 9.2.1A All interviewers should ideally be trained simultaneously, with approximately ==15 to 20 interviewers per training room==.

Recommendation 9.2.1B During interactive interviewer training sessions, a tablet computer should be set up as a data display machine so that interviewers can follow along with the trainer.

Standard 9.2.2 Countries shall 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 interviewer 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, typically a supervisor, must be present in each room to assist the lead trainer and the interviewers. The assistant trainer must also observe and evaluate the interviewers during the sessions.

Guideline 9.2.2D An individual designated as "technical support" must be assigned to 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 tablet computer that is projected on the screen for all interviewers to view (during applicable sessions)==.

Recommendation 9.2.2B ==During training, interviewers should be grouped by supervisory region==. The interviewers' regional field supervisor should serve as the assistant trainer, so that s/he has the 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 exercises completed by interviewers during training.==

Quality Control Procedures

==As part of the National Survey Design and Planning Report process for the field trial 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 report on the status of scheduling training and arranging training staff for the field trial and the main study.

==Countries should upload all training materials to the PIAAC portal.==

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 shall 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 knowledgeable members 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.

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.

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 trial 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 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 interviewers.

Standard 9.4.2 All PIAAC interviewers shall 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;

- Locating households and respondents;

- Gaining the co-operation of contacted respondents, avoiding refusals and converting refusals;

- Contact strategy for contacting intended respondents;

- Use of the case management system;

- Screener administration (for non registry countries);

- Administration of the background questionnaire (BQ);

- Administration of tablet-administered instruments and, where appropriate, paper-and-pencil assessment instruments;

- Quality control and monitoring of interviewer work;

- Administrative tasks, including rules on assignment of disposition codes;

- Practice interviews, in the form of role plays and/or paid respondent practice;

- Question-and-answer session following the role plays and/or paid respondent practice.

Guideline 9.4.2C During training, countries should provide supplemental review sessions for interviewers who request additional practice or are identified as needing additional practice with the various survey instruments.

Recommendation 9.4.2 All interviewers should have the opportunity to conduct at least one complete unscripted practice interview with a respondent unfamiliar with the PIAAC survey. 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 shall 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 collect data in only one language, but will translate the BQ 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, a tablet computer-based assessment administration and, where appropriate, a paper-and-pencil assessment administration, in addition to the training elements noted in Recommendation 9.4.3B.

<mark>**Standard 9.4.4 Interviewers shall receive home study training prior to in-person training.**</mark>

Guideline 9.4.4A Home study materials should 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 and basics of in-person interviewing. A written exercise should be included to ensure that the interviewers complete the required components of the home study. The completed exercise submitted by interviewers must be scored at in-person training.

Recommendation 9.4.4 Countries may choose to include additional materials or exercises in the home study, 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 must receive GIT training prior to project-specific training.

Guideline 9.4.5A GIT training provided by the Consortium includes 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;

- 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:

  ⎯ Interviewer behaviour and style when making contact with the respondent;

  ⎯ The importance of making effective and fast connections with the respondent;

  ⎯ Methods to overcome resistance and address respondent concerns;

  ⎯ Online training modules or 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 an exercise that includes consent and confidentiality scenarios that interviewers may confront during data collection; and

- Basics of tablet computer use.

Guideline 9.4.5B Countries should include training content on the remuneration and administrative aspects of working for the survey institute.

Standard 9.4.6 Interviewers who are new to CAI shall receive instruction on CAI basics as part of the project-specific training session.

Guideline 9.4.6 The CAI instruction must instruct interviewers on CAI questionnaire format, question types, and instrument navigation. This content should be incorporated into the first training session in which interviewers use the tablet computer (screening or BQ administration).

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial 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.

At the conclusion of the interviewer training session, countries will be required to report on data collector training for the field trial 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.

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 shall 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 procedures 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).

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 screening questions, additional background questionnaire items, instructions for using the country-specific case management system, administrative procedures, and procedures for locating households and respondents.

Guideline 9.5.2 Each country must follow 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 shall 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 case 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 trial and the main study, countries will be required to document their proposed training plan and country-specific training.

At the conclusion of the interviewer training session, countries will be required to report on the status of training for the field trial 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 uploaded to the PIAAC portal. Any deviations from the procedures developed by the Consortium must be documented and reported.

9.6 Evaluation of Interviewers

Purpose

To assess interviewers' abilities before they begin field work 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 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 shall evaluate interviewers' performance during training.

Guideline 9.6.1A To evaluate interviewers, training staff will use the evaluation form designed by the Consortium.

Guideline 9.6.1B Training staff must identify interviewers 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 Interviewers exhibiting performance problems should be paired during the role-play interviews with a more experienced interviewer or with the assistant trainer or supervisor.

Recommendation 9.6.1C If an interviewer does not successfully complete training, the country may choose to either provide the interviewer with post-training remedial work or dismiss the interviewer.

Standard 9.6.2 At supervisor and interviewer training, PIAAC project staff shall 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 trial and the main study, countries will be required to document their proposed plan for evaluating interviewer 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 shall, in a timely fashion, address issues that arise during data collection by providing appropriate retraining or training on new issues.

> **Guideline 9.7.1** Interviewers must receive feedback, both individually and as a group, as follows:
>
> - Provide immediate individual feedback in case of any deviation from prescribed study procedures .
>
> - Provide routine individual feedback for self-improvement.
>
> - Offer group feedback to focus efforts on improving the data collection process.
>
> **Recommendation 9.7.1** 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.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial 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 report ongoing interviewer training issues and resolutions for the field trial and the main study.

9.8 Interviewer Attrition Training

Purpose

To ensure a sufficient number of data collection staff to offset 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 shall conduct attrition training if a significant number of interviewers do not complete the principal in-person training session or if substantial interviewer attrition occurs during data collection.

> **Guideline 9.8.1** During the planning process, each country should assess the need for attrition training, based on 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 trial 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 report on the number of interviewers who have left the study, as well as the status of attrition trainings for the field trial 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 momentum 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 shall 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 a list 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 showcard booklets, study endorsement materials, administrative forms, pencils and pens.

> **Guideline 10.1.1C** When assigning work to interviewers, 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 difficult cases to determine if these are appropriate for reassignment.

> **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 experienced interviewers on a nonresponse conversion trip.

Quality Control Procedures

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

10.2 Advance Contact Strategy

Purpose

To facilitate 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, how the data will be used and other relevant details. A professionally created informative advance mailing provides potential respondents with 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 sampled person or household before the interview.

> **Guideline 10.2.1A** When an address is available for sampled persons or households, a letter printed on official stationery must be mailed in advance of the interviewer's initial contact. If the sampled person's email address is available (registry countries), the letter can be sent electronically. The letter should be available in the majority language(s) as defined by the country.

> **Guideline 10.2.1B** An attractive study 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 name or address was obtained

- Why another person or household cannot be substituted for the sampled person or household

- Confidentiality of the data

- Length of the interview

- Study telephone number

- URL of the study website for respondents

- Uses of the data

- Links to PIAAC Cycle 1 news articles or results.

Guideline 10.2.1C The advance mailings should be staggered to correspond with the planned schedule of interviewer visits to the area.

Guideline 10.2.1D All advance materials should include a PIAAC-specific telephone number and website address so that potential respondents can access additional information about the survey.

Guideline 10.2.1E Interviewers should 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 first visit.

Recommendation 10.2.1B A study website for respondents should be designed and available before the first advance mailing. This website should provide information about PIAAC, including the sponsoring agency, the data collection agency (if applicable), links to PIAAC news articles or PIAAC results, and what the study entails for respondents who are selected for participation.

Recommendation 10.2.1C A project logo should appear on all study materials that are presented to potential respondents. This project logo can increase respondent recall of materials and tie 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 individuals or organisations 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 dissemination of information directed toward the public. Dissemination activities may include newspaper articles and links to websites with news related to PIAAC, or television and radio advertising, with references to the official website established for the study by the National Centre.

Recommendation 10.2.1G It may be useful to notify the local authorities (police stations) in areas in which data are being collected. Respondents who are older or are wary about the study can benefit from assurance that the authorities have been informed about the survey and that they are able to check with the local police station. Countries should develop an informational 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 study telephone number).

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial and the main study, countries will be required to document their planned strategy for promoting PIAAC including listing introductory study materials that will be developed and how these 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 persons or households shall 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 sampled persons or households through an in-person visit, at least six contact attempts shall be made before the case is coded as a non-contact, with at least one attempt on a weekday, one attempt on a weeknight and one attempt on the weekend. Additional efforts may be needed to keep the rate of non-contacts as low as possible.

> **Guideline 10.3.2** In cases where the first attempt at contact is an in-person visit, the following should be incorporated into the contact strategy:
>
> - All components of the interview should, ideally, be completed in the same visit. However, if the interviewer is unable to contact the sampled person 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 sampled persons or households by telephone, at least seven attempts shall be made before the case is coded as a non-contact. Additional efforts may be needed to keep the rate of non-contacts as low as possible.

> **Guideline 10.3.3** In cases where the first attempt at contact 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 sampled person, the interviewer should query the household member to establish a time when the sampled person 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 screener (if applicable), background questionnaire, the doorstep interview, and the direct assessment – shall be conducted in person.

Standard 10.3.5 The use of translators/interpreters is encouraged for the administration of the screener as a way to limit the occurrence of literacy related non-response to the screener.

Standard 10.3.6 The use of translators/interpreters is encouraged for the administration of the background questionnaire as a way to limit as much as possible the occurrence of literacy related non-response to the background questionnaire.

Standard 10.3.7 The interviewer shall thoroughly document each contact attempt with the sampled person or household in the Electronic Record of Contact in the CMS. Interviewers must record contact information each time a contact attempt with a sampled person or household does not result in a completed interview.

> **Guideline 10.3.7** The information to be documented for each contact attempt should at a minimum, include the visit number, day, date, time, contact mode and a disposition code.

Standard 10.3.8 The interviewer shall thoroughly document information on each case that receives a non-interview disposition code because of refusal or other nonresponse (i.e., vacant dwelling unit, maximum number of calls, physical/mental disability, temporarily absent/unavailable during field period, etc.). Interviewers shall enter this information in the Electronic Record of Contacts in the CMS.

> **Guideline 10.3.8** For refusal cases, the information collected should include, at a minimum:

- Demographic data on the person who refused

- Reason for refusal

- Strength of refusal

- Likelihood of refusal conversion

- Comments

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial and the main study, countries will be required to provide a description of the proposed contact strategy for data collection.

10.4 Instrument Administration

Purpose

To specify the data collection procedures for the screener, BQ, doorstep interview and assessment 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 instruments and procedures are not identical for all participants, bias and/or variance 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:

- **screener (non-registry countries)**

- **background questionnaire (BQ)**

- **direct assessment of cognitive skills (including reading and numeracy components and adaptive problem solving).**

Standard 10.4.2 The tablet computer delivery platform developed by the Consortium shall be used to administer the screener (non-registry countries) and the BQ. The direct assessment should be available as a self-administered tablet-delivered instrument, and in paper-based format for countries that choose that option in the main study, consistent with the psychometric assessment design specified in Section 5.6.

Standard 10.4.3 Instruments (including the screener, background questionnaire and the direct assessment) shall be administered in the main language(s) determined by each country, by data collection staff appropriately trained and fluent in the language(s) of administration.

Standard 10.4.4 Countries for which the sample design involves the sub-selection of individuals within a sampled household will require a set of questions (hereafter called the screener) to identify the target population members within a sampled household and to facilitate the random selection of one or two persons within the household.

Standard 10.4.5 Interviewers shall confirm the address of the sampled household before conducting the screener.

Standard 10.4.6 The screener shall be conducted with a household member who is of legal age to provide informed consent for survey participation.

Standard 10.4.7 A person is considered a household member if the sampled dwelling unit is their usual place of residence (the place where they live and sleep the majority of the time) at the time the screener is completed. This includes a person who is:

- **living in the dwelling unit but temporarily absent at the time the screener is completed (e.g., on vacation, away on business or not at home due to short hospitalisation);**

- **a domestic or other employee who lives in the dwelling unit;**

- **a boarder or roomer who lives in the dwelling unit;**

- **a student living away from home while attending school and who uses the dwelling unit address as their permanent address;[1] or**

- **temporarily visiting the household and has no usual place of residence elsewhere.**

Standard 10.4.8 Interviewers must list every household member in the screener household roster. For each household member listed on the roster, interviewers must collect an identifier (such as first name, nickname or initials), age or age range, and gender.

Standard 10.4.9 For each sampled person (or persons), interviewers must collect month and year of birth, educational attainment, and other demographic information specified by the country, as approved by Consortium, that may prove useful in addressing nonresponse bias.

> **Guideline 10.4.9A** Interviewers shall collect a telephone number to re-contact the household for validation purposes.

> **Guideline 10.4.9B** Countries that are planning to use their own case management system must ensure that their screening questions include all required sampling criteria, as well as other information required for subsequent contacts or analysis purposes, such as the name, age, and gender of all household members, the number of eligible household members, number of sampled household members, dwelling unit address confirmation, and telephone number.

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[1] The Consortium recommends that countries sample students through their permanent residence rather than their student group quarters (see Recommendation 4.4.1). However, if they choose to sample students through group quarters, then this condition does not apply.

Recommendation 10.4.9 Depending on the needs of the country, countries can collect the race and ethnicity of sampled persons in the screener.

Standard 10.4.10 At the end of the screener, interviewers shall collect information from the household respondent about any hidden dwelling units. Hidden dwelling units, i.e., dwelling units that are not visible or accessible from the street, may be missing from the sampling frame. To help reduce undercoverage bias, countries must add found hidden dwelling units to the sample following established procedures.

Standard 10.4.11 The BQ and the direct assessment shall be administered only to the sampled person; no substitution is permitted. The use of an interpreter for the BQ is acceptable. The interpreter's only involvement shall 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 10.4.12 Proxy respondents and interpreters shall not complete the direct assessments.

Standard 10.4.13 Interviewers shall use the specific auxiliary/stimulus materials required during the interview.

Standard 10.4.14 Interviewers shall not schedule return visits to complete cases wherein the sampled person broke off after starting the direct assessment.

> **Guideline 10.4.14A** The background questionnaire and the direct assessment should be administered in the same visit. In extenuating circumstances, the background questionnaire and the assessment may be administered in separate sessions to accommodate family concerns or crises.

> **Guideline 10.4.14B** 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 10.4.15 If an interviewer encounters a household/respondent whose language is not one of the official languages in which the PIAAC instruments are available in the country, the interviewer shall attempt to ascertain the language spoken in the household using the Doorstep Language Identification Card.

Standard 10.4.16 The tablet computer self-administered doorstep interview shall only be provided to respondents who do not speak the languages in which the PIAAC instruments (BQ and direct assessment) are available <u>and</u> when a translator/interpreter is not available.

Standard 10.4.17 Countries shall report the expected rate of literacy related non-response in the National Survey Design and Planning Report based on experience conducting PIAAC or similar national surveys.

> **Guideline 10.4.17** Countries should evaluate whether there is geographical clustering of minority language speakers in order to anticipate areas where the doorstep interview administration could

be expected to occur frequently so that the area is adequately staffed with bilingual interviewers and interpreters.

Recommendation 10.4.17 If pockets of minority language speakers are identified during data collection, countries can arrange for an interpreter to accompany interviewers.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial and the main study, countries will be required to specify the method and mode of data collection for each stage of the interview process.

Countries will be required to report on the expected number of minority language-related nonrespondents in the country based on the most current information available from various sources including previous surveys.

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 shall 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 sampled persons or households. (See Section 10.2.) Include the study website and study telephone 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 and monitor 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 in achieving the production targets and provide regular feedback on adequate progress.

- Train supervisors on reassignment strategies for potential refusals, actual refusals and other types of nonresponse.

Guideline 10.5.1B Interviewers should clearly display an identification badge with their photograph and signature and the official study logo.

Recommendation 10.5.1A To encourage respondent participation, countries may choose to use an incentive which may be monetary or non-monetary. (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 shall 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 building managers of locked buildings or gated communities, to be distributed as needed in the field. These materials should include information on PIAAC as well as sources that can confirm the legitimacy of the study.

Guideline 10.5.2B After repeated unsuccessful attempts by the interviewer to enter a locked building, the supervisor must contact the apartment building management to explain the importance of PIAAC in order to gain co-operation.

Guideline 10.5.2C In order to gain access to locked buildings, strategies such as using reverse lookup directories and online address and telephone databases may be employed to obtain respondents' telephone numbers in order to facilitate an initial contact.

Recommendation 10.5.2A After an interviewer has made unsuccessful attempts to contact someone at the sampled household or sampled person's address, s/he should contact a neighbour

to identify the best time and day to contact the household. Interviewers may ask neighbours about the occupancy status of dwellings that appear to be unoccupied.

Recommendation 10.5.2B Options to ensure an interviewer's safety in potentially dangerous areas should be made available. Interviewers should be permitted to hire an escort to accompany them to the sampled household or sampled person's address. The escort should complete the PIAAC non-disclosure/confidentiality agreement.

Standard 10.5.3 All countries shall implement effective refusal conversion strategies.

Guideline 10.5.3A Specially targeted letters, leaflets and postcards should be developed with text addressing refusals or uncooperative respondents. These materials can be tailored to specific circumstances (e.g., respondents who are too busy, older respondents who may require a larger text font, respondents concerned about being presented with a sales pitch). All materials should include the study telephone number and website address.

Guideline 10.5.3B Follow-up of refusals or uncooperative respondents may be conducted by an experienced interviewer or travelling interviewers with demonstrated skills in gaining co-operation and nonresponse conversion.

Recommendation 10.5.3 Refusal conversion materials should be sent (ideally by priority or registered mail), to increase the likelihood of the materials being read and to reinforce the legitimacy and importance of the study.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial and the main study, countries will be required to provide details of the proposed strategy to achieve the target response rate.

On a monthly basis during the survey planning and data collection period, countries will be required to report on the steps that have been proposed or taken to ensure that the specified response rate targets are met.

10.6 Case 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 use an automated case management system (CMS), either the international CMS provided by the Consortium or a national version, to enable the conduct, timely management, 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 supervisors in their day-to-day operational tasks, such as case assignment and transfer, assignment of result codes and monitoring of interviewers.

Standards, Guidelines and Recommendations

Standard 10.6.1 Each country is responsible for using an automated case management system to conduct the PIAAC interview if the international case management system provided by the Consortium is not used.

Standard 10.6.2 The national case management system developed by each country shall be able to support the functions necessary for supervisory staff to manage the PIAAC day-to-day field operations.

> **Guideline 10.6.2A** Each country's national case 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
>
> - 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 but 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, doorstep interview and direct assessment, any paper booklets and derived scoring/capture sheets, coding files, and eventually the weighting international file.

The use of the check digit algorithm for person IDs will be described at a future NPM meeting.

> **Guideline 10.6.2A** Each country's case management system should include a mechanism for documenting information related to each contact attempt that does not result in a completed interview through an Electronic Record of Contacts. (See Section 10.3.)
>
> **Recommendation 10.6.2** Each country's case 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 case management system developed by each country shall be able to support the production of automated reports during the data collection period. (See Section 10.8.)

> **Guideline 10.6.3** Each country's case 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.) The case management system should contain the information listed below:
>
> - Case ID
>
> - Geographic area (i.e., primary sampling unit, region, segment)
>
> - Dwelling unit address information
>
> - Case-level status and disposition code
>
> - Task-level status and disposition code
>
> - Date when 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 booklet(s) (if conducting paper-based assessments)
>
> - Status of booklet(s) (if conducting paper-based assessments)
>
> - Date when booklets were returned to the survey institute by the interviewer (if conducting paper-based assessments).

Standard 10.6.4 Countries that choose to include the paper-based assessment in the main study shall assign a unique booklet ID (serial number) to each task assessed with a paper instrument that is prepared, in order to verify that booklets distributed to interviewers have been used for

respondent assessments or returned and eventually destroyed in order to account for all instruments.

> **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 fields in the PIAAC survey platform.

> **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 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 shall develop a survey control file to be used for the initial loading of data into the case management system.

> **Recommendation 10.6.5** Standard 4.6.5 and Guideline 4.6.5 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 trial and the main study, countries not using the international CMS will be required to provide the specifications for their case management system and the proposed 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 When assigning status codes at both the instrument and case levels, all countries shall implement the list of approved PIAAC disposition codes shown in Tables 10-1 to 10-5.

Table 10-1. Disposition Codes for PIAAC Screener

Description	Code
Complete – 1 sample person selected	01
Complete – 2 sample persons selected	02
Partial complete[1]/break-off	03
Refusal by household member	04
Refusal by gatekeeper	05
Language barrier	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, i.e., a household member not successfully contacted	21
Dwelling unit under construction	22

Table 10-1. Disposition Codes for PIAAC Screener (continued)

Description	Code
Temporarily absent/unavailable during field period	24
Vacant dwelling unit, or dwelling unit used as holiday or temporary residence only	26
Duplication – already interviewed	27
Address not a dwelling unit, e.g., a group of vacation cabins owned and operated under a single management; non-residential units such as businesses, government offices, and other organisations; and residential units within institutions (e.g., prisons or sanitariums) and military barracks	28

[1] 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)

Description	Code
Complete	01
Partial complete/break-off[1]	03
Refusal by sample person, e.g., for refusal to participate due to time constraints or lack of interest	04
Refusal by other person	05
Language barrier	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; i.e., sample person not successfully contacted	21
Unknown whereabouts or invalid address (for population registry samples only)	22
Moved within the country but not successfully located by the interviewers	23
Temporarily absent/unavailable during field period	24
Not in target population, i.e., not in age range, or moved outside the country or into institution	25
Duplication – already interviewed	27
Technical problem	90

[1] A partial completed case is a case in which the participant started, but refused to complete, the BQ.

[2] There is an associated mandatory write-in, e.g., DISP_CI_IN.

Table 10-3. Disposition Codes for PIAAC Doorstep Interview

Description	Code
Complete	01
Partial complete/break-off	03
Refusal by sample person	04
Unaccommodated language	07
Other (unspecified), e.g., sickness, falsification or unusual circumstances	17
Maximum number of calls; i.e., respondent not successfully contacted	21
Technical problem	90

[1] There is an associated mandatory write-in, e.g., DISP_CI_IN.

Table 10-4. Disposition Codes for PIAAC Assessments (Tutorial, Locator, Components, PBA Core and Main Assessment)

Description	Code
Complete	01
Partial complete/break-off[1]	03
Refusal by sample person	04
Refusal by other person	05
Lacks the skills to use the tablet	06
Language barrier	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; i.e., respondent not successfully contacted	21
Temporarily absent/unavailable during field period	24
Duplication – already interviewed	27
Technical problem	90
Missing paper booklet[2]	91

[1] A partial completed case is a case in which the participant completed the BQ but refused to continue to the direct assessment (which will affect response rates).

[2] The disposition code of 91 (missing paper booklet) is not part of the PIAAC Delivery System. 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.

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 and direct assessment. Recommended interim status codes appear in Table 10-5.

Table 10-5. 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.
CB: Call back – no appointment	You have made contact and obtained a general idea of when to return to the household but do not have a scheduled appointment.
NH: Not at home	No one is at home at the time of contact.
AV: Avoidance	Someone appears to be home at the time of contact, but will not open the door.
LO: Locked/gated dwelling unit	The dwelling unit is in a locked building, on a gated lot or in a gated community.
RB: Initial refusal	A household member refused to participate or broke off the interview before it was completed.
IL: Illness/disability	The respondent is unable to complete the interview because of an illness or disability.
OT: Other	Any other situation that requires follow-up, such as a language difficulty, or a dwelling unit you cannot locate.

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 PIAAC delivery system for the screener, case initialisation, background questionnaire (BQ), doorstep interview and direct assessment.

Quality Control Procedures

Countries will be required to provide a full list and description of the disposition codes to be used for each instrument for the field trial and the main study.

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 Countries not using the international CMS shall develop automated reports or adapt existing reports to effectively monitor the data collection. The reports must focus on the completion status of cases and the progress made to finalise work and should provide, at a minimum, the same information as the reports in the international CMS.

Guideline 10.8.1A The reports must be produced based on the data collected and stored within the country's case 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, 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 update case information.

Guideline 10.8.1D The reports generated by the case management system should provide the following information for up-to-date tracking of the data collection effort:

- Distribution of the actual completes versus expected completes overall, and by region, subregion (PSU), age groups, gender, language, instruments, mode of assessment.

- Interviewer production report including the number of completed cases by interview stage (screener, BQ, assessment, doorstep interview) by week.

- Disposition code frequencies including the distribution of disposition codes – interim and final by instrument.

- An Electronic Record of Contacts which maintains the history of contacts of all nonfinalised cases (by interviewer, by case).

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 In order to have the most current status of field work, interviewers must transmit data daily. Countries must produce a report that lists data transmissions by interviewer, including the most recent time and date of inbound and outbound transmissions.

Guideline 10.8.1H In order to review the status of the validation efforts, countries must produce validation reports generated by the case management system that, provide a summary of validation efforts to date as well as a report providing the validation rate by field interviewer and validation outcome.

Recommendation 10.8.1 In order 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.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial 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 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 shall be made aware during training that their work will be monitored.

Standard 10.9.2 Each country shall 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 audio recording 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 observations are implemented, these should be conducted by supervisors or survey institute staff.

Standard 10.9.3 Each country shall develop and implement procedures to verify 10% of each interviewer's finalised work, including cases finalised as nonresponse. Cases shall be randomly pre-selected for validation.

Guideline 10.9.3A Interview validation must be conducted to verify that an interviewer has interviewed a sampled person according to the study procedures.

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 by telephone or in person, using a standardised validation form developed by the Consortium. Although not preferred, validation of cases finalised as completes can be done by mail. However, mail is generally not effective for nonresponse validation.

Guideline 10.9.3D The validation form will collect respondent demographic data, a few key background questionnaire items and some questions related to 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 with no available telephone number, interview validation can be conducted in person by a senior interviewer, using a standardised in-person validation form developed by the Consortium. This form will be different from the validation form used by supervisors.

Guideline 10.9.3F Countries need to document their conformance to validation requirements and document any other methods used to detect falsification.

Guideline 10.9.3G 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 Standard 4.6.6.)

Guideline 10.9.3H The BQ data should be reviewed for average item timings, duplicate responses, and differentially high rates of selected responses for skip controlling questions. For example, for each interviewer, the minimum average item timing should be provided.

Standard 10.9.4 If an interviewer's work is found to be suspect, 100% validation of his/her other cases shall be conducted. Any falsified work shall be refielded and completed by another interviewer.

Standard 10.9.5 Countries shall develop and implement procedures to review audio recordings of each interviewer's work.

> **Guideline 10.9.5** Interviewers will provide the survey institute with audio recordings of at least two full interviews early in the data collection period (ideally their third and tenth interviews). Supervisors will review the audio recordings, using a standardised form developed by the Consortium, and will provide feedback as necessary.

Standard 10.9.6 Countries not using the international CMS shall develop automated reports that the field supervisor and other project management staff can use to detect interviewer behaviour that might indicate falsification. The automated reports should be reviewed at a minimum on a weekly basis.

> **Guideline 10.9.6** The automated reports should include information on the following:

- Interview administration length

- Individual instrument administration time

- Elapsed time between interviews

- Interviews conducted very early in the morning or late in the evening

- BQ and direct assessment competed on different days number of interviews conducted per day.

Standard 10.9.7 All interviewers shall review their hard-copy materials before finalising a case and returning the materials to the survey institute.

Standard 10.9.8 The survey institute shall conduct an extensive review of all completed hard-copy materials (if applicable) and automated interview data to ensure that they meet the project standards for data quality.

Standard 10.9.9 The survey institute shall review data frequencies, missing data, open-ended answers, and the coding of "other-specify" responses.

Quality Control Procedures

As part of the National Survey Design and Planning Report process for the field trial 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 trial 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:*

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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 and response capture 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 on tablets, with an option to include a paper-and-pencil mode in the main study. Scoring sheets will be derived from the paper-and-pencil instruments. (See Section 11.3) In the field trial, reading and numeracy components will be delivered on tablet only.[1] In the main study, components may also be delivered in paper-and-pencil mode, with results captured on response capture sheets. Due to the nature of the stimulus and response formats, 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 of cognitive test instruments as well as the components tasks will require paper-and-pencil administration.

Standards, Guidelines and Recommendations

Standard 11.1.1 All PIAAC scoring/response 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/response 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 and response capture sheets as a result of the scoring/response capture task by consulting the National Data Manager.

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[1] Note that new countries that opt to conduct an operational test of paper administration in the field trial will use a paper-based version of the components assessment.

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/ response capture sheets must be securely stored and archived such that they can be accessed and retrieved using their unique identifier (i.e., PERSID) 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 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 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/response capture sheets (i.e., they will be re-entered by a second key 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 operators will be notified if they attempt to use an already existing PERSID 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 Classifications and 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 or automatic coding of open answer fields, as well as the mapping of predetermined country-specific closed answer responses to the prescribed international standard coding schemes.

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 (mostly international standard) classifications will be used to code country, region, language, industry, occupation, education as well as type of employment contract in the background questionnaire.

- **Country:** 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. Countries will use a combination of open and country-specific closed responses in the BQ; some countries will also use a look-up list (see Section 6.2.1), which should be converted after data collection into UN M49 codes.
- **Region:** 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). Countries not contained in the OECD classification are invited to provide individual lists of national regions for Consortium and OECD approval. Once approved, additional national region codes will be made available in the international codebook by the Consortium. Countries

will use the respondent's address from the survey control file/case management system and convert it into OECD TL2.

- **Language:** 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. Countries will use a combination of open and country-specific closed questions in their BQ (see Section 6.2.1), which should be converted by the countries into ISO 639-3.

- **Industry:** Four-digit codes from the *International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4*, will have to be used to code the sector in which the respondent is working. Countries will use open questions in their BQ, a lookup-list or confirm relevant register information (see Section 6.2.1), and the responses should be manually or automatically coded into ISIC Revision 4.

- **Occupation:** Four-digit codes from the *2008 International Standard Classification of Occupations (ISCO-08)* will have to 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 will use open questions or a lookup-list in their BQ or confirm relevant register information (see Section 6.2.1), and the responses should be manually or automatically coded into ISCO-08.

- **Education:** Four-digit codes based on (but not identical with) the *2011 International Standard Classification of Education (ISCED-11)* will be used to code all items referring to formal education of the respondent. ISCED 2011 provides slightly different codes for educational attainment and educational programs. While current participation in education will be coded in terms of educational programs (PIAAC-P), educational attainment, educational pathways and incomplete education will be coded in terms of attainment (PIAAC-A) in correspondence with the ISCED-P and ISCED-A coding schemes in ISCED 2011 (see UNESCO Institute for Statistics 2012, annex II and III). For the educational attainment of respondents' parents, only the broad levels of ISCED-A (low = ISCED 0-2, medium = ISCED 3-4, high = ISCED 5-8) need to be coded. Further details are available in the "PIAAC Cycle 2: Background Questionnaire Harmonization and Extension Guidelines". Countries will use one or more country-specific closed questions in their BQ, the responses to which will be converted by the consortium into the international education coding scheme as agreed in the education consultation (see Section 6.2.1). After data collection, countries are therefore required to deliver country-specific education variables and codes to the consortium. Countries with complex national adaptations and mappings will need to support the consortium in the conversion process. The orientation of respondent's education (vocational or general) will be derived directly from the international education coding scheme. Based on information on minimum normal cumulative duration of education for each national category agreed in the education consultation, the Consortium will also derive a new variable on years of education. These derived variables will be added to the international dataset.

- **Employment contract:** 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 resulting 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 50% of the occupation and sector of industry data will receive a second (quality control) code by a (different) human coder. The reliability target is 85% agreement at the three-digit level.

> **Guideline 11.2.3A** Each country should train a minimum of two coders. These coders should preferably have extensive experience in coding 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.

Guideline 11.2.3B Some countries may opt to utilise software for automated coding for some or most of their coding. However, even when automated coding is utilized 50% of all codes – independently of whether they result from manual or automatic coding – still need to be double coded by a human coder for quality control purposes.

Quality Control Procedures

The Consortium will provide the international standard codebooks to be used for coding education, occupation, industry, country, region and language data. These documents will be posted on the PIAAC Portal. A training session on coding will also be provided in an NPM meeting (for all concepts except education).

Participating countries will provide a description of their coding system and coding quality control procedures regarding occupation and industry coding.

In countries that use national classifications for coding 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 for industry, a conversion key NACE-ISIC can be provided by the Consortium. The education consultation uses official ISCED 2011 mappings from Eurostat (for EU countries) and UIS (for non-EU countries) to convert national education categories to international codes (even though it is known that these mappings are not always consistent across countries).

Countries will be required to report on the outcome of their coding of the respondent's education, occupation and industry by comparing the distribution in PIAAC Cycle 2 data with the most recent Labour Force Survey or equivalent survey. Countries will be required to account for large discrepancies between PIAAC data and the reference survey and to establish that these are not due to coding (or, in the case of education, mapping) error. Countries should contact their NSM to perform the comparison of the percentage distributions of the external survey data with PIAAC data using the base weights. As the field trial is a non-random sample, this requirement holds only for the main study.

The Consortium will provide the codebook containing the codes for each variable.

11.3 Scoring Paper-and-Pencil Instruments

Purpose

To ensure that scoring of the paper-and-pencil cognitive instruments is consistent across scorers both within and across countries, for those countries that opt to include the paper booklets in the main survey. Administering paper booklets will not be required in the main study, but rather will be an option that countries may select based on their national response rates to the tablet delivery in the field trial or other national criteria.

Rationale

Accurate and reliable scoring is a key component of quality control for PIAAC. Human scoring is required to determine whether respondents have correctly answered the questions in the core, literacy and numeracy paper-and-pencil booklets. The reliability of scoring is established by rescoring a portion of the responses, as well as through careful monitoring of scoring results. These steps are required as quality-assurance measures to determine whether scorers are applying the scoring rubrics consistently.

A within-country reliability study will be implemented during the main study to check the consistency of scoring. This study will require a second scorer to rescore a set of paper-and-pencil booklets and monitor the agreement rate. The purposes for rescoring are to: (i) document the degree of agreement between the scorers; and (ii) identify items and scorers that have low inter-rater agreement (i.e., low consistency). The outcomes may indicate that a particular scorer's performance accounted for lower rescore reliability.

An across-country reliability study will be implemented to examine systematic scoring bias across those countries administering the paper booklets. This study will require bilingual scorers (fluent in the national language and English) to score English-language international anchor booklets to ensure the equivalence of scoring across countries. Results will be monitored by comparing the scores of these two bilingual scorers against the master scores for accuracy. Inaccurate scores should be investigated as any systematic deviations may require that country scores be corrected.

Standard 11.3.1 To achieve the goal of comparability, each country must score all paper-and-pencil cognitive booklets in a manner that is consistent both within and across countries. The detailed main study coding design and coding procedures will be described in a scoring procedures manual to be released prior to the main study.

> **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 will be required to rescore a set of cognitive booklets following the design and procedures described in the scoring procedures manual.

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, each of whom will score a set of English-language international anchor booklets. The two sets of scores for the anchor

booklets will be used by the Consortium to calculate inter-rater agreement across countries. The design and procedures for this study will be described in the scoring procedures manual.

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 trial (for new countries conducting a small operational FT with paper-based instruments) 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.

The Consortium will provide countries with a software tool that supports and facilitates the observation of within country inter-rater reliability.

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, in some cases, the paper-based cognitive instruments). Most of the PIAAC data will be collected on the PIAAC delivery system 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 case 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 international 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 case 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 international 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.

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 case management system (e.g., ID numbers, selection probabilities, screener disposition codes);

- Assessment design meta and workflow data from the PIAAC delivery system (e.g., random assignments, branching and sequence of adaptive measures);

- Background questionnaire (BQ) responses from the PIAAC delivery system;

- 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 PIAAC delivery system;

- Auxiliary and audit information from the PIAAC delivery system (e.g., time taken, number of activities,);

- Scoring of paper-and-pencil booklets, where applicable (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 PIAAC delivery system, 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., IEA 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 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 code data are recorded for every case (household or person), including those that do not start the interview, and for checking that disposition codes are in agreement with the availability of BQ and assessment responses (tablet computer based assessment or paper based assessment). 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 the PIAAC delivery system 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 delivery system, 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 PIAAC delivery system.

Guideline 12.2.2B All adaptations must be thoroughly tested prior to the production use of the data integration software (IEA 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 from a data and coding perspective before they are implemented.

The software will have built-in check routines that will provide information on the consistency of the entire database. Each country will be required to conduct and review these checks 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, as well as cross-tabulations 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 trial 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 upon 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, 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 (such as the General Data Protection Regulation [GDPR] as applicable) 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 trial 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 tablet 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 PIAAC portal 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 PIAAC portal 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 PIAAC portal and PIAAC delivery system must sign non-disclosure agreements.

Standard 13.2.7 Protection of the PIAAC software and results data is a national responsibility.

Recommendation 13.2.8A Tablets used by interviewers should be protected from unauthorised access. Interviewers should be trained to keep tablets in a secure place when not in use. Strong passwords should be required to log into interviewer tablets and access the PIAAC software.

Recommendation 13.2.8B Tablets used by interviewers should be protected via whole disk encryption, such as Bitlocker or TrueCrypt.

Quality Control Procedures

Before the field trial, 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 an example of a 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 PIAAC Portal set up and managed by the 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 trial 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 interviewers, must understand the importance of maintaining respondent confidentiality and data security to ensure that there are no compromises to the data. Furthermore, interviewers 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, 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.)

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 tablet computers, keeping passwords separate from the tablet computer and using the tablet computer only for PIAAC-authorised activities.
>
> **Guideline 13.4.2B** Interviewers must be trained to keep tablet 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 trial 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 the details of the data collection security plan as part of the quality control monitoring requirements.

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 commercial 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, 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 trial 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 details of their security plans as part of the quality control monitoring requirements.

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 trial (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 (e.g., GDPR where applicable) 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) 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 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 (where applicable, e.g., satisfying the GDPR) affect (1) the microdata files used by the Consortium and the OECD after the field trial 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.

> **Guideline 13.6.2A** Countries should keep confidentiality edits to a minimum and only apply such to the extent necessary to comply with national legislative requirements (e.g., adhering to the GDPR).

> **Guideline 13.6.2B** Countries should actively participate in Consortium/OECD led process to harmonise measures and to create new commonly, i.e., across all countries, used derived variables if necessary.

Standard 13.6.3 One of the fundamental objectives of PIAAC is to provide data for comparative analysis. The members of the BPC re-affirmed the principle 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 trial 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)[1]

Name: _____

Phone number: _____

E-mail: _____

Address: _____

_____

This is to certify that I, _____, have agreed to provide linguistic services[2] (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, 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 _____

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[1] This heading should be adapted for other project staff as appropriate.

[2] 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.

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 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 completed cases, as defined in Standard 4.3.3, and all completed doorstep interviews.

>   **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

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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. More information is provided in the PIAAC Weighting and Variance Estimation Plan.

Recommendation 14.3 For more information on weighting, refer to the PIAAC Weighting and Variance Estimation Plan in the PIAAC portal.

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. Literacy-related nonrespondents at the BQ stage can be represented by those that complete the doorstep interview.

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.[1]

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[1] For weighting purposes, imputation can be used only on variables used in forming weighting cells, or when calibrating the weights using BQ 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.

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 trial 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 International File Layout for Benchmark Totals*.

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, aligned with the *Weighting International File Layout for Benchmark Totals in the PIAAC portal,* 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 The Consortium will deliver the weights to countries according to the *Weighting International File Layout for Quality Control Checks* and the *Final Weighting International File Layout*.

Guideline 14.7A The *Weighting International File Layout for Quality Control Checks* in the PIAAC portal contains the weights at each stage, and should be used by countries to perform quality control checks on the weighting process. Countries are responsible for reviewing the weights and providing final approval.

Guideline 14.7B The *Final Weighting International File Layout* in the PIAAC portal contains the final weights and will be used by the Consortium for data processing and estimation.

Recommendation 14.7 See *Quality Control Procedures* for recommended checks on the weights.

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 14.8** Countries must provide the data necessary for creating replicate weights, as specified in the Sample Design International File Layout.

> **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, the Consortium will fill in the remaining replicates by setting them equal to the full sample weight. However, the number of active replicates will be specified in the *Final Weighting International File Layout*, 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.

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, countries will be required to specify their plans for providing the Consortium with the variables needed for the weighting process.

During the weighting period, the Consortium will report on each country's 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.

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 measures of precision for PIAAC population estimates – such as variances, standard errors and coefficients of variation – will be computed using the replication method and will account for both sampling and measurement error components (through the plausible values).

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

  — Country-Specific Objectives

- Special Population Subgroups

- Sample Design and Selection

  — Target Population

  — Sampling Frame

  — Sample Size

  — Sample Design

  — Sample Selection

  — Response Rates

  — Respondent Incentives

  — Sample Monitoring

- Survey Instruments

  — Country-Specific Supplemental Background Questionnaire Items

  — Selected National Option for the Assessment

  — Translation, Adaptation and Verification

- Information Technology

- Field Management

  — Organisation of Data Collection Staff

  — Supervision and Monitoring

  — Recruitment and Hiring of Data Collection Staff

- Data Collector Training

  — Supervisor Training

  — Interviewer Training

- Data Collection

  — Contact Procedures

  — Promoting Respondent Participation and Obtaining Specified Response Rates

  — Case Management System

  — Quality Control of Fieldwork

- Data Processing

- Confidentiality and Data Security

- Estimation

  — Weighting

  — 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.