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Implementation in Diverse Settings of the Literacy Assessment and Monitoring Programme (LAMP)

Lessons for Sustainable Development Goal 4 (SDG 4)

UNESCO

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P.O. Box 6128, Succursale Centre-Ville
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Tel: +1 514-343-6880
Email: uis.publications@unesco.org
http://www.uis.unesco.org

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Foreword

With the adoption of Sustainable Development Goal 4 (SDG 4), the world has pledged to provide inclusive and equitable quality education and the promotion of lifelong learning by 2030. Five of the ten targets of the global education goal focus on learning, with Target 4.6 specifically stating that all youth and a substantial portion of adults should achieve literacy and numeracy.

As the official source of cross-nationally comparable education data, the UNESCO Institute for Statistics has been given the mandate to produce a new generation of indicators on education quality, equity and learning, including reading and numeracy skills. The indicators will be used not just to monitor progress but to help countries and the wider international education community better target their policies and initiatives to achieve SDG 4.

Clearly, no single organization can achieve this alone so the Institute works with a wide range of partners – including policymakers, national statistical offices, technical experts, international and regional organizations, as well as donors and civil society groups – through a series of initiatives, such as the Global Alliance to Monitor Learning, the Technical Cooperation Group on SDG 4-Education 2030 Indicators and the Inter-Agency Group on Education Inequality Indicators. Through this collaborative approach, we are developing the methodologies, metrics, data sources and consensus needed to measure learning outcomes globally, with a specific focus on functional literacy skills among youth and adult populations.

The challenges are daunting, at times, but far from insurmountable. Instead of trying to "re-invent the wheel", we are building on the tremendous efforts made over the past 20 years. In particular, a growing number of countries are conducting learning assessments and many have found innovative ways to transfer this experience, which has mostly focused on the achievement of schooled individuals, into the realm of adult literacy.

While these experiences set the foundations for the new international statistical work in literacy, they are limited to a rather small set of affluent countries, mostly OECD Member States. To monitor and achieve SDG 4, we must focus on the vast majority of countries that face very different circumstances, priorities and challenges in terms of literacy skills.

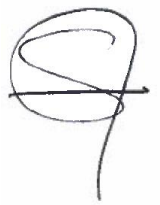
We can therefore learn from the experience of the Literacy Assessment and Monitoring Programme (LAMP), which was first launched by the UIS in 2003 to develop (on the basis of previous experiences) a methodology that could be used beyond the realm of European languages and industrialised countries to inform governments, education and learning experts, and the community in general about what people are actually able to do when confronted with written materials.

LAMP can be seen as a methodological endeavour into uncharted territory. The need to provide sound information, especially concerning the least-skilled in a population or those who are "learning to read", posed several challenges. One of the major challenges stemmed from the fact that the process of acquiring reading skills is strongly influenced by the specific characteristics of the languages and scripts used by a given population. Thus, LAMP had to contend with a significant amount of diversity, which also applies to the institutional dynamics in each of the countries the UIS had partnered with.

As we move forward with the SDG 4 indicators, it is important to release this report and learn from the experiences and results of LAMP. This report shows the complexities of a diverse group of countries, who face very different challenges but share a common commitment to address the specific needs of their adult populations in terms of literacy skills. Through LAMP, we gain a unique perspective on the diversity of human literacy experiences.

This report was made possible thanks to the commitment of the different national teams responsible for implementing LAMP. Their contributions were further enriched by a team of specialists within and outside the UIS. Together, the report team brings a unique and pragmatic view on how to resolve the technical issues that will certainly arise in producing the data needed to monitor SDG 4. The UIS is deeply grateful for these contributions that have allowed us to explore this uncharted territory successfully through the identification of some key challenges as well as their solutions.

The information presented in this volume shows that literacy challenges are extremely complex and that this complexity cannot be overlooked by societies that are committed to guaranteeing the universal right to education. At the same time, despite the difficulties encountered when trying to measure and compare results, the report shows how information generated following a sound approach and meeting basic quality standards can provide significant clues as to how those challenges can be addressed. It also shows that the methodology, with the necessary adaptations, can be used across different cultures, languages and scripts.



Silvia Montoya
Director
UNESCO Institute for Statistics

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- The LAMP national teams in Jordan, Mongolia, Palestine and Paraguay, countries for which data are included in this report.
- The LAMP national teams in Afghanistan, El Salvador, Morocco, Niger and Viet Nam, where the LAMP field tests were completed, but for different reasons main assessments have not been conducted as of today.
- The team in the People's Democratic Republic of Lao, which has completed the LAMP main assessment and disseminated the data.
- Statistics Canada and the Educational Testing Service (ETS), which provided invaluable support, especially in the first years, by sharing their experience in previous studies and authorising the UIS to use some copyrighted materials.

We would especially like to thank the Members of the LAMP Global Advisory Board for offering their time and expertise on a pro bono basis over the course of several years. Their insightful and challenging contributions made our annual meetings an invaluable source of inspiration, encouragement and ideas to ponder. Likewise, the UIS would like to thank Matthew Johnson, Ismael Sanz Labrador, Francisco Javier Garcia Crespo, Ruth Martín Escanilla, Luis Sanz San Miguel, María Elena Brenlla, Pierre Brochu, Luis Crouch, Sheren Hamed, Anthony Nitko and Seamus Hegarty, who reviewed the report.

Finally, this report is dedicated to all LAMP respondents in all countries, who literally opened their homes to us; told us about their education, their work, their leisure and their households; and showed us some of the things they can (or cannot) do with written words and numbers. They did this with the understanding that this project would help improve the quality of education in their countries (and maybe in other countries as well). We are all indebted to each one of them.

Abbreviations

ALL	Adult Literacy and Lifeskills Survey
CONFINTEA	International Conference on Adult Education
OECD	Organisation for Economic Co-operation and Development
DGEEC	General Direction for Statistics and Censuses (Paraguay)
DIF	Differential Item Functioning
DOS	Department of Statistics (Jordan)
EFA	Education for All
ETS	Educational Testing Service
GDP	Gross Domestic Product
GED	Global Education Digest
GMR	Global Monitoring Report
GRALE	Global Report on Adult Learning and Education
HDI	Human Development Index
IALS	International Adult Literacy Survey
IEA	International Association for the Evaluation of Educational Achievement
IRT	Item response theory
ISCO	International Standardized Classification of Occupations
ISRS	International Survey of Reading Skills
KNALS	Kenya National Adult Literacy Survey
LAMP	Literacy Assessment and Monitoring Programme
LCA	Latent class analysis
MECS	Ministry of Education, Culture and Sciences of Mongolia
MOE	Ministry of Education
NAfKE	National Assessment for Knowledge Economy (Jordan)
NALS	National Adult Literacy Survey
NCHRD	National Centre for Human Resources Development (Jordan)
OEI	Organization of Ibero-American States

PCBS	Palestinian Central Bureau of Statistics
PDN	Prose, Document and Numeracy
PIAAC	Programme for the International Assessment of Adult Competencies
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
RC	Reading Components
RCA	Reading Components assessment
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SES	Socio-economic status
STEM	Science, Technology, Engineering and Mathematics
STEP	Skills towards Employment and Productivity
TIMSS	Trends in International Mathematics and Science Study
UIS	UNESCO Institute for Statistics
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WHO	World Health Organization
WLE	Weighted Least-Squares Estimation

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Executive Summary

In 2003, the UNESCO Institute for Statistics (UIS) started the Literacy Assessment and Monitoring Programme (LAMP) in partnership with several countries and organizations in order to develop a new methodology for measuring literacy and numeracy skills among youth and adults (aged 15 years and up) to improve the available body of statistical evidence. Its design was inspired by surveys conducted mostly in member countries of the Organization for Economic Co-operation and Development (OECD): the International Adult Literacy Survey (IALS) and the Adult Literacy and Lifeskills Survey (ALL), which are thus far the most significant efforts in cross-national measurement of literacy and numeracy. Addressing their strengths and weaknesses helped shape LAMP in its early years.

LAMP was designed with UNESCO's notion of the "plurality of literacy" in mind, which emphasises the social, economic and cultural bounding of literacy. It explores the distribution of different skills among populations and the need to use those skills in everyday life situations. Therefore, LAMP can meaningfully inform about core elements of people's right to education.

What does LAMP measure?

LAMP tests in three domains: reading of continuous texts (prose), reading of non-continuous texts (document) and numeracy skills. Prose skills enable individuals to read texts organized in paragraphs, with indentation and headings that reveal its structure and purpose. Document skills are applied to non-continuous texts in different formats (tables, schedules, charts, maps, etc.) where readers can use different strategies to enter and extract information. Finally, numeracy skills enable individuals to perform short mathematical tasks that require computing; estimating; and understanding notions of shape, length, volume, currency and other measures. The assessment tasks are intended to be meaningful to respondents in everyday life settings: home and family; health and safety; community and citizenship; consumption; work; and leisure and recreation.

In addition to these three domains, LAMP explores factors associated with lower performance in order to gain useful information for literacy interventions. In fact, the UIS specifically commissioned an original framework for the measurement of reading components. Assuming that reading requires both word recognition and comprehension skills, this module tests how people apply these skills to process written texts. The ability to name letters and numbers, process sentences rather than just decoding words and read paragraphs fluently are proficiency indicators that describe the population according to their reading skills.

Finally, LAMP also gathered data on each respondent's socio-economic background and use of written materials in various daily-life contexts, thus providing key analytical elements to characterise the population.

Assessment development approach

The procedures that the UIS applied during the development of this assessment assured that LAMP would be:

- Comparable across countries, languages and scripts (for reading and numeracy skills)
- Country-, language- and script-specific (for pre-reading skills)
- Country-specific for socio-economic and socio-demographic information.

For each of the three domains (Prose reading, Document reading and Numeracy), LAMP used item response theory methodology to develop the assessment scale. This allowed all countries' results to be placed on the same metric for easy comparison. LAMP also divided the metric for each domain into three performance levels so that scores on the metric could be described in terms of the specific literacy or numeracy skills that the score represents. These levels of performance are progressive (or developmental) in the sense that if a person scores at a higher level, all skills described as lower level performances can also be performed along with those at the higher level. Chapter 3 defines the skills persons scoring at each performance level can perform.

The metric and performance levels that LAMP provides cannot be used to create literacy rates. LAMP measures literacy and numeracy on a continuous metric. Therefore, it does not produce dichotomous results that are converted easily into a 'rate'.

Household-based assessment

It should be noted that LAMP assessed literacy and numeracy using a household-based sampling design. Following a carefully designed sampling plan, households were randomly selected to represent the demographics of a country. Then, within a selected household a randomly selected adult (15 years or older) was administered the LAMP assessment individually. This process is unlike school-based assessments that assess students within selected schools. It is also unlike general household surveys for which literacy assessment is not the main intent but which might include a small module for collecting information on literacy as part of a broader data collection effort.

LAMP items were derived from several sources and revised for new field testing using input from participating countries. Among the sources were items from the International Adult Literacy Survey (IALS) and the Adult Literacy and Lifeskills Survey (ALL), items especially written for LAMP by participating countries with the intention of using them across all countries, and items that were developed specifically for use within a specific country.

Fieldtesting LAMP

The LAMP assessment items were field tested in eight countries with a wide array of languages and scripts (from 2006 to 2010). Languages and scripts included Arabic (Arabic script), Mongolian (Cyrillic script) and languages with a Roman script – French, Fulfulde, Hausa, Kanuri, Tamasheq, Zarma, Spanish and Vietnamese. Field testing in this diverse context allowed the development team to improve the items and to select items that, when adapted and translated, functioned well across several countries.

Final design of LAMP

The final design of LAMP consists of a battery of instruments that includes: i) Background Questionnaire; ii) a filter test to determine whether a lower or higher level test is appropriate for an individual; iii) Module A for lower performance assessment; iv) Reading Components for assessment of pre-reading skills that are lower than Module A; and v) Module B for higher level performance assessment.

Countries implementing LAMP

Four countries implemented the final version of LAMP on a sampling basis: Jordan, Mongolia, Palestine and Paraguay. Participant rates were high – in fact, they were above average rates for other international adult literacy assessments.

General findings of the LAMP study

Identifying participants' skills

The findings of the LAMP assessment for the four countries can be summarised by describing the estimated percentages of the countries' populations that perform at different levels in Prose reading, Document reading and Numeracy.

With regard to Prose reading the distribution of respondents in the four countries is as follows:

a. Level 1. Less than 30% of respondents could only: Identify literal, concrete information in reading-to-do passages (e.g. job vacancy notices, product labels and vaccination information) or simple one-paragraph passages.

b. Level 2. 41% to 51% of the respondents could do everything in (a) above and in addition could: Identify literal information in reading-to-do or reading-to-learn passages. Respondents could paraphrase, understand more 'academic' language and write full-sentence answers.

c. Level 3. 20% to 31% of the respondents could do everything in both (a) and (b) above, and in addition could: Identify literal information in longer, more challenging reading-to-learn texts (1-10 paragraphs) with linguistically dense passages or when the required information is in the middle or end of the passage.

With regard to Document reading in the four countries:

a. Level 1. Less than 35% could only: Identify a single piece of information in a simple reading-to-do or reading-to-learn document (passages, graphs or tables)

b. Level 2. 35% to 54% of the respondents could do everything in (a) above and in addition could: Understand reading-to-learn graphs or tables that included two or three variables with descriptive labels, compare or contrast numerical information or processes, and coordinate and match parallel information (e.g. time and activity data in one table).

c. Level 3. 21% to 38% of the respondents could do everything in both (a) and (b) above, and in addition could: Understand complex documents and integrate information from complex sources (densely packed tables, multiple graphs in order to identify numerical values, given a set criterion); and fill out complex forms by turning personal data into categorical variables.

With regard to Numeracy in the four countries:

a. Level 1. 36% or fewer of respondents could only: (i) answer explicit questions requiring a one-step, simple operation; (ii) add 3 whole numbers with 2-3 digits, or with decimals in a 'money' context; and (iii) subtract 2 whole or decimal numbers in a 'money' context.

b. Level 2. 42% to 45% of the respondents could do everything in (a) above and in addition could: (i) complete tasks involving some fractions and decimals; (ii) understand and use some simple fractions such as one-half (½) written with numbers or words; (iii) demonstrate some understanding of the meaning of decimal numbers; and (iv) multiply a decimal number and a whole number.

c. Level 3. 22% to 38% of the respondents could do everything in (a) and (b) above, and in addition could: (i) perform multiple-step operations; (ii) subtract a percent from an initial value; (iii) find a proportion by combining operations in a money context; (iv) add 3 numbers after computing 2 of them through multiplying by 10 or 2; (v) read time using clocks or in numeric form; (vi) interpret qualitative or quantitative data from tables or price tags with percents, decimals and whole numbers; and (vi) represent money and weight.

Country averages

For the four countries, most national averages were similar to one another in all three domains. Countries' averages in each domain were in the Level 2 range. Few of the small differences between national averages were statistically significant. Although different countries did slightly better in different domains, no individual country stood out across all domains. However, a country's averages do not describe the distribution of skills that its citizens possess.

Each country will need to consider whether the distribution of skills across the three LAMP levels is appropriate for its national literacy and numeracy goals. As noted previously, approximately a third of a country's adult citizens can perform the higher level skills assessed by LAMP. Is this level of performance sufficient for a country to continue its current and future economic and social growth? This is a question policymakers will need to discuss, especially as new technologies may become important for a country's development. New technology requires more skills in reading documents and working with quantitative information (numeracy) than has been the case in the past.

Findings related to socio-demographic variables

LAMP results in the three domains were correlated with several socio-demographic variables:

- Educational attainment. In all countries, average LAMP performance in all three domains is higher for respondents with higher levels of education. In numeracy, significant percentages of those with a primary education or less scored at LAMP Level 2 or higher in three of the four countries participating.

- Sex. Men scored higher than women in numeracy in all countries even when scores were adjusted for levels of educational attainment. For prose reading, after taking educational attainment into account, women generally had an advantage over men. In document reading, after taking educational attainment into account, the men had an advantage over women.

- Age. When the full range of age was plotted against LAMP scores, there was a downward curvilinear relationship. In all four countries' scores, on all domains, there tended to be a slight peak in performance around age 35, then scores dropped as age increased.

- Parents' education. Participants with parents who attained post-secondary education scored significantly higher than participants whose parents had lower educational attainment.

- Parents' occupation. Participants with parents in high-skilled occupations also scored higher in all LAMP domains, even after adjusting scores for the participants' own educational attainment. The differences, however, were small.

- Socio-economic status. Participants whose parents had the highest socio-economic status scored higher than participants whose parents had the lowest socio-economic status, after adjusting the scores for the participants' own level of educational attainment.

- Location. Participants from urban areas scored higher on average than participants from rural areas, after taking into account the participants' levels of educational attainment. However, after adjustment the differences between urban and rural participants became very small.

- Use of technology. Participants who used mobile phones had higher scores than participants who relied solely on media broadcasts. In addition, those using computers had higher scores than those using only mobile phones. This advantage for computer users persisted even after adjusting for educational attainment – though the advantage in mean difference was much smaller after adjustment.

- Employment status. Participants who were employed had higher scores than unemployed participants, even after taking into account educational attainment.

- Occupational level. Participants with high-skilled occupations had higher LAMP scores, although this advantage became very small after adjustment for educational attainment.

- Use of skills at work. The more participants used their reading and numeracy skills in their work, the higher were their LAMP scores. This advantage persisted in most countries when scores were adjusted for education level of the participants although, here again, the advantage was not great.

Thus, LAMP scores are related to many socio-demographic variables but the relationships are generally less strong after participants' educational attainment levels are taken into account. Education seems to be the key factor to attaining literacy and numeracy as measured by LAMP.

LAMP data suggest that policies aimed at increasing gender parity in the distribution of reading and numeracy skills should go beyond school attendance. Those policies should also target increased participation of both genders in the labour market and the use of skills both at work and for leisure.

As access to schooling approaches gender parity, female employment rates are still lagging behind those of males.

As for literacy practices for leisure, they have the potential to help narrow the gap in the other two skills domains. This type of use seems to be relatively gender-neutral as compared to the workplace. Policymakers should find ways to foster it not only among females but also among older respondents and rural residents – older rural women, in particular.

In-depth study of the language variable in Paraguay

The LAMP performance in Paraguay was studied in more detail, especially in relation to bilingualism. Native Spanish-speakers outperformed other respondents by at least 50 points (half a standard deviation) in all LAMP domains, before controlling for other factors. After introducing a number of control variables (sex, age, location, parental occupation, maternal education, respondent's years of schooling, literacy practices at home and occupational skill demand), this advantage is substantially reduced (to 12-15 points) in Prose and Document reading, and it ceases to be statistically significant in Numeracy.

This has some important implications. For those who have sufficient command of the Spanish language, having a second mother tongue, which in most cases is Guarani, is associated with higher performance in at least one domain (Document reading) or even two (Numeracy and Document reading). This is an important finding as the advantage of having Spanish as a mother tongue may be wrongly perceived as a disadvantage of having Guarani as a mother tongue. No such disadvantage is found in LAMP data. In fact, as mentioned before, for those speaking Spanish well enough, speaking a second language at a similar level of proficiency (whether this is Guarani or another language) is associated with higher performance in at least one domain.

Thus, the relationships between language and literacy are complex but certainly relevant for policy purposes in the Paraguayan case. LAMP could be used to study other bilingual situations where more in-depth information is relevant to policymaking.

Conclusions

All in all, LAMP demonstrated that measuring adults' prose and document reading and numeracy with a household-based assessment can be done well and that the results from several countries can be placed on a common metric that allows comparison. The metric can be related to specific literacy and numeracy skills so that scores on it can be interpreted by describing the distribution of a country's adult population in relation to their ability to perform these skills. The distribution of the population over each level of competence in prose and document reading, and in numeracy may have more important implications for policy and intervention programmes than simply the study of average results. For countries wishing to use the LAMP approach, details can be found in a technical annex that is a companion to this report. It would also be advisable to contact the UIS learning outcomes unit for more information and guidance.

Chapter 1. Introduction

Literacy is at the heart of the fundamental human right to education. Reading, writing and computing are essential to enabling people to learn continuously throughout their lifespans; to exercise other fundamental rights; to possess agency; to store, retrieve, and communicate information, ideas and expectations; to be more productive; and to access a broader set of opportunities that are instantiated in written form using specific languages and scripts. It is not only a right but a constituent of essential freedoms.

Literacy is a manifold phenomenon that cuts across the lives of individuals, families, local communities and nations. No statistical measure can encompass literacy and capture it in all its complexity. Thus, a quantitative effort to capture literacy should aim at maximising the quality of the information generated – in terms of both its usability and sound technical attributes – while making users fully aware of its limitations.

1.1 Literacy Assessment and Monitoring Programme (LAMP)

The UNESCO Institute for Statistics (UIS) developed a quantitative methodology for assessing literacy and numeracy with the cooperation of several countries over a period of six years (2006-2011). This methodology, called the Literacy Assessment and Monitoring Programme (LAMP), is described in this country summary report along with the results of its application in four countries: Jordan, Mongolia, Palestine, and Paraguay. This report presents a look at literacy and numeracy through the LAMP lens. Although it only manages to scratch the surface of this wealth of data, it aims to provide the lessons that may be drawn to inform policy as the ultimate goal.

1.2 The scope of LAMP

In defining the scope of LAMP, the UIS identified key factors that would be amenable to statistical treatment based on available tools, standards and techniques. The purpose was to maximise the information that could be obtained from an educational assessment while focusing on some main areas.

LAMP was developed to yield sound information on:

- reading (prose and document) and numeracy skills of individuals
- pre-reading skills of those who are "learning to read"[1]
- individuals' perceptions about their reading, writing and computing abilities
- inequities in the distribution of skills across different subpopulations
- literate environment and the sustainability of skills
- associations between the different variables that LAMP measures.

[1] The expression "learning to read" is generally used to refer to those individuals who have not yet mastered reading competency.

The findings of LAMP shed light on core elements needed to manage written materials. In other words, LAMP was created to yield information in three domains:[2]

- Reading skills: expressed as the ability to decode various texts (i.e. continuous phrases/paragraphs called 'prose literacy', and schematic texts, such as those included in forms, maps or timetables, called 'document literacy').

- Numeracy skills: expressed as the ability to perform basic arithmetic operations and calculations.

- Reading Components: Exploration of the elements that could explain low performance, referred to as reading components. These are the basic operations involved in decoding and understanding texts and numbers (i.e. alphanumerical perceptual knowledge – letter and number recognition, word recognition, vocabulary, sentence processing and passage fluency).

Therefore, LAMP focuses on reading and leaves writing aside. Reliably testing reading skills is demanding enough on respondents to the battery of instruments required. Including a module on writing would only add complexity that might compromise the whole effort.

LAMP is implemented as a household assessment rather than a household survey. It is not a separate module that can be attached to a household survey designed to collect other information. In typical household surveys, households are sampled and information is gathered about the household on a number of variables. In LAMP, households within a country are selected according to an appropriate sampling plan, then a member of the household who is 15 years or older is selected at random and LAMP is administered to that person to assess the person's literacy and numeracy.

The procedures that the UIS has applied in the development of this assessment assure that LAMP is:

- comparable across countries, languages and scripts (for reading and numeracy skills)
- country-, language- and script-specific (for pre-reading skills)
- country-specific (for socio-economic status and some other socio-demographic information).

On the other hand, LAMP does not assess or evaluate:

- writing skills (although respondents use writing to answer reading and even numeracy items)
- oral language skills (although respondents are required to use these skills in the assessment)
- the effectiveness of literacy programmes or other educational programmes (although it collects information regarding the enrolment of respondents in such programmes)
- social or community practices that involve the use of written materials.

The fact that LAMP does not cover certain areas does not mean they are not relevant. Rather, the LAMP approach was not suitable to address them or including them would have rendered the project unfeasible by demanding too much from respondents and/or national teams.

The details on the construction and contents of the LAMP assessment are described later in this report.

[2] Chapter 2 provides more complete descriptions of the domains mentioned here.

1.3 Why LAMP was developed

In particular, the assessment strives to address two major needs: i) to describe the actual distribution of reading and numeracy skills of people within a country; and ii) to explore in detail the current level of abilities of those at the lower end of the distribution scale.

The first need results from understanding literacy as a complex set of skills that exist over different continua (reading, numeracy) which are not theoretically commensurate, and therefore, not representable as a unique dimension. These trends became evident at the Sixth International Conference on Adult Education (CONFINTEA VI) held in Belém do Pará, Brazil in 2009, where participants agreed to the *Belém Framework for Action*, which states that: "we commit ourselves to … ensuring that all surveys and data collection recognise literacy as a continuum… [and] investing in a process to develop a set of comparable indicators for literacy as a continuum and for adult education" (UNESCO, 2010b, p. 38 and 41). This view applies not only to assessment but also to instruction: "Effective programmes approach literacy as a continuum, where learning is a continuous process both within and outside educational settings, and throughout life" (UNESCO, 2013, p. 9). "In the case of the International Adult Literacy Survey (IALS) and LAMP, the broad and multi-dimensional definition of literacy was broken down into three domains: reading, writing and numeracy. Each can be seen as a continuum of skills that can be further differentiated into sub-dimensions" (p.25).

Providing this type of information requires a particular variety of data collection – an education assessment. Over the past years, some countries have employed different strategies to help improve their understanding of literacy levels: adding questions to their population censuses or household surveys, conducting specific studies, etc. Nevertheless, producing reliable information on reading and numeracy skills entails paying attention to a complex set of elements that if overlooked can easily compromise the validity and reliability of any measurement effort.

For instance, a straightforward approach could consist of asking respondents in a household survey to read aloud a simple sentence and for the interviewer to provide a score using some specific rubric. If the scoring rubric defines a correct response as any instance where the respondent is able to utter a plausible pronunciation of the sentence, there would be a serious validity issue: sounding a sentence shows the ability of a person to decode a text, and while decoding is a central ability underlying the capacity to read, it is distinct from it. Reading entails grasping meaning and not just sounding written words.

Furthermore, when testing different populations (within a single country or across countries), it is reasonable to assume that they are not homogeneous in terms of their exposure to texts of different nature. A 'simple' sentence about an everyday life situation will not be equally simple to everyone in the target population, thus yielding information that will be biased. A single-sentence-test is not a reliable test at all.

For reasons like those mentioned above, testing literacy skills cannot be accomplished just by adding a few questions to an existing household survey. Further challenges appear when we attempt to generate information that would be comparable across countries, languages and scripts.

The field of educational assessment has developed extensively over the past decades and as a result of this process, standards have already been identified for the proper design and implementation of such an enquiry. Postlethwaite (2004) summarised most of these elements. LAMP adheres to these standards while applying and adjusting some of them since LAMP is not a school-based survey and cannot be expected to function as one.

1.4 Commonality and differences between IALS/ALL and LAMP

The similarities and differences between IALS/ALL and LAMP are:

- Institutional discourses and intentionality: LAMP and IALS/ALL are based on different organizational settings. IALS and ALL were developed by the Organisation for Economic Co-operation and Development (OECD) to address increasing concerns about competitiveness and the importance of skill development in the current economy. LAMP does not preclude economic emphases on skill development but is based on the broader set of foundations provided by the principles, values and mandates of the UN system.

- Cultural diversity: IALS and ALL were conducted primarily in OECD countries and exclusively in European languages. The introduction of testing in other contexts poses several challenges that IALS does not address. LAMP was developed with an awareness of these issues and promotes the value of diversity. LAMP's approach has to avoid any form of ethnocentrism, which was less of an issue for international studies conducted in countries sharing basic commonalities, such as those belonging to the Western world. While IALS and ALL were conducted mainly in industrialised countries with European languages written in the Roman alphabet, LAMP focuses on developing countries with a wider array of language families and scripts.

- Country ownership: Country ownership is a major concern for LAMP. The involvement of UNESCO's Member States is a key element to ensure diversity and an adequate institutional support. It must be stressed that LAMP is not a private endeavour. UNESCO, as an international civil service organization, is mandated to protect the public interest. Therefore, LAMP and all of its components must be regarded as a public good. Of course, some elements must be kept confidential to protect the integrity of the whole effort but this is inherent to testing and is not a way of protecting a private interest.

- Statistical evidence and the complexity of literacy: LAMP has been developed with the understanding that statistical evidence can provide a significant input for policymaking but it cannot be treated as the only evidence that matters. Literacy is a complex and manifold phenomenon (e.g. Street, 1998; UNESCO, 2004) and while data can provide significant insight, they are not necessarily sufficient to provide a detailed understanding. Therefore, other approaches are welcome even if the UIS, given its specialization as a statistical agency, would not be expected to play a role in them.

- An international study design versus the need for the self-reliant and sustained production of data: LAMP was conceived primarily as an attempt to enable countries to produce more robust data on literacy in a sustainable and self-reliant manner. UNESCO has produced a number of statistical tools over the past decades that countries have been using independently to build and develop their own statistical systems in fields such as education. LAMP is one of those tools. Thus, the ultimate goal of LAMP is not to produce an international report but to contribute to the development of national capacities.

- The universe of skills to be measured: LAMP shares with IALS/ALL a common approach to three operationally defined domains for measuring literacy skills: prose, document and numeracy. This is framed by two major factors: i) the robustness of defining those domains as central elements for measurement; and ii) the need to have a common ground for comparisons. Thus, LAMP shares with IALS/ALL the frameworks required to define what is measured. Both measure the same domains in similar ways. At the same time, LAMP makes a sustained effort to ensure that cultural and power-related issues are explicitly dealt with.

- Reading components: In order to improve the potential benefits of LAMP data in policymaking, the systematic observation of people's abilities in relation to basic reading components was introduced in the design. LAMP is the first international attempt to study these abilities in a diversity of languages. This feature is unique to LAMP and differentiates it from any existing international study. It makes the programme particularly valuable as it allows countries to identify which skills negatively affect performance when they are lacking, thereby providing critical information for designing policy interventions. The reading components module of LAMP introduces a dimension that is strongly intertwined with the specificities of each language and script used in the assessments. In addition to its own potential for the generation of information, the reading components of LAMP are a reminder against ethnocentrism.

1.5 Foundation of LAMP methodological choices

The *Belém Framework for Action* presents the "key elements for understanding literacy today: (a) literacy as a continuum; (b) sustainable literacy as a target; (c) literacy as an empowering tool that enables participants to continue as lifelong learners; and (d) an enriched literate environment as essential support for continuing education, training and skills development beyond basic literacy skills (UNESCO, 2010a, p. 6; UNESCO, 2013, p. 21). These four elements contribute to the methodological development choices made by LAMP: (a) if literacy is conceived as a continuum, it must be assessed by using a battery of items of varying levels of difficulty in order to reflect a wide range of ability (in each of the three domains); (b) if literacy must be sustainable, background questions must probe the use of skills at work and at home, which are deemed to contribute to skill maintenance; (c) if literacy enables lifelong learning, assessments must also collect data on participation in formal, non-formal and informal learning over a lifespan; and (d) if the literate environment is essential, assessments must collect information on the availability of written materials both in the household and the community.

This report presents a first look at these four elements through the LAMP lens. Although it only manages to scratch the surface of this wealth of data, it aims to provide an overview of future analytical possibilities and the lessons that may be drawn to inform policy as the ultimate goal.

1.6 Organization of this report

This report describes the development of LAMP and presents the international results of administering it within four countries: Jordan, Mongolia, Palestine and Paraguay. The report is organized into 10 chapters. Chapter 1 gives an overview of LAMP. It describes the scope of LAMP, why it was developed and the methodological choices that were made during its development. Chapter 2 places LAMP in the literacy and right to education framework. It describes the conceptual framework for literacy, why developing literacy is so important and why it is necessary for a nation to monitor its progress in developing literacy and numeracy for its citizens using an assessment like LAMP. Chapter 3 briefly reviews earlier attempts to assess literacy and numeracy and how LAMP has extended the progress others have made in this field. It describes the content of LAMP, how it is organised and how it is administered to collect information about a nation's literacy and numeracy rates. Chapter 4 discusses the differences and similarities of LAMP and other indicators of literacy and numeracy. It describes how LAMP differs from indicators of literacy rates and the limitations of using literacy rates instead of directly assessing individuals' literacy performance. It describes the limited role that LAMP might play in evaluating literacy programmes. It explains the distinction between LAMP as a household-based assessment of literacy and typical household surveys. Chapter 5 describes how LAMP was developed and improved by field testing versions of LAMP in many countries. It describes what was learned from field testing and how those lessons were applied to improve LAMP. Chapter 6 describes the literacy and numeracy results obtained by applying LAMP to representative national samples of adult citizens in four countries. Each country's results are described and illustrated. Chapter 7 is a more fine-grained look at LAMP's results in the four countries. It presents the results from each country by subpopulations. The LAMP assessment results for each country are then presented in relation to seven socio-demographic variables that have a bearing on formulating a country's literacy development policies. Chapter 8 is an in-depth case study of using LAMP to assess bilingual literacy and numeracy in Paraguay. Chapter 9 explains how the LAMP project had to develop an assessment component to assess people who are not yet literate or numerate but have learned some components of literacy upon which they can build additional skills. This is called the Reading Components assessment and reaches down to lower skill levels of literacy that typical literacy assessments of adults cannot measure very well. Chapter 10 summarises and draws some conclusions about the LAMP experience.

Chapter 2. Literacy and the right to education

This chapter provides the rationale for LAMP and situates the programme in the context of other information available on the educational outcomes of adults. This section also focuses on the importance of literacy and the need to find better ways to measure it. Literacy matters because it is part of the right to education and because it is a correlate (and cause) of personal well-being outcomes.

2.1 What is literacy?

How does UNESCO define literacy? Over the years, UNESCO has made four key statements either defining or characterising literacy – words marked **in bold** indicate the new elements introduced explicitly by each statement (UIS, 2009, pp. 13-14):

> a) A person is literate who can **with understanding** both **read and write** a **short simple statement** on **his [or her] everyday life** (UNESCO, 1958);
>
> b) A person is **functionally** literate who can engage in all those activities in which literacy is required for **effective functioning** of his or her **group** and **community** and also for enabling him [or her] to **continue to use** reading, writing and **calculation** for his [or her] own and the community's **development** (UNESCO, 1978);
>
> c) Literacy is the ability to **identify**, understand, **interpret**, **create**, **communicate** and compute, using printed and written materials associated with **varying contexts**. Literacy involves a **continuum of learning** in enabling individuals to achieve their **goals**, to develop their knowledge and potential, and to **participate fully** in their community and **wider society** (set in 2003 and published in UNESCO, 2004); and
>
> d) Finally, the notion of "**plurality of literacy**" (2004) was advanced to stress the **social dimensions** of literacy in relation to both acquisition and application. Therefore, literacy is seen as **comprising diverse practices** embedded in socioeconomic, political, cultural and linguistic contexts, acquired **in school and outside of school**. It also involves family and community contexts; the **media** in various forms of technology; skills for further learning; and the **world of work** and life in general. Thus, this concept of literacy emphasises the literacy challenge as **making societies literate** and not simply as making individuals literate (UNESCO, 2004).

2.2 Literacy and the right to education

Within the more general framework of the right to education, UNESCO has consistently recognised literacy's special status as a gateway to further schooling, as well as the trigger of a number of other skills. "Literacy, broadly conceived as the basic knowledge and skills needed by all in a rapidly changing world, is a fundamental human right. In every society, literacy is a necessary skill in itself and one of the foundations of other life skills" (UIE, 1997, p. 4).

UNESCO has also specifically recognised literacy as a right that applies to adult populations, not just children: "Literacy is a right. It is implicit in the right to education. It is recognized as a right, explicitly

for both children and adults, in certain international conventions. It is included in key international declarations" (UNESCO, 2006, p.136).

CONFINTEA linked literacy to "the learning continuum" that encompasses formal, non-formal and informal learning: "Literacy is an indispensable foundation that enables young people and adults to engage in learning opportunities at all stages of the learning continuum. The right to literacy is an inherent part of the right to education. It is a prerequisite for the development of personal, social, economic and political empowerment. Literacy is an essential means of building people's capabilities to cope with the evolving challenges and complexities of life, culture, economy and society" (UNESCO, 2010, p. 38).

2.3 Literacy's impact on people's well-being

"Literacy is also a catalyst for participation in social, cultural, political and economic activities, and for learning throughout life" (UIE, 1997, p. 4).

Mere observation shows that highly literate people tend to be richer, healthier and more socially and politically influential than their less skilled peers. It is even more obvious that individuals with low literacy skills are more likely to be poor, vulnerable and disenfranchised. However, this is what we call 'correlational evidence' – it does not prove that these differences in wealth and well-being are actually an effect of skills. In fact, the role of reading and numeracy skills is difficult to disentangle from schooling and its other possible benefits, such as the credentials, status and social capital that also come with it.

This is particularly true of all the studies that, over the years, have simply used years of schooling (or other measures of educational attainment) as a proxy for skills, instead of assessing them directly. If successful, what most of these studies really demonstrate is that *education* and more specifically *schooling*, but not necessarily *skills*, make a difference in people's well-being.

Furthermore, participation in education is not equitable. It is associated with socio-demographic factors that predate it, such as the socioeconomic status of an individual's family of origin. As a result, highly skilled people may be healthier (or happier or more engaged in society) not necessarily as a result of their skills or even their education but of the fact that they were born into a wealthy or well-connected family, which also happened to provide them with greater access to education. To sum up, many studies that claim that skills have positive effects on an individual's well-being fail to consider alternative explanations. Of course, the point here is not to argue that skills do not have these positive effects but demonstrating these effects requires ingenious approaches.

A systematic review of literature by DeWalt et al. (2004) confirms that low literacy, which is related to weak knowledge on health and healthcare, is also associated with a range of adverse health outcomes, such as a poorer health status, less access to medical screening and disease prevention as well as an increased risk of hospitalisation. The effects of literacy on health also spread to other members of the household, such as children, given that literacy proficient mothers make more effective use of healthcare institutions by taking better advantage of the available advice and information on childcare and health as well as being more inclined to report any treatment ineffectiveness in their children to medical staff (Borooah, 2009).

Several studies also outline that an individual's labour market prospects are harmed by low levels of literacy and numeracy, especially for those at the lower end of the proficiency scale (Robinson, 1998), and that literacy and numeracy proficiency are positively correlated with earnings (Rivera-Batiz, 1992; Green and Riddell, 2003; Ponczek and Rocha, 2011).

These more focused studies actually demonstrate that skills do have a direct impact on people's quality of life. This evidence should provide additional incentives for improvements in the quality of education as it shows that the skills that people develop at school actually make a difference in their lives. This cannot be attributed solely to family background, educational credentials or increased social capital linked to schooling.

Recently, the Survey of Adult Skills, carried out as part of the Programme for the International Assessment of Adult Competencies (PIAAC), found that adults (aged 16 years and over) (a) with low literacy skills were twice as likely to be unemployed; (b) who were high-literacy workers had 60% higher wages than lower-literacy workers; and (c) with low levels of literacy and numeracy had poorer health, lower civic engagement and less trust in the government (OECD, 2013a). Countries with higher levels of inequality in literacy and numeracy also had higher levels of inequality in income.

2.4 Summary

This chapter reviewed the history of the UNESCO definition of literacy and described how the definition evolved. LAMP was developed on the basis of the latest UNESCO definition. The importance of assessing and monitoring a nation's literacy is based on the belief that literacy is a fundamental right that can be developed through education. Literacy and numeracy are essential to people's well-being and to their ability to develop to the fullest. These ideas were reviewed in this chapter and represent the underlying rationale for the development of LAMP.

Chapter 3. The three domains measured by LAMP

This chapter reviews how the evolution of the notion of literacy has had an impact on the ways in which it has been assessed over the years. In terms of measurement, this section reviews previous attempts to assess literacy and then presents an overview of the current approach, including the skill domains assessed, the proposed performance levels and some sample items.

3.1 The impact of the evolution of literacy on the LAMP assessment

The evolution of UNESCO's discourse on literacy described in Chapter 2 was accompanied by changes in the way literacy was assessed at each stage:

1. Skill domains*:* In 1958, the concept of 'literacy' encompassed reading and writing. In 1978, calculation became part of the concept. UNESCO's 2003 statement appears to add a variety of sub-skills (identify, interpret, create and communicate) but, for the first time, writing was not explicitly mentioned. The 2004 UNESCO statement introduced the notion of "plurality of literacy" and with it, potentially, a very wide array of skills.

2. Social scope: Between 1978 and 2003, successive statements expanded the focus from the individual to his or her community and to the wider society.

3. Texts: In accordance with the individual-community-society expansion, the texts in which an individual must demonstrate proficiency evolved from "a short simple statement on his [or her] everyday life" in 1958 to "printed and written materials associated with varying contexts" in 2003.

4. Dichotomy versus continuum: The 1958 statement defined what it means to be literate and, by contrast, illiterate; the similarly dichotomous definition from 1978 focused on who is functionally literate or illiterate. The 2003 statement introduced the idea of a continuum, which can be interpreted in two ways: (a) literacy enables individuals to participate in the learning continuum that includes formal, non-formal and informal education, and (b) literacy itself should be measured on a continuum. Finally, the notion of "plurality of literacy" from 2004 seems to go beyond the notion of a single dimension continuum.

As mentioned previously, CONFINTEA also expressed a commitment to collecting data that recognised that literacy was a continuum of ability and that this continuum should be represented in a way where comparable data and indicators are developed based on the concept of a literacy continuum (UNESCO, 2010a).

This evolution of the concept of literacy by UNESCO over the years has huge implications for the monitoring of literacy at the national and global levels. As a result, the UIS responded directly to a need to operationalise the concept for LAMP, which would become UNESCO's first foray into large-scale assessment and monitoring of adult literacy skills. By the time LAMP was being developed, writing was no longer included in the UNESCO conception of literacy so writing was not included in the scope of LAMP's operational definition. The omission of writing from the literacy concept was fortuitous seeing as LAMP is a household-based assessment that would probably be unable to assess writing directly.

3.2 Earlier attempts to assess literacy through surveys

For several decades now, some population censuses or household surveys (e.g. labour, health or demographic surveys) in a number of countries have included short statements or short passages for respondents to read – often aloud and sometimes accompanied by one or more simple reading comprehension questions. This practice was clearly informed by the 1958 definition and while it was initially an improvement over the most widespread alternative at the time (self-report or report by the head of the household or other informant), it fell short in light of the subsequent UNESCO literacy conceptions, starting with the introduction of calculations in 1978 but particularly in 2003 with the call to assess the ability to read a variety of texts that referred to a variety of contexts.

The limitations of using the method of reading a single statement or short passage as a reliable indicator of literacy appear obvious in light of more recent conceptions of literacy. These limitations include:

1. Unreliability: The small number of words to be read and questions to be answered led to unreliable estimates of reading accuracy and comprehension, respectively.

2. Limited validity: The use of only one passage led to an extremely narrow definition of reading, necessarily focused on one type of text (either narrative or expository).

3. Confounding reading with other skills: Occasionally, the use of widely known passages (e.g. patriotic poems, excerpts from the constitution, etc.) led to validity problems since the test actually measured general knowledge rather than reading skills. For instance, in one survey, a map of the respondents' country and surroundings was presented and respondents were asked to read the map and name the neighbouring countries. Many may have known the answer without reading the map – a skill they may or may not have had.

4. Limiting reading to decoding only: In some cases, the sentence or passage was not accompanied by questions. As a result, 'reading' was operationally defined as the ability to decode and utter the printed words presented on the page. This was clearly at odds even with the 1958 definition, which emphasised the need to read 'with understanding'.

5. Use of administrators untrained in reading assessment: The questions were administered as part of a household survey by interviewers with no assessment experience. This should prompt us to exercise caution when using these surveys as sources for the improvement of educational programmes. Detailed scoring rubrics may not have been provided in order to ensure consistency in the administration of these questions, which may have been treated as any other question on the questionnaire.

These practices have not disappeared from some surveys. Even though they may have been an improvement over self-reporting – although for the reasons detailed above, that too may be debatable – one of their unintended consequences in the long run was that they created the illusion of an actual assessment of reading and failed to list or provide an explanation of all the associated limitations. As a result, in some cases this may have delayed – and may still continue to delay – the introduction of more rigorous approaches that would be truly worthy of being called an assessment.

3.3 Introduction of better literacy assessments

Literacy assessment changed in the 1990s with the introduction of the International Adult Literacy Survey (IALS) (Kirsch, 2001), which was in turn based on and named after the USA's National Adult Literacy Survey (NALS) (Kirsch et al., 1993). The IALS assessment was the comparative assessment of adult literacy skills by using household-based samples.

LAMP and other similar assessments, such as IALS, Adult Literacy and Lifeskills Survey (ALL: OECD and Statistics Canada, 2005), PIAAC (Programme for the International Assessment of Adult Competencies: OECD, 2013a, 2013b, 2013c) and STEP (Skills toward Employment and Productivity: Valerio et al., 2014), were based on the work of a number of specialists in a wide array of fields and share a number of advantages over the one-paragraph approaches. These include:

1. Differentiation from general knowledge: The skill domains to be measured (e.g. reading and numeracy) are clearly defined and differentiated from others, such as general knowledge. This is necessary to ensure the validity of the results.

2. More representative of skill domains: Several stimuli of different types (narrative and expository texts, charts, tables, etc.) are presented and a number of different questions involving different tasks (literal and inferential comprehension, arithmetical operations, etc.) are demanded of the respondent so as to cover as much as possible of each skill domain – within certain constraints, such as the duration of the assessment. This thorough coverage of the wider scope of the domain of assessment is also necessary to guarantee the validity of the measurement.

3. Improved reliability: Several items related to similar tasks and skills are presented. This increases the reliability of the scores.

4. Quality assurance: A set of quality assurance procedures for assessments is implemented along the entire process. These safeguards include: double scoring (two people independently scoring the same answers) in order to minimise scorer bias; analysis of Differential Item Functioning (DIF) to flag items that could be unfair to some groups; dimensionality analysis to confirm that the different domains should be analysed separately instead of merged with each other; and many others.

Assessments like LAMP, however, can be more costly and operationally demanding. They may also be unfeasible in the context of least developed countries, post-conflict situations or some displaced populations. There is still hope, however, for worldwide high-quality assessment of literacy skills. As we accumulate knowledge from various international assessments, we may be able to produce more parsimonious and streamlined tests that will help monitor progress towards the achievement of adult literacy goals on a global scale. Perhaps the optimal solution for a global monitoring tool lies somewhere between those full-blown assessments and the one-paragraph or one-sentence approaches.

3.4 Measures of reading and numeracy skills

LAMP, like IALS and ALL before it as well as PIAAC, focuses on reading and numeracy only because there are operational difficulties associated with testing writing in a household-based assessment. This section defines the three skill domains (Prose, Document and Numeracy), presents examples of items[3] from each domain, describes the types of tasks that respondents at different levels of proficiency can perform, and discusses the rationale for keeping the Prose and Document domains separate instead of merging them into one Reading domain.

LAMP is the first international household-based assessment to test Reading Components, which are also briefly described here.

i) Reading: Prose and Document

Unlike PIAAC and like IALS and ALL, LAMP makes a distinction between two types of reading skills: prose and document. 'Prose' refers to the comprehension of continuous texts, typically organized in paragraphs (*see* ***Box 3.1***). 'Document' refers to the comprehension of discontinuous texts, typically not organized in paragraphs, such as tables, graphs, schedules and forms (*see* ***Boxes 3.2 and 3.3***).

There are advantages and disadvantages to preserving the distinction between these two domains. Some experts[4] contend that the skills needed to read those two types of texts are inherently different and that both have to be learned. This means that the distinction is not just theoretically defensible but it is also relevant for policy and instruction. Additionally, ample evidence shows that from a socio-demographic point of view, there are some differences between these two domains. Gender is one of the relevant factors here – in a wide array of school-based and household-based assessments, females tend to outperform males in Prose while males do better in Document (OECD, 2002). Therefore, in order to keep track of the gender gap in reading skills, it may be a good idea to keep these two domains separate – at least in LAMP countries. In addition, the explicit teaching of 'document' reading skills may be relatively recent in some of these countries' educational curricula. This may produce "cohort effects", leading younger age groups to perform better in this specific domain. This type of information may be very relevant for policy purposes. Furthermore, the UIS has conducted a validity study (*see* ***Annex 1***) to empirically answer this question using the data collected from the four countries. The results support the claim to report reading skills in two separate domains (Prose and Document) rather than one combined domain (Reading).

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[3] The examples presented here are items shared with LAMP by ALL, and already made public by ALL. In the foreseeable future, it is possible that some of the items specifically developed for LAMP by the participating countries will be made public as well, but a decision has yet to be made regarding which ones. This is a delicate decision since once the contents of an item are disclosed, it limits the possibilities for its future use.

[4] Including John Strucker (Harvard Graduate School of Education) in a discussion held during the LAMP Global Advisory Board (Montreal, 6-7 May 2010), as a result of which a validity study regarding the reporting of reading skills in two domains was conducted.

Box 3.1. Example of Prose Reading item: Medco Aspirin

MEDCO ASPIRIN 500

INDICATIONS: Headaches, muscle pains, rheumatic pains, toothaches, earaches. RELIEVES COMMON COLD SYMPTOMS.

DOSAGE: ORAL. 1 or 2 tablets every 6 hours, preferably accompanied by food, for not longer than 7 days. Store in a cool, dry place.

CAUTION: Do not use for gastritis or peptic ulcer. Do not use if taking anticoagulant drugs. Do not use for serious liver illness or bronchial asthma. If taken in large doses and for an extended period, may cause harm to kidneys. Before using this medication for chicken pox or influenza in children, consult with a doctor about Reyes Syndrome, a rare but serious illness. During lactation and pregnancy, consult with a doctor before using this product, especially in the last trimester of pregnancy. If symptoms persist, or in case of an accidental overdose, consult a doctor. Keep out of reach of children.

INGREDIENTS: Each tablet contains
500 mg acetylsalicylic acid.
Excipient c.b.p. 1 tablet.
Reg. No. 88246

Made in Canada by STERLING PRODUCTS, INC.
1600 Industrial Blvd., Montreal, Quebec H9J 3P1

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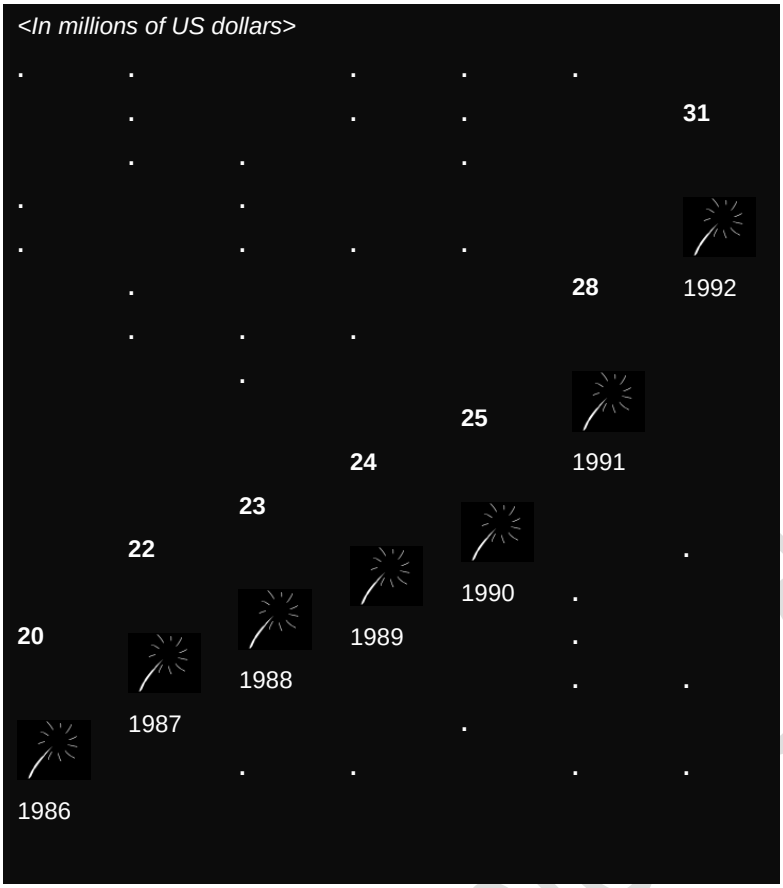
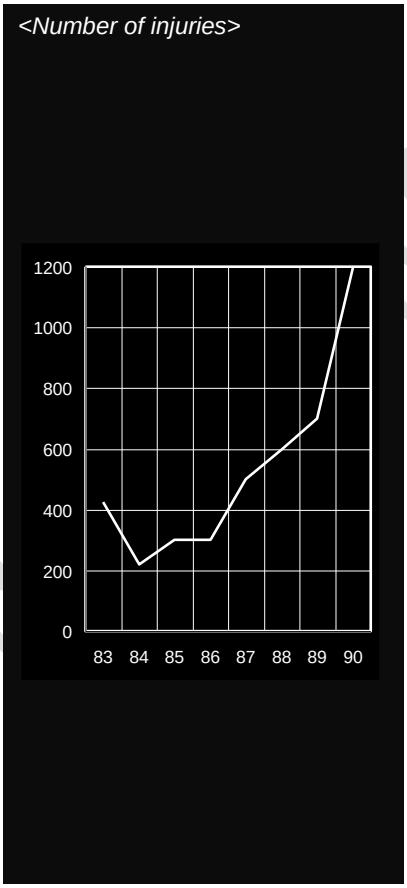
Question: *What is the maximum number of days you should take this medicine?*

Answer: Seven or 7

Note: This is a released item that originally appeared in IALS. It was one of the easiest prose literacy tasks in IALS.
Source: Kirsch, 2001, p. 21.

Box 3.2. Example of a Document Reading item: Fireworks





Question 1: 26. *According to the charts, what was the value, in <US dollars>, of <fireworks> sold in the <Netherlands> in 1991?*

Answer: ($)28 million [million is a required part of the answer]

Question 2: 27. *Describe the relationship between sales of <fireworks> and <injuries due to fireworks>.*

Answer: As sales increase so do injuries [Accept "they both went up" without requiring a causal relationship to be implied]

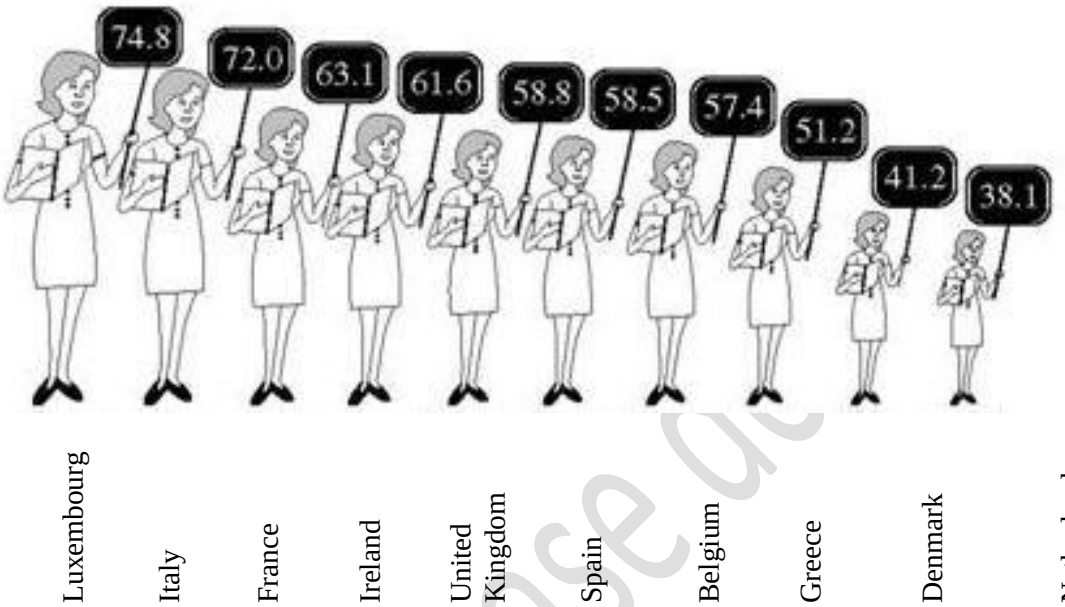
Note: These items are released items that first appeared in IALS. The items were of moderate difficulty in IALS.
Source: Kirsch, 2001, p. 29.

What are the disadvantages of this separation between 'Prose' and 'Document'? The main one is that this approach requires separate test items for the assessment of each domain. It is also a problem because as readers we often encounter texts that combine these two types of information. Examples of these may be a newspaper or magazine article or even a textbook that combines text in paragraph form (Prose) with tables and charts (Document), sometimes forcing the reader to integrate both sources of information in order to make inferences about the meaning of this complex text as a whole.

Box 3.3. Example of a Document Reading item: Female teachers

FEW DUTCH WOMEN AT THE BLACKBOARD

There is a low percentage of women teachers in the Netherlands compared to other countries. In most of the other countries, the majority of teachers are women. However, if we include the figures for inspectors and school principals, the proportion shrinks considerably and women are a minority elsewhere.



Percentage of women teachers (kindergarten, elementary, and secondary)

Question 1: *What is the percentage of women in the teaching profession in Greece?*

Answer: Mentions ONE of the following: 51.2(%) or 51(%)

Question 2: *In which country, other than the Netherlands, are women in the teaching profession in the minority?*

Answer: Denmark

Note: This item is a released item that originally appeared in IALS. It was one of the easiest document literacy items in that assessment.
Source: Kirsch, 2001, p. 28.

Perhaps in a future revision of LAMP, it may be possible to keep the domains separate but to include some test stimuli that combine both types of information. These stimuli could be accompanied by a combination of two types of items: several that assess each domain separately (either Prose or Document) and a few others that focus on the ability to integrate information from both types of texts, and that may contribute to the estimation of skills in both domains.

ii) Quantitative or numeracy skills?

While IALS had a 'quantitative' domain, ALL, LAMP and PIAAC assessed numeracy instead. What is the difference? 'Numeracy' refers to mathematical operations performed with the possibility of written support. In that regard, it is different from what some scholars call "oral quantitative skills", colloquially referred to as "mental calculations", in that these do not include written support.

Numeracy is more likely to depend on the ability to read, especially when test items approach what mathematics teachers call "word problems". However, as shown in the following sample item, it is possible to conceive of numeracy items where the linguistic information in the stimulus is kept to a minimum (*see* ***Box 3.4***). For example, the first part of the cognitive test is orally presented to the respondents. However, after the first part, the respondent still has to read the question and provide the answer in writing, either with words or numbers.

Box 3.4. Example of a Numeracy Reading item: Bottles

Question: *In total, how many bottles are there in the two full cases?*

Answer: 48

Note: This is a released item that appeared on the ALL test. It was an easy item on the numeracy assessment.

Source: OECD and Statistics Canada, 2005, p. 298.

3.5 Performance level descriptions for Prose, Document and Numeracy domains

Each LAMP skill domain has been divided into three performance levels. The details of how this was done are explained in Annex 2. Levels were established using a process that involved several steps. Initially, a statistical criterion was applied and responses from four countries were pooled to estimate participants' abilities – the top 30% of respondents were labelled as Level 3; the bottom 30% as Level 1; the remaining 40% in the middle as Level 2. Next, the resulting groupings' item responses were analysed by subject matter experts in reading and numeracy who provided descriptions of what respondents whose scores placed them into one of the groups could do. It is important to note that these level designations are specific to LAMP. A level does not have the same meaning as the same numbered level in another assessment (e.g. Level 1 in LAMP does not have the same meaning as Level 1 in PIAAC).

Table 3.1 presents, for each domain, the type of tasks that a respondent at each level would be able to do.

3.6 The correlations between skill domains

It should not be assumed that performances on the three LAMP domains are unrelated. As shown in **Table 3.2**, within each country, LAMP scores across the three different skill domains are correlated. These correlations are:

- highest between Prose and Document scores (0.84-0.92). This result is to be expected given that both of these domains assess reading skills, albeit of different types of texts.
- lowest between Prose and Numeracy scores (0.77-0.80). This is also plausible since these two domains have the least overlap with each other in terms of the skills assessed. However, these correlations are still rather high.
- remarkably consistent across countries for Document and Numeracy scores (0.82-0.83), which are also rather high.

All of these correlations are similar to those found in ALL between Prose, Document and Numeracy and in PIAAC between literacy and numeracy (OECD, 2013a), as well as in other international learning outcome assessments.

Table 3.1. Performance levels for the Prose, Document and Numeracy domains

	Prose Continuous texts, typically organized in paragraphs	Document Discontinuous texts (e.g. tables, graphs, forms)	Numeracy Mathematical operations with access to written support[5]
LEVEL 1	At this level, individuals can identify literal, concrete information in reading-to-do passages (e.g. job vacancy notices, product labels, and vaccination information) or simple one-paragraph passages, provided that i) language is identical in passages and questions; ii) only everyday colloquial vocabulary is required; and iii) choices or distractors are absent from the questions. Respondents can produce answers that require minimal action (e.g. circling, underlining, copying a short fragment of text). Lowest level respondents with no Prose reading skills are included here.	At this level, individuals can identify a single piece of information in simple reading-to-do or reading-to-learn documents (passages, graphs or tables) provided that i) language is mostly identical in stimuli materials and questions; ii) only one or two variables are included in the materials; and iii) only a few choices or distractors are present in the questions (although potentially these are always present). Lowest level respondents with no Document reading skills are included here.	At this level, individuals can, when presented with material communicating information in a familiar context that offers easy access to quantitative information because of its visual representation and minimal text, answer explicit questions requiring a one-step, simple operation; can add 3 whole numbers with 2-3 digits or with decimals in a 'money' context; and can subtract 2 whole or decimal numbers in a 'money' context. Questions contain no choices or distractors. Lowest level respondents with no Numeracy skills are included here.
LEVEL 2	In addition to performing the skills in Prose Reading Level 1, individuals at this level can identify literal information in reading-to-do or reading-to-learn passages when the required information appears in reading-to-do passages in a brief, clearly marked section or in reading-to-learn passages near the beginning of the text; and when i) language is not identical in passages and questions; and ii) questions do not have choices. Respondents can paraphrase, understand more 'academic' language, and write full-sentence answers.	In addition to performing the skills in Document Reading Level 1, individuals at this level can understand reading-to-learn graphs or tables that include two or three variables with descriptive labels, compare or contrast numerical information or process, and coordinate and match parallel information (e.g. time and activity data in one table), provided that language is mostly identical in stimuli, and when questions have several distractors.	In addition to performing the skills in Numeracy Level 1, individuals at this level, when presented with material communicating information in a familiar context, can complete tasks involving some fractions and decimals; can understand and use some simple fractions such as one-half (½) written with numbers or words; can demonstrate some understanding of the meaning of decimal numbers; and can multiply a decimal number and a whole number.
LEVEL 3	In addition to performing the skills in Prose Reading Levels 1 and 2, individuals at this level can identify literal information in longer, more challenging reading-to-learn texts (1-10 paragraphs) with linguistically dense passages or when the required information is in the middle or end of the passage, not the beginning, and when questions may or may not have choices or distractors.	In addition to performing the skills in Document Reading Levels 1 and 2, individuals at this level can understand complex documents and integrate information from complex sources (densely packed tables, multiple graphs) in order to identify numerical values, given a set criterion; fill out complex forms by turning personal data into categorical variables; and when language differs in passages and questions or is 'academic' (e.g. value, rates).	In addition to performing the skills in Numeracy Levels 1 and 2, individuals at this level, when presented with complex tasks with several visual representations and when asked explicit questions that may or may not have choices or distractors, can perform multiple-step operations that require multiplication (maybe by repeated addition) and then division (maybe by repeated subtraction); can subtract a percent from an initial value; can find a proportion by combining operations in a money context (sometimes with decimals); can add 3 numbers (sometimes with decimals) after computing 2 of them through multiplying by 10 or 2; can read time using clocks or in numeric form; can interpret qualitative or quantitative data from tables or price tags with percentages, decimals and whole numbers; and can represent money and weight (using appropriate measurement units).

[5] Numeracy thus differs from oral quantitative skills or "mental calculations". However, some respondents may have performed the numeracy tasks without paper and pencil until the very end, only reporting their final results in writing.

Table 3.2. Coefficients of correlation between Prose, Document and Numeracy scores

	Prose vs. Document	Document vs. Numeracy	Prose vs. Numeracy
Jordan	0.92	0.82	0.77
Mongolia	0.84	0.82	0.80
Palestine	0.90	0.83	0.80
Paraguay	0.87	0.82	0.77

Source: LAMP, 2010-2011.

Even though all of the correlations are relatively high, it is not possible to say that any of them are too high. In other words, a correlation of 0.97 or more between two domains would call into question the need to keep those domains separate unless there were very powerful substantive reasons for it. These correlations that are high but not too high seem to confirm that these are three different domains with some strong associations with one another rather than just two domains.

Scores from all three skill domains are, as we will see later, strongly correlated with the individual's level of schooling. However, after controlling for schooling, the correlations between domains persist and remain remarkably high and consistent as shown in **Table 3.3**. The relationship between the three skill domains is thus not entirely due to the educational attainment of respondents. Furthermore, the same patterns observed before continue to apply here: correlations tend to be highest between Prose and Document and lowest between Prose and Numeracy.

Table 3.3. Correlation between Prose, Document and Numeracy scores after controlling for schooling

	Prose vs. Document	Document vs. Numeracy	Prose vs. Numeracy
Jordan	0.84	0.70	0.61
Mongolia	0.75	0.73	0.69
Palestine	0.80	0.68	0.62
Paraguay	0.76	0.68	0.61

Source: LAMP, 2010-2011.

3.7 Reading Components and "Learning to Read"

LAMP introduced the 'Reading Components' items as an attempt to measure the pre-reading skills of those respondents who would not be able to answer the Prose and Document questions due to limited reading comprehension skills, limited writing skills or both but who were not totally lacking in any reading-related skills. As a result, the Reading Components sections differ from Prose and Document in two main ways. First, the former extends the range of assessed abilities downward to include so-called precursors (i.e. letter naming and word recognition). Second, they prompt oral rather than written answers from respondents. Although, in theory, the abilities tested by the Reading Components lead to those tested in the Prose and Document booklets, the results from the Reading Components, due to their format, cannot simply be put on the same scale as either the Prose or Document domain. As such, the Reading Components will be analysed separately in Chapter 9.

Chapter 4. LAMP and other sources of information on literacy

This section situates the programme in the context of other information available on literacy rates, evaluation of literacy as well as other educational programmes, and household surveys.

4.1 LAMP and literacy rates

One frequent misconception about LAMP is that it is a device to produce more accurate literacy rates. This section explores the roles of literacy rates alongside comparative assessments of adult literacy like LAMP.

i) How are literacy rates produced?

The *Global Education Digest* (GED) was the UIS's annual compendium of education statistics, published between 2003 and 2012. It published literacy rates since 2006. More recent statistics can be found in the UIS Data Centre at http://data.uis.unesco.org. The GED glossary defines literacy as "the ability to read and write, with understanding, a simple statement related to one's daily life. It involves a continuum of reading and writing skills, and often includes basic arithmetic skills (numeracy)" (UIS, 2006, p.179).

As for the indicator itself, literacy rates are defined as "The number of literate persons in a given age group, expressed as a percentage of the total population in that age group" (UIS, 2006, p.183).

According to *Literacy for Life: EFA Global Monitoring Report 2006*, "in practice, experts determined an individual's literacy level by one of three methods:

> 1. Respondents reported their literacy level as part of a census questionnaire or survey instrument (self-declaration).
>
> 2. Another individual – typically, the head of the household – reported on the literacy level of household members (third-party assessment).
>
> 3. The number of years of schooling completed was used as a proxy measure to distinguish the 'literate' from the 'non-literate' (educational attainment proxy)" (UNESCO, 2006, p. 163).

The literacy rates disseminated by the UIS combine those three methods. Each has its own shortcomings, which the UIS has documented: "For all the countries where census or household survey data are used (nearly all), the estimates of literacy are likely to be over-estimates relative to what would have been the results of a test" (Carr-Hill, 2008, p. 33).

The so-called 'third-party assessment' method seems to be at a further disadvantage, even compared to self-declaration: "For some countries, there is also the problem of proxy responses by the head of household which may well further inflate the estimates" (Carr-Hill, 2008, p. 33). Its impact is greater among some groups: "There may be proxy responses from up to 30% of households, and these will affect reported literacy and may exaggerate the rates for children, women and dependents" (Carr-Hill, 2008, p. 19).

Finally, when it comes to the educational attainment proxy, the UIS only uses it for a small number of countries "to impute literacy rates for countries for which the regular "dichotomous" literacy data are not available. …Data that are based on a proxy of educational attainment are used only for estimating purposes and are not disseminated at the individual country or territory level" (UIS, 2008, p. 12).

"The vast majority of these [literacy] rates consist of estimates based on national censuses, household surveys and educational attainment data. They combine several approaches to questioning (self-reported or reported by someone else in the household), yielding information of limited reliability. However, this method of measuring literacy ignores substantive conceptual developments over the past 50 years, in particular the understanding of literacy as a continuum" (UNESCO, 2006, p. 33).

This notion also links literacy with the notions of life-long and life-wide learning, and with the need to sustain all three through action that goes beyond a narrow definition of education policy: "Literacy is a continuum, not a dichotomy. Learning and using literacy skills is a continuous, context-bound process that takes place both within and outside explicitly educational settings and throughout life. This understanding implies concerted development of cross-sectorial policy" (UNESCO, 2006, p. 35).

To sum up, literacy should be measured directly, on a continuum, and understood as a continuous process throughout life.

ii) How are literacy rates used?

Literacy rates are widely used by international organizations, although a decline has been observed recently, as exemplified by the United Nations Development Programme's (UNDP's) Human Development Index (HDI). For the purpose of monitoring countries' progress towards certain goals, international organizations often use adult literacy rates either as a stand-alone indicator or as part of composite indices. The youth literacy rate (for the population 15-24 years) was an official indicator for Millennium Development Goal 2 on universal primary education (United Nations, 2015). Both the youth and adult literacy rates (for the population 15 years and older) are among the thematic indicators for Sustainable Development Goal 4 on education (UIS, 2016).

The best-known example was probably the pre-2011 HDI, which combined three dimensions: "a long and healthy life", measured by life expectancy at birth; "a decent standard of living", measured by Gross Domestic Product (GDP) per capita; and the 'knowledge' dimension, where the adult literacy rate accounted for two thirds of its value (the remaining third was the combined gross enrolment ratio across primary, secondary and tertiary education). For a hypothetical country looking to "move up" in these rankings, increasing literacy rates may have appeared as a relatively fast, easy and inexpensive way to do it – as compared to increasing life expectancy, school enrolment or GDP (*see* ***Box 4.1***). However, this misapprehension is based on a narrow understanding of what literacy really is, and on an underestimation of the level of policy efforts that would be required to increase it in a sustainable way. That said, literacy is clearly a worthy investment for any country.

Literacy rates are at a crossroads between two professional cultures. On the one hand, National Statistical Offices may appreciate literacy rates because they provide a single numeric indicator comparable, for instance, to the unemployment rate. On the other hand, education officers may be sceptical about their usefulness in guiding policy; at the national or subnational level, some

policymakers and practitioners would admit their frustration at these rates, claiming that they are not particularly helpful for their work.

Although literacy rates have been criticised because they normally do not stem from direct assessments, they are a fast and affordable way of collecting socially relevant information about literacy and thus remain useful for analysis and monitoring purposes, even if they may represent self-perceptions rather than actual skills.

Box 4.1. Can illiteracy be eradicated?

For decades, maybe even centuries, the seemingly greater progress achieved in medicine and public health has cast a long shadow on the comparatively meagre returns on education policy. Never has this been more evident than in the late 1950s and early 1960s, when the World Health Organization started a global campaign to eradicate smallpox, ending with an official declaration of success in 1980. How was smallpox eradicated? By undertaking massive vaccination campaigns that made it impossible for the pathogen to survive in enough quantities to cause an outbreak. Smallpox was 'eradicated' in the word's etymological sense: it was rooted out, its very cause removed forever, wiped off the face of the Earth. This eradication through vaccination – the only example of such an accomplishment so far – was so successful that the routine administration of shots against smallpox has stopped, because it is no longer needed.

Not coincidentally, in 1964, UNESCO released its *Declaration on Eradication of Illiteracy* in the United Nations Development Decade. The influence of the medical example was evident: "The magnitude of the task that needs to be carried out if illiteracy is to be wiped out, is as vast as it is urgent" (UNESCO, 1964).

However, even back in 1964, UNESCO was already aware that, even after 'eradication', and unlike smallpox, illiteracy may have the ability to rise from its own ashes: "The eradication of mass illiteracy and *provision for the maintenance and widespread use of literacy* should therefore be treated in development plans as an essential complement of formal education as one of the foundations of self-sustaining economic growth" (UNESCO, 1964). Why would it be necessary to *maintain* and *use* literacy even after the eradication of illiteracy? Well, because illiteracy is not like smallpox at all: being illiterate or literate is not a simple binary variable as literacy is a continuum of skills; and the causes of the lack of literacy skills as well as the process of development and maintenance of these skills are much more complex. There is no vaccine that can protect against illiteracy. Literacy must be fostered through widespread lifelong exposure to (and ideally, production of) written materials. Although the global need for initial literacy instruction is indeed urgent, we should be sceptical of a quick fix to a problem that is inherently complex and that will require a sustained effort from a number of stakeholders.

iii) LAMP is not a tool to produce literacy rates

There are several practical reasons why LAMP is not the most effective tool to produce literacy rates:

1. LAMP does not assess writing skills. Although LAMP items are open-ended, and therefore require a modicum of writing, this is not enough to assess this skill. Why is there no writing test in LAMP? While universally recognised as one of the pillars of literacy, this skill is generally absent from large-scale assessments. It was omitted on grounds of practicality. Writing is difficult to assess: scoring hundreds (or thousands) of essays can be costly, time-consuming and ultimately, unreliable. Also, this type of test is difficult to administer in households (as opposed to schools) because writing requires the respondent to be highly motivated and concentrated, which may not be a realistic expectation in this setting.

2. LAMP tests skills in a few specific languages per country. Those may or may not be all the languages used for reading in a given country. LAMP will provide an estimate for a person's reading and numeracy skills only in the language in which this person took the test, which may not be the language in which this person is most skilled. For instance, in Paraguay, Spanish was the only language of assessment; therefore, reading skills in other languages used (Guarani, Portuguese, etc.) were not assessed, although examinees did provide a self-declaration on these skills.

3. In addition, the production of literacy rates is not consistent with the LAMP approach: "When literacy is conceived as a continuum, there is no definite line between 'literate' and 'non-literate'. Rather, literacy becomes a kind of moving target. Therefore, the dichotomy reflected in the widespread use of the terms 'illiterates' and 'literates' … creates a conceptual problem" (UNESCO, 2013, p. 25).

Meanwhile, "the evolving notion of literacy as a continuum has increased interest in the direct measurement of skills levels in many countries" (UNESCO, 2013, p. 25).

4. Finally, conducting LAMP in order to produce literacy rates would not be efficient. If the purpose was simply to obtain a rate (i.e. a one-dimensional, dichotomous measure), LAMP or any other similar effort would not be the fastest or most affordable way to do this.

iv) Can LAMP replace literacy rates in international comparisons?

One of the main purposes of literacy rates is for comparison across countries and regions. This is possible because literacy rates are available for most countries of the world – although it is debatable whether literacy rates produced through different methods are comparable. By comparison, direct assessments of reading skills are available for a relatively small number of countries. It remains to be seen whether in the foreseeable future, full-blown direct assessment of skills will replace literacy rates based on self-declaration or third-party assessment. The *Incheon Declaration and Framework for Action* increases the focus on these skills and as a result, on this type of measurement (UNESCO, 2016).

"A number of challenges stem from these internationally adopted commitments as they seek to measure literacy both as a continuum and through the use of comparable indicators. The requirement to measure literacy skills levels as a continuum is incompatible with a clear line between 'literate' and 'illiterate' individuals. … This does not preclude the possibility of defining a threshold in each

continuum considered acceptable at one time. This threshold has to be specified in terms of the actual skills and tasks an individual can perform, and can be revisited and redefined according to changing needs and challenges" (UNESCO, 2013, p. 25).

v) Can LAMP help us understand literacy rates?

LAMP directly assesses each respondent's prose, document and numeracy skills. In addition, respondents also provide a self-report of four different skills: reading, writing, numeracy and oral quantitative skills (sometimes called 'mental calculations'). As a result, LAMP allows us to compare a person's self-assessment of a given skill – for instance numeracy – with results from the direct assessment of that same skill. This will help us understand to what extent people overestimate (or sometimes underestimate) their own skills in their self-declarations.

However, what we learn from LAMP alone about the relationship of self-estimates to the direct assessment of literacy may not be generalizable to other methods and contexts. Why not? The LAMP interview is not identical to a census or household survey. In a census, for instance, most respondents know that their skills will not be tested. Therefore, when asked to declare their skills, they may be inclined to inflate them because self-reporting of having high skills is socially desirable. In LAMP, however, respondents know from the beginning that they will be tested so they may be humbler or more realistic in their declarations. They may still have a tendency to overestimate their skills but this will probably not be as pronounced as in the case of a census.

vi) Both LAMP and literacy rates have advantages

Literacy rates are simple, widespread and relatively fast and inexpensive to produce. However, as compared to direct assessments, they can be less valid – due to social desirability bias, among many other reasons – and more difficult to interpret since they are based on self-perceptions, which may be affected by many factors. If they are based on simple one-sentence assessments as opposed to self-reporting, their reliability is likely to be low because of the shortness of the reading sample – although even a simple reading test is superior to self- or third-party-declaration of literacy skills. Most importantly, their use for policy purposes may be limited since they do not provide enough information on the specific skills that the population has or lacks.

Results from LAMP or other direct assessments of literacy skills will be more reliable and valid since they measure the desired construct in a direct way through a battery of carefully designed and fieldtested items. These assessments provide more useful inputs for policy design by describing respondents' skills along a developmental reading or numeracy continuum. For instance, in reading, a developmental continuum may range from knowledge of the alphabet to making an inference after reading a passage. In numeracy, a developmental continuum may range from knowing digits to being able to solve a complex word problem that entails combining several arithmetical operations or applying relatively complex concepts like calculating the 'average'.

On the other hand, direct assessments may be costly, time-consuming and require an important operational and technical capacity at the country level. Further efforts should be devoted to finding ways to streamline these assessments in order to make them simpler, faster and less costly, without compromising the validity, reliability and, most importantly, policy-relevance of their results.

4.2 Can LAMP be used to evaluate a literacy programme?

LAMP aims to take a snapshot of the stock of skills of a nation at a given point in time. As such, it differs from programme evaluations in a number of ways.

The evaluation of an educational programme is a complex and delicate undertaking that may have serious consequences on policy. Therefore, it requires an approach that takes into account many different components of a programme, including inputs, processes, implementations, outputs and outcomes. It should also measure the outcomes of interest several times – at least once before the programme and once immediately after. This section shows that LAMP is not an appropriate mechanism to evaluate a programme. Nevertheless, some parts of the LAMP instruments could be used as part of the evaluation of a programme.

Are adult literacy programmes as effective as primary schools in teaching people to read? Results from assessments like LAMP alone cannot answer that question. However, a related question could be answered: can literacy programme graduates read as proficiently as primary school graduates? LAMP may answer this question provided that the sample contains enough graduates from each programme.

How are these two questions different? In trying to answer the first, one may compare the skills of graduates from those two programmes and, based on any differences between them, draw the conclusion that one is more effective than the other. This conclusion would be unjustified as other factors may explain those differences. For instance, student profiles for the programmes may differ – for instance, only one programme's incoming students may come from rural areas or poor households. As a result, judging the programmes' effectiveness by looking only at their graduates' skills may not only be unfair but simply incorrect.

The second question (can literacy programme graduates read as proficiently as primary school graduates?*)* is easier to answer. It suffices to compare the skills of the two groups without drawing any unfounded conclusions as to why the differences arose. If a significant difference is found, however, this does not necessarily reflect the programmes' effectiveness. Is this information still useful for policy purposes? Yes, because it still reflects the skill profiles of respondents who have graduated from different programmes. As such, a country can make a broad prediction of the stock of skills by looking at how many people graduate from each programme.

LAMP by itself cannot evaluate the impact of specific literacy or educational programmes. It provides a snapshot of the distribution of literacy skills among all adults. Thorough programme evaluation entails more than outcomes assessment. It also collects data on inputs and processes: curricula are reviewed, instructional materials examined, classroom interactions observed and the degree of implementation of a programme is assessed.

LAMP is not a curriculum-based assessment. Instead, it focuses on skills deemed useful for everyday life, whether they are explicitly featured in educational curricula or not. Conversely, when educational programmes are evaluated, tests are aligned with curricula in order to assess whether the curricula have been taught. Could LAMP be curriculum-based? No. As an international assessment targeting both unschooled and schooled adults with varying levels of educational attainment, it should not be aligned to a specific curriculum.

LAMP is cross-sectional so each person is tested only once. Programme evaluations, on the other hand, should be longitudinal, preferably panels, where the same individuals are tested repeatedly. Panels include a pre-test (before the programme starts) and a post-test (as the programme ends), and often a maintenance test to ensure that the new skills are sustainable. Should LAMP be a panel? In a household-based assessment, it is extremely difficult to follow up on a specific sample of individuals over time.

LAMP is correlational (as opposed to experimental): LAMP collects information without manipulating any variables. Programme evaluations, on the other hand, should ideally follow a controlled design. This ensures that the observed increases in skills are indeed a result of the programme. Whenever possible, programme evaluations should:

1. Collect data for both an experimental group (which receives the intervention that is being evaluated) and a comparison group (which either does not receive the intervention at all or receives it at a later date).

2. Randomly assign individuals to the experimental and comparison groups.

All this allows evaluators to be reasonably certain that the changes observed can indeed be attributed to the programme. On the other hand, this raises ethical and operational challenges. Moreover, experiments also tend to be very costly, which limits the size of the samples used. That, in turn, may raise questions about whether their results can be generalised to the overall population. Assessments like LAMP can be administered among much larger samples, which increases their ability to describe the skills of the population at large. However, experiments are much more powerful in their ability to explain and predict, and to evaluate the effectiveness of specific interventions.

As a result, a combination of household-based assessments like LAMP that reach wide samples and controlled programme evaluations (based around literacy centres, for instance) using smaller samples may be an approach that succeeds in both describing the skills of the population and finding ways to foster them. Some LAMP instruments could potentially be used across both instances.

4.3 LAMP is not a household survey

LAMP is an assessment. This means that rather than just collecting information on individuals or households, it tests individuals' skills under conditions that are intended to be as standardised as possible to prevent procedural inconsistencies from affecting the results. Although household surveys should also be standardised, the importance of this issue is far greater in the field of assessments.

To reduce inconsistencies and bias in data collection, interviewers should be well trained in the following implementation process:

1. Selection of the respondent within the household must be done according to precise randomisation procedures. Interviewers should be prepared to explain these procedures in simple terms. They should anticipate resistance from household members (especially the head of the household) who may object to a particular respondent having been selected, especially when the latter was female, elderly, unschooled, disabled or anyone other than the head of the household.

2. Scoring should receive special attention, particularly when field scoring is used to allocate respondents to different booklets, since it is a skill that most survey interviewers do not master. Scoring rubrics should be detailed and training on this topic should be extensive, especially in assessments with an oral component. Interviewers scoring consistency should be monitored and improved until she or he reaches the appropriate level of competencies.

3. Confidentiality of the content of cognitive test items is crucial in order to guarantee that it will be possible to use them in subsequent cycles of the assessments. This normally does not apply to questions in a household survey.

4. Presence of third parties during the interview should be curtailed whenever possible to avoid interference and because it would be embarrassing for respondents if their shortcomings were revealed to other household members or even to their neighbours. In this regard, assessments should ideally be treated in a similar way as surveys focusing on sensitive topics such as sexual practices or substance use. In practice, however, this may be unfeasible, especially in rural areas.

Also, in its current form and due to its length and complexity, LAMP cannot be attached to a household survey as a 'module' on literacy. However, lessons learnt from LAMP may be used as the basis for the development of such a module if demand for it exists, and if certain special procedures are put in place to guarantee its correct administration. Although LAMP is not a household survey and its assessment components could not simply be attached to one, data from LAMP and from existing household surveys can be used in conjunction in order to maximise the usefulness of their results.

Having established the difference between household surveys and assessments, such as LAMP, it is now worth mentioning one issue of particular importance that is equally critical to both of them:

'Non-responses' at the household and individual level should be carefully monitored by keeping track of the profile of non-respondents in terms of gender, age, schooling and relationship to the head of the household. They should also be minimised by conducting media campaigns and liaising with local authorities or community leaders in advance of the field operation as well as using a battery of interviewing techniques and even providing material incentives to respondents or households in order to encourage their participation. Non-response rates should be calculated, used for weighting the data prior to analysis and disclosed when reporting assessment results (e.g. Pike, 2007). Protocols for substitution by other respondents – in the case of LAMP, from a different household – and for adjusting for non-response, need to be explicitly developed and used.

Chapter 5. The overall process of design, development and implementation of LAMP

5.1 Landmarks in the initial design of LAMP: 2003-2006

This section presents certain landmarks in the process of designing the LAMP instruments and field procedures. It is based on discussions held during a number of international workshops where experts from the participating countries[6], cooperating countries, international agencies and consulting organizations[7] discussed the design of these instruments and field procedures, and gradually achieved consensus on most of them while occasionally agreeing to disagree on others. It also documents how some early concerns from countries would prove to be justified later in the implementation process. This issue will be revisited in Section 5.2 since it is one of the main contributions that LAMP can make to the field of international assessment in general, and in developing countries in particular.

The participants in the various workshops held during this first phase raised several important issues that were addressed:

- Test framework and item distribution. Country participants expressed concern over both the project design and literacy frameworks presented. In particular, they were concerned that the existing prose, document and numeracy (PDN) frameworks did not adequately take local contexts into account. Consequently, they felt that the existing PDN items did not represent a wide enough distribution of difficulty, especially at the lower end of the literacy scales and would not work well in their countries without adaptations beyond those permitted in the translation and adaptation guidelines. They also felt that the spread of numeracy items was too narrow, measuring principally one aspect of numeracy – the notion of percentage.

- Item development, background questionnaire and sampling. It was agreed with countries that there would be four types of items in LAMP:

  1. International PDN items (common to all LAMP countries) drawn from previous surveys (IALS and ALL) and used to establish the link to the LAMP items.
  2. Common PDN items developed by LAMP countries to compare results across them.
  3. National PDN items specific to each country.
  4. Reading Components (RC) items[8], which would be specific to each country and language.

Countries proposed reviewing the breakdown of PDN items by category, increasing the proportion of LAMP common and national items; and creating a template to homogenize item construction. The PDN items and associated issues discussed were:

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6 El Salvador, Kenya, Mongolia, Morocco, Niger and Palestine participated in LAMP international workshops in the first phase of the project.

7 Educational Testing Service (ETS), Statistics Canada, OECD and World Bank.

8 For a detailed description of the Reading Components instruments, see Chapter 9.

- Sampling. The issue of cost and operational challenges in those countries that might conduct literacy assessment in more than one language was raised. However, only one country (Niger) conducted literacy assessments in more than one language (*see* ***Table 5.1***). Only two of the language groups (French and Hausa) had sufficient response rates to be useful for collecting field test data. A follow-up determined that the other languages did not have an extensive written literature. Even those who spoke these languages well often did not recognise the written version of the words whose meanings they knew well.

  A further issue about sampling that was raised was that the selection of only one respondent per household may create difficult situations between household members and the interviewer. The LAMP staff did not systematically document whether such issues arose during the administration of the assessment (see Maddox, 2014 for some observations on this matter in Mongolia).

- Background Questionnaire. The contents of the Background Questionnaire were unanimously approved in February 2005.

- Reading Components. Decisions were made to allow each country to produce its own word recognition lists and to make the decoding exercises optional. The sentence processing items, on the other hand, would be common. Countries expressed concern about 'absurd' items (e.g. "rain comes from the ground" and "a circle is square"). The sentence processing items were designed so that a respondent would not need any special knowledge to decide whether the sentence was true or false once it was read. As a result, some of the items were tautological and obviously true if one could read the sentence. Similarly, the false items were obviously false once read and may appear to be nonsensical.

- Implementation delays and other issues. Countries raised concerns about delays in implementation, which affected motivation at the country level; the need for capacity building, technology transfer and technical support; financial support; sensitivity to countries' issues; and also process issues, such as communication and transparency. Towards the end of this first phase, Kenya dropped out of the programme, citing the delays in the implementation process as the reason for its decision. The country would go on to conduct its own survey, the Kenya National Adult Literacy Survey (KNALS) and kindly acknowledged LAMP as a source of inspiration for its methodology.

The introduction of this methodology in a new set of countries with marked cultural differences – as compared to the IALS countries but also among each other – posed a number of challenges. Some were unexpected but others were foreseen by the national teams and the UIS's technical partner (Educational Testing Service). The lessons to be learnt here are very simple: to pay attention to the opinion of the national experts and to negotiate between participating countries and the technical partner since they both have a unique understanding of the issues that may arise during implementation.

5.2 The field test and improvement process: 2006-2010

The process of field testing the instruments and procedures was used to improve their quality and adjust them to the contexts in which they would be used (*see Table 5.1*). Out of the eight field tests that were conducted during this period, six were observed directly (the two exceptions being Jordan and Palestine) by one or more members of the LAMP team in Montreal, who accompanied interviewers and supervisors into the respondents' households in a wide array of urban and rural locations, including the Gobi Desert in Mongolia and the Sahel in Niger. This provided the UIS staff opportunities to:

(i) Support the training of interviewers, supervisors, scorers and data entry personnel

(ii) Observe the instruments and procedures at work in the field with a view to adjusting them according to a country's cultural difference, yet to remain within the framework to maintain consistency and comparability among participating countries

(iii) Collect qualitative data to inform the analysis (e.g. in Reading Components)

(iv) Deliver feedback to the national team on the quality of their field procedures

(v) Learn as much as possible about respondents' languages, scripts, cultures and environments.

Table 5.1. Countries that participated in the field testing

Country	Data collection	Languages (scripts)	Number of cases
Palestine	Sept. – Dec. 2006	Arabic (Arabic)	565
Morocco	July 2007	Arabic (Arabic)	647
Mongolia	Dec. 2007	Mongolian (Cyrillic)	567
Niger	Mar. – Apr. 2008	French, Fulfulde, Hausa, Kanuri, Tamasheq, Zarma (Roman)	2,093
El Salvador	Nov. – Dec. 2008	Spanish (Roman)	559
Viet Nam	Dec. 2009 – Jan. 2010	Vietnamese (Roman)	622
Jordan	Feb. 2010	Arabic (Arabic)	509
Paraguay	Mar. – Apr. 2010	Spanish (Roman)	622

Note: Afghanistan and Lao PDR are not included here as field testing was performed after 2010 in these countries.

i) The language scope of LAMP: Languages, families and scripts

While IALS and ALL had confined themselves to European languages written in the Roman alphabet, LAMP broke a number of barriers from the start. Between 2006 and 2014, it was field tested in ten countries in a combined total of 13 languages that belong to seven different families (*see* ***Table 5.2***). Reading of those languages was assessed in four different scripts: two alphabets (Cyrillic and Roman); one consonantal alphabet or *abjad* (Arabic); and one alphasyllabary or *abugida* (People's Democratic Republic of Lao).

Table 5.2. Languages and scripts that were fieldtested to develop LAMP

Families	Languages	Scripts			
		Arabic	Cyrillic	Lao	Roman
Afro-Asiatic	Arabic	Jordan, Morocco, Palestine			
	Hausa				Niger
	Tamasheq				Niger
Altaic	Mongolian		Mongolia		
Austro-Asiatic	Vietnamese				Viet Nam
Indo-European	Dari	Afghanistan			
	French				Niger
	Pashto	Afghanistan			
	Spanish				El Salvador, Paraguay
Niger-Congo	Fulfulde				Niger
Nilo-Saharan	Kanuri				Niger
	Zarma				Niger
Tai Kadai	Lao			Lao PDR	

This diversity of languages posed a number of challenges. For instance, Nilo-Saharan languages (Kanuri and Zarma of Niger) and Mongolian – which belongs to the unrelated Altaic family – all share one common trait: in a sentence, the object precedes the verb. However, in English, French and Spanish, it is usually the other way around. This was one of the reasons why a forced-choice cloze of the type "He visited the (city/book)", where the respondent has to choose the object based on the verb that precedes it (based on the English word order), could not be used in those countries as part of the Passage Fluency exercise. This was one of several factors that led to a thorough reformulation of that task, which was transformed into a series of conventional passages, each followed by six traditional comprehension questions.

Script diversity also presented some challenges. Although readers of the Roman alphabet are often puzzled by the fact that Arabic is read from right to left, that feature does not pose any actual issues for the comparative analysis of reading across scripts. However, Arabic is also a consonantal alphabet. This means that the so-called 'short' vowels can be omitted. This does not normally pose problems in everyday reading situations, where the proficient reader can rely on the context to disambiguate the meaning of the word. However, in Word Recognition exercises where each word is presented in isolation, there is room for ambiguity. There are several possible strategies to deal with this issue but a consensus has yet to be reached on which would be the most appropriate one.

Since the Mongolian language puts the verb before subject, items that were in the cloze format in the Reading Components were replaced by open-ended questions for reading comprehension in the last two sections of Reading Components. These sections were re-formatted from cloze-format to open-ended reading comprehension.

In Arabic, there is no upper and lower case so in Reading Components for Arabic countries (Palestine and Jordan), only one section is used: letter naming. This only applies to Arabic-speaking countries.

There were two items (the content of which referenced bicycle frames) from IALS by ETS that were used as common items in the PDN booklets (they appeared in Books 1 and 2). These two items were removed from the assessments of all countries since respondents were consistently misinterpreting them across all countries (as per the feedback from countries).

ii) Lessons learned from the field test and the resulting changes made

The following are some of the important changes made to the LAMP assessment as a result of the field testing:

- Learned from Morocco. The field observation in Morocco revealed how *diglossia* would impact the assessment of Reading Components and how contact between Arabic (the language of assessment) and other languages would affect, for instance, the Digit Naming, Letter Naming and Oral Vocabulary tasks (e.g. through the use of Berber, French and Spanish names for some numbers, letters and objects, respectively).
- Learned from Mongolia. The field test operation in Mongolia was accompanied by an ethnographer, Bryan Maddox, from the University of East Anglia, who has since written about the experience (Maddox, 2014). His observations shed light on the implementation of LAMP.
- Learned from Niger. The field observation in Niger, conducted in six different languages (French, Fulfulde, Hausa, Kanuri, Tamasheq and Zarma) from four different families (Afro-Asiatic, Indo-European, Niger-Congo and Nilo-Saharan) proved to be one of the richest in lessons learnt. It ultimately led to substantial changes in the structure of the Sentence Processing and Passage Fluency exercises for all countries. For the Sentence Processing exercise, it led to a substantive reduction in the number of sentences as well as a small reduction in the proportion of false sentences. For the Passage Fluency exercise, it led to its transformation from a forced-choice cloze to a traditional passage with reading comprehension questions. The field test also found that, as expected by authorities in Niger, some respondents of these languages sometimes wrote them down by using the Arabic script, called *ajami* meaning "foreign".

- Learned from Paraguay. By March 2010, when the field test was conducted in Paraguay, the order of the Reading Components exercises had changed based on input from previous observations. This field test offered the opportunity to confirm the advantages of the updated order before moving on to the round of main assessments. It also added more evidence that led to the reform of the Passage Fluency task. Finally, it offered an opportunity to witness the assessment at work in a pervasively bilingual (Spanish-Guarani) environment.

By the end of this process, field procedures were streamlined and fine-tuned, and several instruments had undergone significant improvements:

- A few PDN items were dropped and several others were modified.
- The Reading Components were reordered with some sections streamlined (in particular Sentence Processing), while others were reformulated (Oral Vocabulary and Passage Fluency).
- The Respondent Booklet disappeared as parts of it were merged with other tools.
- The Background Questionnaire underwent important changes.
- The Enumeration Area Information sheet was added to provide background information on the immediate environment of the respondents.
- A Supervisor Daily Report form was created to monitor the data collection activities and to track non-responses in particular.

In addition, data from the field tests were used for another important purpose: to identify suitable cut-scores to match low- and high-literate individuals to the booklet with the appropriate difficulty level. This process is used to reduce assessment time yet provide sufficient accuracy in the estimation of their competencies. In the main assessments, respondents were allocated to either a low-difficulty (Module A) or high-difficulty (Module B) form of the test. The decision to allocate a given individual to a given module was based on his or her score in the first test instrument, the so-called 'filter', which contained 17 items. The decision to set the cut-off score for the filter equal to 8 (the minimum score required for allocation to Module B) was made by analysing field test data and incorporating input from subject matter experts.

Last but certainly not least, our new understanding of the participating countries gave us a fresh perspective on the data.

5.3 The final design of LAMP

LAMP uses a battery of instruments (*see* ***Figure 5.1***) that includes:

- The Background Questionnaire. This instrument, which is administered first, gathers information about the respondent and his or her family and settings; his or her educational attainment and experience; the language learned and spoken; his or her self-reported literacy; his or her literacy and numeracy practices at work and outside work; and his or her main economic activity and that of his or her parents or guardians. This instrument is a key element to gain a meaningful understanding of the social, demographic and economic background of the respondent that may contribute to shaping his or her skills.

- The filter test. The filter test is administered after the Background Questionnaire. This is a booklet with 17 items that establish whether the respondent likely possesses lower or higher levels of literacy skills. It helps in deciding what sort of instruments should be used to gain a more in-depth picture of the respondent's skills. The score from the filter test determines whether the respondent will take the module for those with lower performance (Module A) or the module for those with higher performance (Module B). All respondents that score less than 8 are assigned to Module A while all those who score 8 points or higher are assigned to Module B.

- Module A for those with lower performance. This module is composed of two instruments. One instrument, the locator test, supplements the information produced by the filter test with more detail and establishes more precisely where the respondent stands in relation to the lower skill levels. It includes Prose, Document and Numeracy items. The other instrument, the Reading Components, enables an in-depth exploration of the elements that might be preventing the respondent from achieving a better performance.

- The Reading Components. This instrument is part of Module A and is administered to those with lower literacy skills. It is aimed to collect in-depth information on a reader's ability and efficiency in processing the elements of the written language – letters/characters, words (and non-words), sentences and larger, continuous text segments. It also provides a measure of basic oral vocabulary and of speed of response. Each country that implemented LAMP developed a set of component measures unique to its language, script and culture based on the guidelines specified in the Reading Components framework (UIS, 2009).

- Module B for those with higher performance. This module is one test but there are two versions (Booklet 1 and Booklet 2). The respondent is randomly assigned to Booklet 1 or Booklet 2. Both include Prose, Document and Numeracy items that supplement the information produced by the filter test with more detail and establish more precisely where the respondent stands in relation to the higher skill levels.

5.4 Countries implementing and collecting data for the main assessment: 2010-2011

The data collection for the group of four countries in the main assessment took place between November 2010 and October 2011. Prior to the field operations, instruments and procedures went through an extensive review, which benefitted from the experience of conducting the field test in these countries as well as four others who did not go forth with the main assessment.

Field procedures were also fine-tuned as a result of the validation process. As mentioned in the previous section, a cut-off was determined for assigning respondents to test modules based on filter test scores.

Four countries implemented the LAMP main assessment: Jordan, Mongolia, Palestine and Paraguay. The countries' sample sizes were between 2,666 and 4,666 cases (*see* ***Table 5.3***). Response rates were high – in fact, they were above average rates compared to other international assessments of adult literacy skills (OECD, 2013a; 2013b). The demographics of the participating countries are described in the following paragraphs.

Figure 5.1. The instruments comprising LAMP

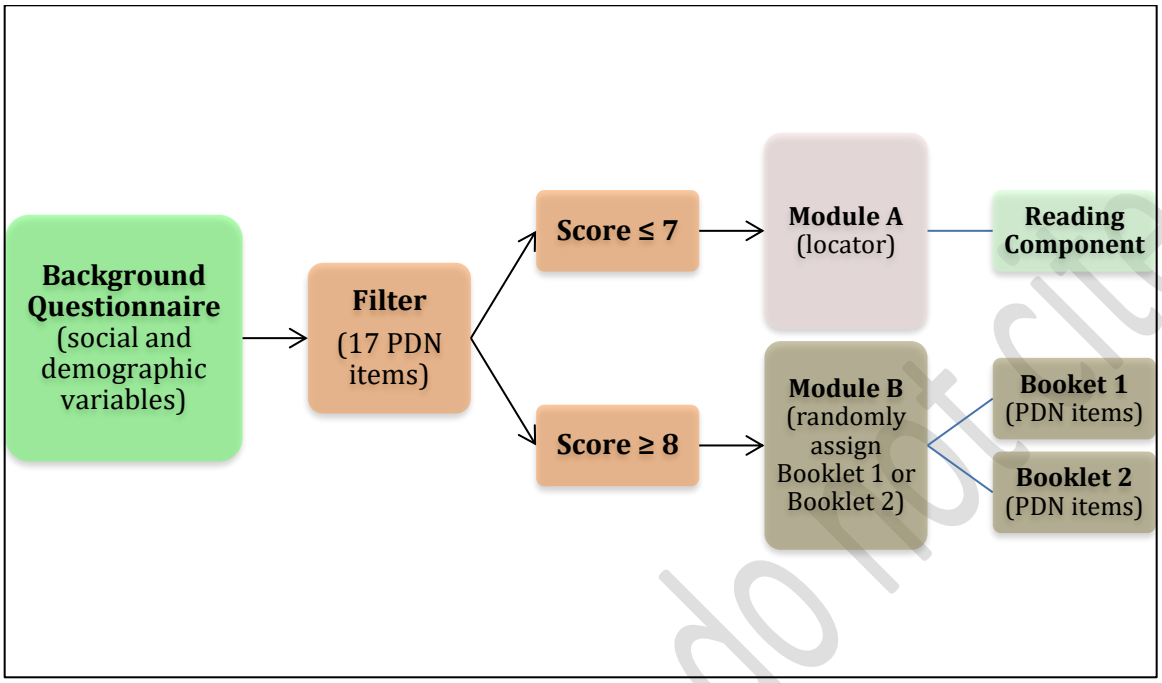


Table 5.3. Countries, implementing partners and sample sizes for the main assessment

Country	Implementing partners	Sample size	Completed
Jordan	National Centre for Human Resources Development (NCHRD), Department of Statistics (DOS), Ministry of Education (MoE)	2,666	November 2010
Mongolia	Ministry of Education, Culture and Sciences of Mongolia (MECS); Institute of Education	4,000	November 2010
Palestine	Palestinian Central Bureau of Statistics (PCBS)	3,630	July 2011
Paraguay	Ministry of Education and Culture (MEC), Organization of Ibero-American States (OEI), General Direction for Statistics and Censuses (DGEEC)	4,666	October 2011

Sampling implemented in country

In each country, respondents were selected on the basis of a set of criteria to ensure representative samples. A country went through at least three stages of sampling: The first stage involved selecting enumeration areas (clusters) from the national master sample. The second stage involved the systematic sampling of households from a list of all households from the selected enumeration areas. The third stage involved randomly selecting an individual aged 15 years or over within a household. All members of the household selected were eligible for inclusion in the sample but only one eligible member from each household was selected.

Jordan

Demographics. The Hashemite Kingdom of Jordan is a small country of 89,342 km^2 in the Middle East, bound by Syria, Iraq, Saudi Arabia, Israel and the Palestinian West Bank. The population reached 6,455,000 inhabitants by mid-July 2010. Jordan has a young population with 35.1% of residents younger than age 15 years and only 3.4% aged 65 years or over, with a median age of 22.5 years (United Nations Department of Economic and Social Affairs, Population Division, 2013b). The Jordanian population is highly urbanised with approximately 78% of Jordanians living in urban localities (Department of Statistics, 2004) with this percentage having continuously increased for two decades (United Nations Department of Economic and Social Affairs, Population Division, 2013b.)

Economy. The Jordanian economy mostly relies on its service sector – mainly tourism, transport and communication as well as finance and banking. This sector provides jobs to 79.2% of the employed population. In 2011, male participation in the labour force was recorded at 67.1% -- more than four times the participation of females, which has increased in the past decades but remains low at 15.6%. Jordan has one of the lowest employment-to-population ratios in the world at 37%[9] (World Bank, 2014). The poverty rate stood at 14.9% in 2010 (World Bank, 2014). Jordan ranks 95th on the Human Development Index (HDI) and its value of 0.698 means the country falls under the "medium human development category" (United Nations Development Programme, 2011).

Education. Basic education in Jordan consists of two compulsory cycles – six years of primary and four years of lower secondary schooling. In 2011, Jordan reported a net secondary enrolment rate[10] of 87.9%, a mean years of schooling[11] of 9.9, and a school-life expectancy[12] of 13.2 years (UIS, 2014b).

Mongolia

Demographics. Mongolia is an Eastern Asian country, landlocked between China and Russia. The population reached 2,713,000 inhabitants by mid-July 2010 with 27% younger than age 15 years, only 3.8% aged 65 years or over and a median age of 25.7 years (United Nations Department of Economic and Social Affairs, Population Division, 2013b). Slightly more than half (57%) of the population lives in urban areas (World Health Organization, 2011). The rest of

9 Based on ILO estimates.

10 Net enrolment rate is reported for both sexes. It is the ratio of children of official secondary school age who are enrolled in secondary school to the population of official secondary school age.

11 Average number of completed years of education of a country's population, excluding years spent repeating individual grades. Mean years of schooling are based on ISCED 1 or higher and reported for the population 25 years and up and for both sexes (UIS 2014a). Data are based on UIS estimates.

12 The total number of years of schooling that a child entering the school system could expect to receive in the future, assuming that the probability of his or her enrolment is equal to prevailing participation rates.

the population lives in rural areas in a nomadic or semi-nomadic way or resides in *soum*[13] centres. Approximately one third of the total population lives in the capital, Ulaanbaatar, which only occupies 0.3% of the territory (Tsogtsaikhan, 2008).

Economy. Mongolia's economy has been traditionally based on agriculture, the sector employing 32.5% of the working population and contributing to 14.5% of the GDP in 2011. The male participation rate in the labour force was reported at 68.1% in 2011 while female participation was slightly lower at 55.6% (World Bank, 2014). Mongolia ranks 110th on the HDI and its value of 0.653 places Mongolia below the average of other Asian countries, placing the country in the "medium human development" category (United Nations Development Programme, 2011).

Education. Basic education in Mongolia consists of two cycles – five years of primary and four years of lower secondary schooling. In 2011, Mongolia reported a net secondary enrolment rate of 66%, mean years of schooling of 8.8[14] and a school-life expectancy of 14.8 years (UIS, 2014b).

Palestine

Demographics. The State of Palestine in the Middle East is comprised of the West Bank (5,860 km^2)and the Gaza Strip (360 km^2). Its population reached 4,013,000 inhabitants by mid-July 2010 (United Nations Department of Economic and Social Affairs, Population Division, 2013a). The Palestinian population is highly urbanised with approximately 73.8% of Palestinians living in urban localities in mid-2012, 16.8% in rural areas and 9.4% in refugee camps, which are generally located in urban areas (Palestinian Central Bureau of Statistics, 2012). Palestine has a young population structure with 42.1% younger than age 15 years, only 2.8% aged 65 years or over and a median age of 18.2 years (United Nations Department of Economic and Social Affairs, Population Division, 2013b).

Economy. The Palestinian economy mostly relies on its service sector, providing jobs to 62.4% of the employed population. In 2011, a quarter of the Palestinian labour-force remained unemployed. Male participation in the labour force is recorded at 66.1%, significantly more than female participation at 14.8%. Additionally, 25.8% of Palestinians live in poverty (World Bank, 2014). Palestine ranks 114th on the HDI in 2011 and its value of 0.641 places the country in the "medium human development" category (United Nations Development Programme, 2011).

Education. Basic education in Palestine consists of two cycles – six years of primary and four years of lower secondary schooling. In 2011, Palestine reported a net secondary enrolment rate of 80.8%, mean years of schooling of 8.6, and a school-life expectancy of 13.3 years (UIS, 2014b).

[13] Administrative subdivision of *aimags* or provinces, which are the first of the largest administrative unit.

[14] Based on latest available data collected in 2000.

Paraguay

Demographics. The Republic of Paraguay is a landlocked state in South America, surrounded by Argentina, Bolivia and Brazil. The population of Paraguay reached 6,460,000 inhabitants by mid-July 2010. Paraguay has a relatively young population with approximately 33.5% younger than age 15 years, only 5.2% aged 65 or over and a median age of 23.1 years (United Nations Department of Economic and Social Affairs, Population Division, 2013b). Paraguay's population is unequally distributed as approximately 97.3% of the people live in the Oriental Region that represents only 40% of the territory. The population is mainly urban – 62.1% of Paraguayans live in urban areas in 2011 (United Nations Development Programme, 2011) and this figure has increased by more than 10 percentage points since 1990 (World Health Organization, 2011).

Economy. The Paraguayan economy is highly dependent on foreign trade and mostly relies on agriculture that provides jobs to 26.4% of the working population. The male participation rate in the labour force was reported at 84.8% in 2011 while female participation was lower at 55.1%. The overall unemployment rate is 5.6% (World Bank, 2014). Paraguay ranks 107th on the HDI and its value of 0.665 places the country in the "medium human development" category (United Nations Development Programme, 2011).

Education. Basic education in Paraguay consists of six years, comprising the first and second cycles of compulsory education, after which students receive a leaving certificate. In 2011, Paraguay reported a net secondary enrolment rate of 62.6%, mean years of schooling of 7.7 and a school-life expectancy of 12.1 years (UIS, 2014b).

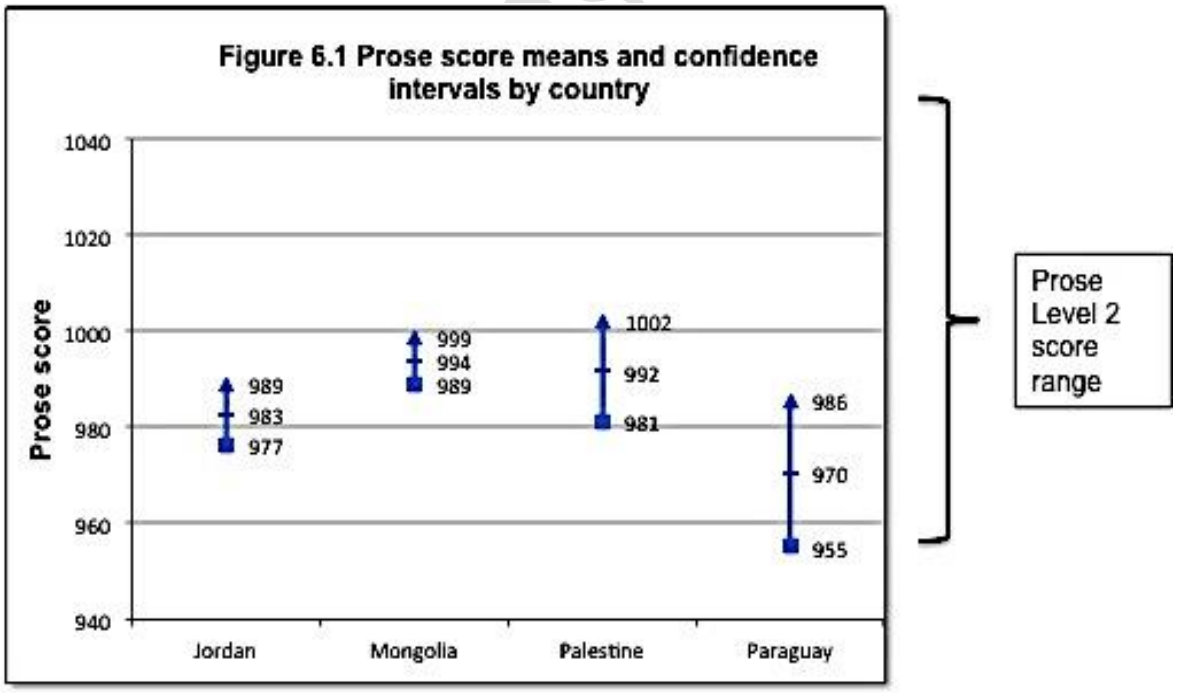
Chapter 6. LAMP literacy and numeracy results for countries[15]

This chapter presents the results from the main assessments for the four countries that participated: Jordan, Mongolia, Palestine and Paraguay. This chapter focuses on average results for Prose, Document and Numeracy, and the correlations between scores on these assessed domains within each country. Each country was assessed using LAMP and the scores in each domain were reported on a scale ranging from 600 to 1,400. The scores in each domain when all countries are pooled have an average value of 1,000 and the standard deviation of the scores is 100.

6.1 Literacy levels in Prose Reading

Figure 6.1 shows each country's estimated average score in LAMP Prose Reading along with the corresponding 95% confidence interval. Each country's Prose average has been estimated from the sample to which LAMP was administered and as it is a sample, it contains some error. The 95% confidence interval shows a range of values (i.e. a country's average score will be within this range in 95% of all possible samples drawn from the population). A country's sample average is marked in the middle of the range, and the top and bottom of the range are shown as well. For example, in Figure 6.1, Jordan's average was estimated to be 983. The 95% confidence interval ranges from 977 to 989. Thus, we are 95% confident that Jordan's true average Prose score is between 977 and 989. The smaller the range of the confidence interval, the more precise is the estimate of the average in these results.

Figure 6.1. Prose score means and confidence intervals by country



[15] Basic statistics, including standard errors of the mean, for this and the remaining chapters of this document are found in **Annexes 3, 4, 5** and **6**.

Figure 6.1 allows a comparison across countries to determine whether a country's average is significantly higher than another's. When the confidence intervals for some countries overlap, we are not confident that those countries' averages are truly different. The countries' averages are rather close to one another. In Figure 6.1, only one difference is statistically significant: Mongolia's average is higher than Paraguay's when it comes to Prose skills.

Figure 6.2 shows the percentage of respondents in each country at each of LAMP's Prose Reading Performance Levels. Not all LAMP respondents in a country received the same Prose Reading score, instead, Prose Reading scores are spread along the LAMP score scale. A country's LAMP Prose Reading results can also be summarised by displaying the percentage of the respondents who read prose at each of LAMP's Prose Performance Levels.

Figure 6.2. LAMP Prose Performance Levels comparison

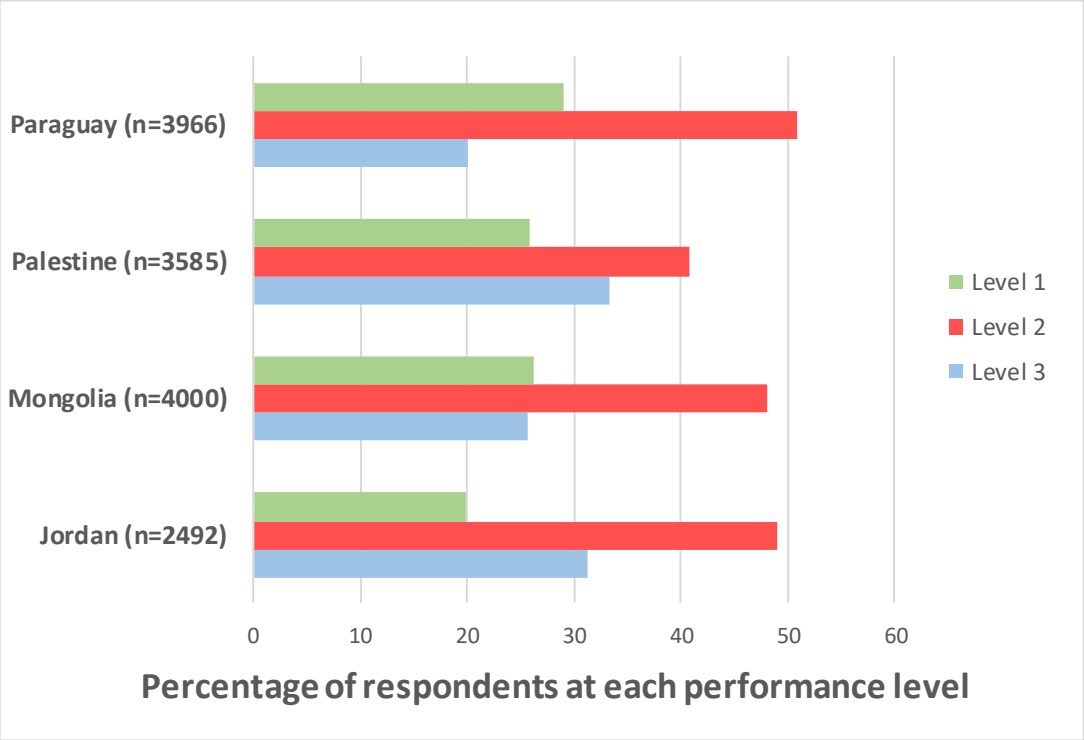


Figure 6.2 shows that countries vary in the percentage of persons at each level: 20% to 29% at Level 1, 41% to 51% of persons performing at Level 2 and 20% to 31% at Level 3. The largest group of persons in each country performed at Level 2. Figure 6.2 shows that in Prose Reading in the four countries:

a. Level 1. Less than 30% of respondents can: identify literal, concrete information in reading-to-do passages (e.g. job vacancy notices, product labels and vaccination information) or simple one-paragraph passages, provided that (i) language is identical in passages and questions; (ii) only everyday colloquial vocabulary is required; and (iii) choices or distractors are absent from the questions. Respondents can produce answers that require minimal action (e.g. circling, underlining, copying a short fragment of text).

c. Level 2. 41% to 51% of the respondents can do everything in (a) and in addition can: Identify literal information in reading-to-do or reading-to-learn passages when the required information appears in reading-to-do passages in a brief, clearly marked section or in reading-to-learn passages near the beginning of the text; and when (i) language is not identical in passages and questions and (ii) questions do not have choices. Respondents can paraphrase, understand more 'academic' language and write full-sentence answers.

d. Level 3. 20% to 31% of the respondents can do everything in both (a) and (b) and in addition can: Identify literal information in longer, more challenging reading-to-learn texts (1-10 paragraphs) with linguistically dense passages or when the required information is in the middle or end of the passage – not the beginning – and when questions may or may not have choices or distractors.

6.2 Literacy levels in Document Reading

When it comes to LAMP Document reading as displayed in **Figure 6.3**, we find once again that all national averages are rather close and many confidence interval ranges overlap. Thus, most countries' averages are not significantly different from one another. There is only one statistically significant difference in the averages: Jordan's average is higher than Paraguay's when it comes to Documents reading skills.

Figure 6.3. Document score means and confidence intervals by country

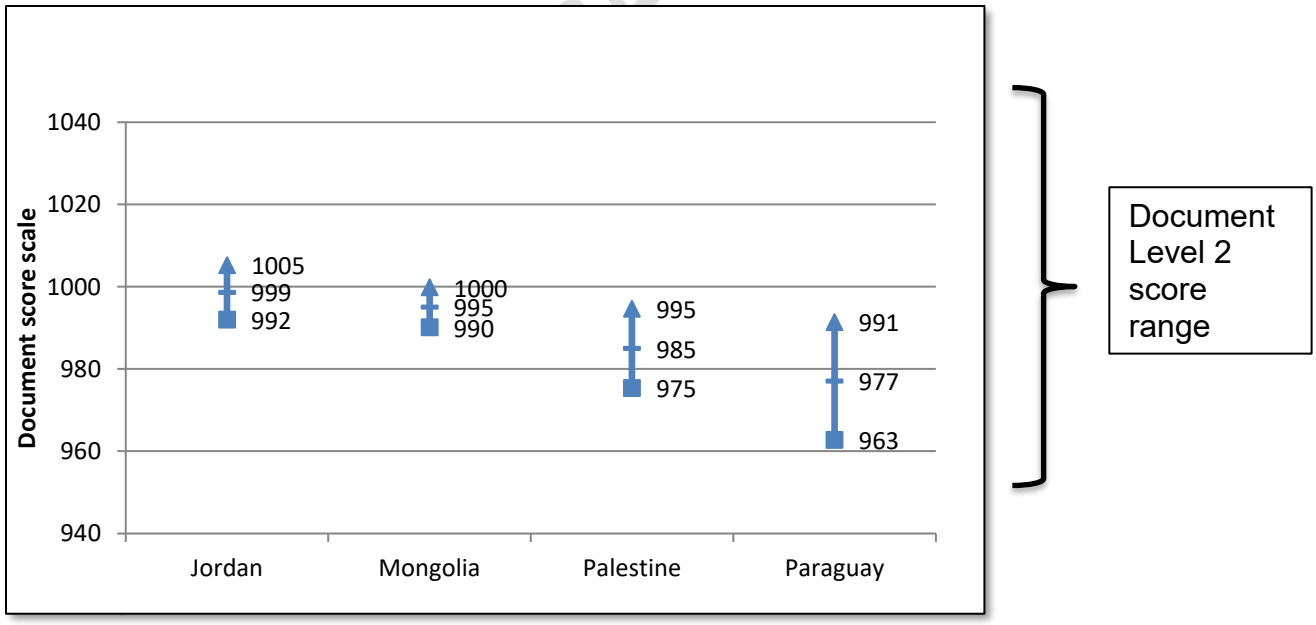
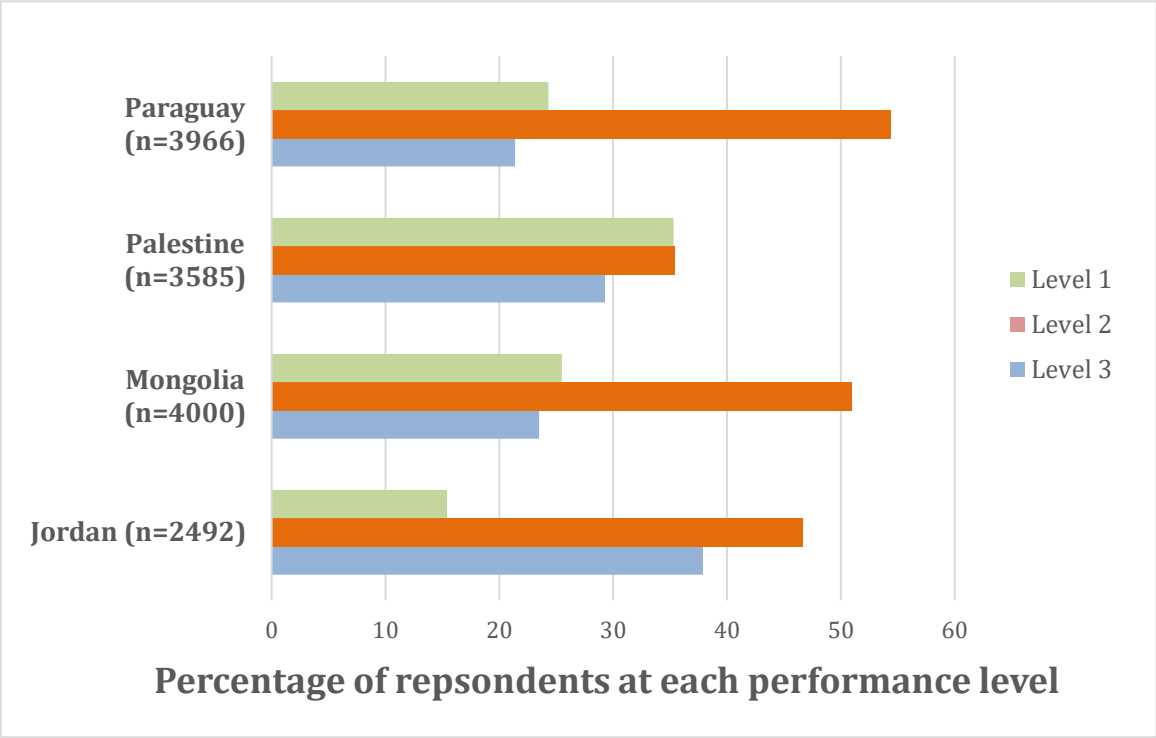


Figure 6.4 shows the percentage of respondents in each country at each of LAMP's Document Reading Performance Levels. Document reading scores are spread along the LAMP score scale. A country's LAMP Document Reading results can be summarised by displaying the percentage of respondents who read prose at each of LAMP's Document Performance Levels.

Figure 6.4. LAMP Document Performance Levels comparison



The figure shows that countries vary in the percentage of persons at each level: 15% to 35% at Level 1, 35% to 54% of persons performing at Level 2 and 21% to 38% at Level 3. The largest group of persons in each country performed at Level 2, with the exception of Palestine, which has about the same percentage at Levels 1 and 2. Figure 6.4 shows that in Document Reading in the four countries:

a. Level 1: Less than 35% or fewer of respondents can identify a single piece of information in simple reading-to-do or reading-to-learn documents (passages, graphs or tables) provided that: (i) language is mostly identical in stimuli materials and questions; (ii) only one or two variables are included in the materials; and (iii) only a few choices or distractors are present in the questions – although potentially these are always present.

b. Level 2: 35% to 54% of the respondents can do everything in (a) and in addition can understand reading-to-learn graphs or tables that include two or three variables with descriptive labels; compare or contrast numerical information or processes; and coordinate and match parallel information (e.g. time and activity data in one table), provided that language is mostly identical in stimuli and when questions have several distractors present.

c. Level 3: 21% to 38% of the respondents can do everything in both (a) and (b) and in addition can understand complex documents and integrate information from complex sources (densely packed tables, multiple graphs) in order to identify numerical values given a set criterion; fill out complex forms by turning personal data into categorical variables; and when language differs in passages and questions or is 'academic' (e.g. value, rates).

6.3 Numeracy levels

In Numeracy, once again all national averages are rather similar to each other. As shown in **Figure 6.5**, the order of the national averages is not the same as in either Prose or Document Reading. The average scores for Jordan and Paraguay are not statistically different from each other. However, all other differences are statistically significant: Mongolia's average score is higher than the average scores of the other three countries, while Palestine's is lower than those of the other three countries.

Figure 6.6 shows the percentage of respondents in each country at each of LAMP's Numeracy Performance Levels. Numeracy scores are spread along the LAMP score scale. A country's LAMP Numeracy results can also be summarised by displaying the percentage of the respondents who perform at each of LAMP's Numeracy Levels.

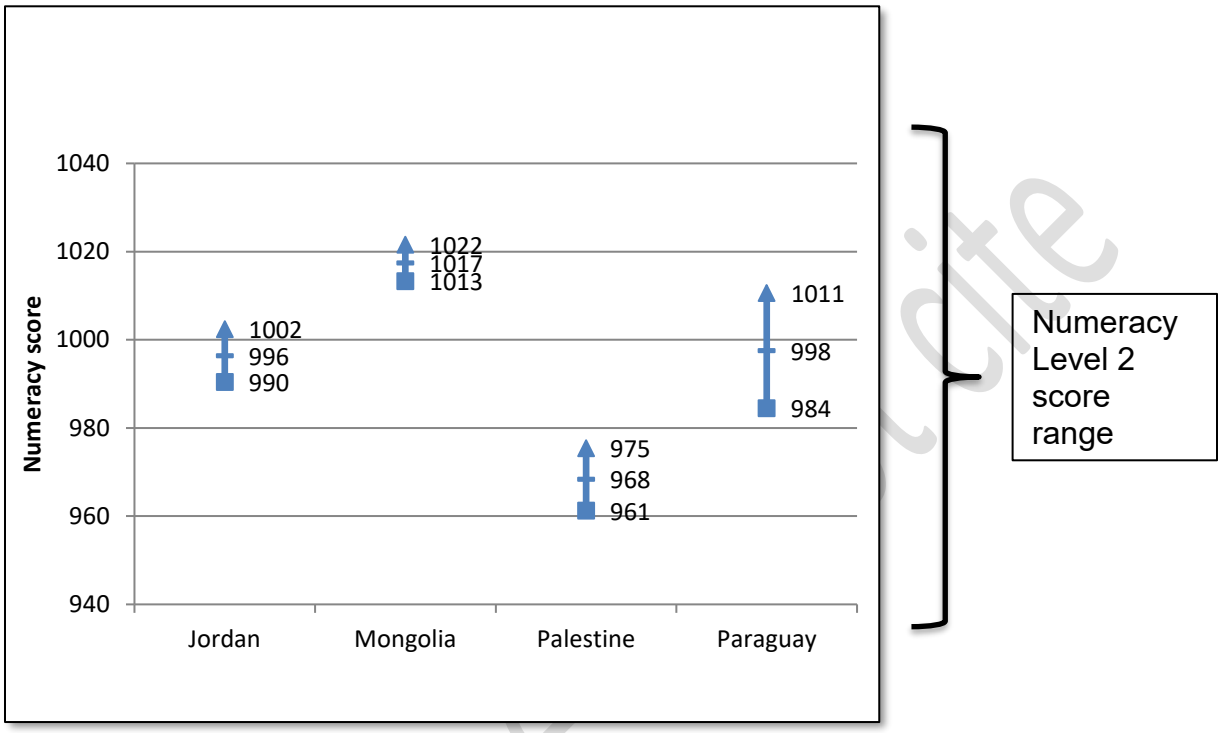
Figure 6.6 shows how countries vary in the percentage of persons at each level: 17% to 36% at Level 1, 42% to 45% of persons performing at Level 2, and 22% to 38% at Level 3. The largest group of persons in each country performed at Level 2, with the exception of Palestine that has about the same percentages at Levels 1 and 2. Figure 6.6 shows that in Numeracy in the four countries:

a. Level 1: 36% or fewer of respondents can answer explicit questions requiring a one-step, simple operation; add 3 whole numbers with 2-3 digits or with decimals in a 'money' context; and subtract 2 whole or decimal numbers in a 'money' context when they are presented with material communicating information in a familiar context with easily accessible quantitative information due to its visual representations and minimal text. Questions contain no choices or distractors.

b. Level 2: 42% to 45% of the respondents can do everything in (a) and in addition can complete tasks involving some fractions and decimals; understand and use some simple fractions such as one-half (½) written with numbers or words; can demonstrate some understanding of the meaning of decimal numbers; and multiply a decimal number and a whole number when they are presented with material communicating information in a familiar context.

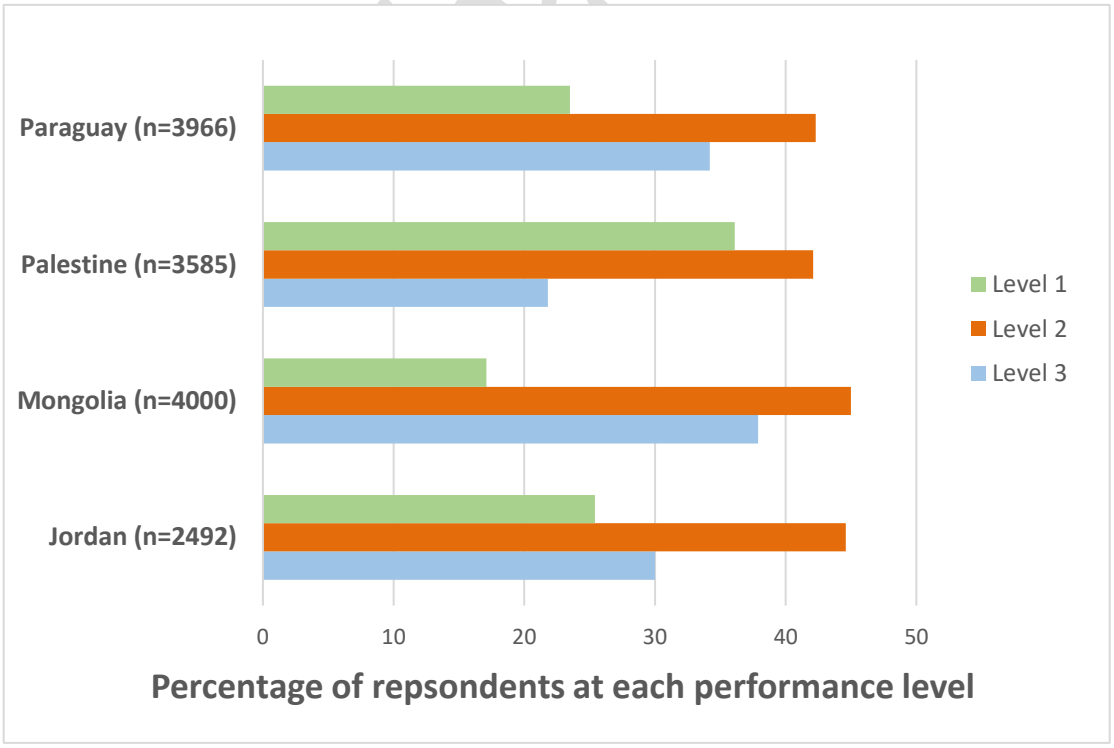
c. Level 3: 22% to 38% of respondents can do everything in (a) and (b), and in addition can perform multiple-step operations that require multiplication (maybe by repeated addition) and then division (maybe by repeated subtraction); subtract a per cent from an initial value; find a proportion by combining operations in a money context (sometimes with decimals); add 3 numbers (sometimes with decimals) after computing 2 of them through multiplying by 10 or 2; read time using clocks or in numeric form; interpret qualitative or quantitative data from tables or price tags with per cents, decimals and whole numbers; and can represent money and weight using appropriate measurement units when they are presented with complex tasks with several visual representations and asked explicit questions that may or may not have choices or distractors.

Figure 6.5. Numeracy score means and confidence intervals by country



d.

Figure 6.6. LAMP Numeracy Performance Levels comparison



6.4 Summary

Overall, the four countries participating in the LAMP main assessment performed similarly across all three domains as most national averages are similar to one another; few differences between national averages are statistically significant; and the ordering of the national averages is not the same for each domain. This means that different countries do slightly better in different domains and no individual country stands out across all domains.

Chapter 7. The performance of socio-demographic subgroups on LAMP literacy and numeracy measures[16,17]

Scores from adult literacy and numeracy assessments (i.e. household-based assessments like LAMP and PIAAC) are correlated with – although not necessarily explained[18] by – a combination of socio-demographic and policy-sensitive variables. These include gender and the seven 'Ls':

- Learning (formal schooling, non-formal education, literacy self-report)
- Lifespan (age and cohort)
- Legacies (parental education and occupation, socio-economic status)
- Location (urban-rural)
- Leisure (use of reading and numeracy skills outside of work)
- Livelihood (use of reading and numeracy skills at work)
- Language (mother tongue, home language, bilingual status).

These seven variables provide the structure for this chapter. The variable gender is discussed both separately and integrated into the sections on the other variables throughout the discussion.

The last variable, language, is discussed in Chapter 8, which presents a case study on language in Paraguay since the other three countries included in this report are relatively homogeneous in terms of their populations' mother tongues and home languages.

7.1 Literacy, numeracy and learning: Schooling and non-formal education

Participation in education remains the best correlate with adult reading and numeracy skills (OECD, 2006; OECD, 2014a). This section describes the populations of LAMP countries in terms of their participation in non-formal, informal and formal education[19], and subsequently describes the link between learning and skills. Education is such an important predictor of skills that the analyses in subsequent sections, which will focus on the relationship between skills and other variables (either socio-demographic variables or practices), will present results adjusted and unadjusted for education.

[16] The percentage of respondents in each country who performed at each of the LAMP Performance Levels is provided in **Annexes 7 through 18**. These annexes disaggregate the data in the same way as the data are presented in the text of this chapter.

[17] The sample sizes, means, standard deviations and standard errors of measurement for all disaggregated data presented in this chapter are reported in **Annexes 3 to 6**.

[18] "Predict" does not necessarily mean, "explain": prediction does not equal causation.

[19] Classification of Learning Activities.

i) Background on schooling and non-formal education in the four countries that used LAMP

Non-formal education participation

In the four countries implementing LAMP, participation in non-formal education and literacy programmes is relatively low. **Table 7.1** shows that the percentage of adults (aged over 15 years) who have participated in literacy programmes does not exceed 3% in any of the countries. Participation is slightly higher among women than among men. When LAMP participants were asked why they did not participate in a literacy programme, the most frequent answer pointed to opportunity costs (e.g. "timing was not convenient"), which is a recurring challenge of adult education.

Table 7.1 Participation in literacy programmes (%)

	Jordan		Mongolia		Palestine		Paraguay	
	Female	Male	Female	Male	Female	Male	Female	Male
Participated in literacy programme	1.6	0.6	3.0	2.1	1.8	1.1	1.2	0.4
Participated in literacy programme (in the last 12 months)	0.3	0.2	0.9	0.2	0.2	0.2	0.7	0.2
Aware of a literacy programme in which respondent wanted to participate (in the last 12 months)	2.8	3.4	6.2	4.7	0.7	0.3	1.9	1.5
Reasons for not participating								
Timing was not convenient	57.4	67.0	39.9	55.8			28.5	71.6
Could not afford paying its costs	3.1	4.7	0.5	0.0			4.0	2.5
Received bad references for the programme	0.0	0.0	0.0	0.0			40.0	0.0
Health problems prevented from attending	6.0	3.1	5.5	5.3			21.0	5.1
Spouse or family would not like it	16.3	5.2	1.9	3.5			0.4	0.0

Source: LAMP, 2010-2011.

Participation in non-formal education programmes other than literacy ranged from 9% to 16% in the last 12 months (*see* ***Table 7.2***). Participation is slightly higher among men in Jordan and Palestine but the opposite is true of Mongolia and Paraguay.

Table 7.2. Participation in non-formal education programmes (%)

	Jordan		Mongolia		Palestine		Paraguay	
	Female	Male	Female	Male	Female	Male	Female	Male
Participated in the last 12 months	9.2	11.8	16.2	12.1	9.2	13.0	13.6	12.2
Most important set of skills developed								
Social skills/personal development	46.7	29.6	21.8	32.6	40.6	25.1	27.8	18.4
Work-related skills	18.5	46.5	46.0	50.0	8.2	33.5	52.3	59.4
Computer skills	24.1	8.5	4.2	2.0	26.1	22.6	14.7	19.9
Language skills	9.0	15.4	25.4	12.0	11.6	11.4	5.0	2.3
Other	0.0	0.0	2.6	3.4	13.4	6.5	0.0	0.0
Missing	1.8	-	-	-	-	1.0	0.2	0.2
Most important reason for participating								
Employer asked to do it	4.4	26.6	25.3	24.3	3.9	11.0	8.8	20.2
To perform better in the job/the business	14.3	26.9	33.2	34.0	12.2	28.6	45.9	40.5
Curiosity/personal interest	72.9	43.4	39.2	39.2	77.2	55.3	44.2	39.1
Other	3.1	3.1	2.4	2.3	6.7	4.1	0.5	0.0
Missing	5.3	-	-	0.3	-	1.0	0.7	0.2
Type of organization that provided education								
National governmental body	34.5	30.5	25.4	32.2	8.8	24.5	33.4	51.6
Provincial/local governmental body	15.8	17.0	8.1	10.2	14.2	9.0	0.2	0.0
Non-governmental organization	4.8	1.2	15.3	13.8	9.4	7.8	45.3	40.5
Religious organization	6.8	2.5	0.0	0.0	8.6	3.1	9.7	2.5
Community organization	5.1	0.5	9.1	7.4	5.8	8.1	6.8	2.0
Private business	26.5	44.7	38.0	33.8	43.5	37.9	2.2	1.8
Other	4.8	1.8	3.9	2.6	9.5	8.4	2.0	1.4
Missing	1.8	1.8	0.1	-	-	-	0.5	0.2
Who paid most of the cost								
Own resources, family resources or loans	50.4	36.6	57.7	51.9	40.8	37.6	43.4	42.7
Provided for free	39.4	31.6	24.4	26.0	55.4	49.7	43.8	33.9
Employer	8.0	26.2	15.2	20.1	3.7	8.4	10.4	15.6
Other	0.3	2.2	2.3	1.5	0.1	3.3	2.2	7.6
Missing	-	-	0.4	0.5	-	1.0	0.3	0.2
Cost partly or entirely reimbursed	2.8	3.4	5.5	1.2	5.5	1.2	2.7	1.3

Source: LAMP, 2010-2011.

The reasons for participating in non-formal education vary substantially across countries and genders. In Jordan and Palestine, where female participation in the labour force is low, most women claim to participate in non-formal education out of curiosity and personal interest. On the other hand, in Mongolia, well known for its reverse gender gap in educational attainment, the distribution of reasons is virtually identical for men and women.

Formal schooling participation

By comparison, participation in formal schooling is relatively high in the four countries. The percentage of adults who attended formal education ranges between 95% and 98% (*see* ***Table 7.3***). Adults in countries who administered LAMP attended school for more than 10 years on average, with Paraguay being the only exception with a mean of 9 years of schooling. In all countries, the largest proportion of adults completed at least secondary education. Around half of Jordanians and Mongolians completed the secondary level, compared to two thirds of Palestinian respondents. In Paraguay, around 40% of adults completed secondary education. Education attainment was computed based on the questions posed to respondent and then classified according to ISCED 1997.

Table 7.3. Participation in formal education, mean years of schooling and educational attainment (%)

	Jordan	Mongolia	Palestine	Paraguay
Attended formal schooling	95.3	97.9	95.7	98.0
Mean years of formal schooling	11.0	10.3	10.4	9.0
Primary (ISCED[20] 1) or less	27.0	11.2	7.2	38.2
Secondary (ISCED 2 or 3)	45.5	50.2	68.4	39.4
Post-secondary (ISCED 4 to 6)	27.5	38.6	24.4	22.4
Total	**100**	**100**	**100**	**100**

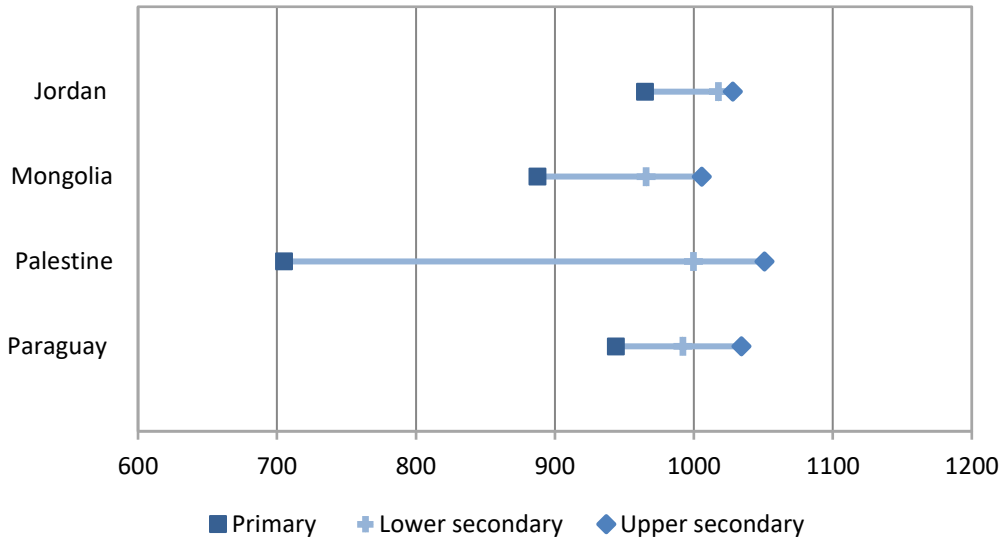
Source: LAMP, 2010-2011.

ii) Educational attainment and LAMP results

Educational attainment is, as expected, strongly associated with skills in all three domains: Prose, Document and Numeracy average scores are lowest for adults who completed only primary education. Performance scores are highest for those who completed upper secondary education (***see Figures 7.1***, ***7.2*** *and* ***7.3***). The size of the gap in average performance on the LAMP scale between adults who completed only primary education and those who completed upper secondary education varies across countries. Interestingly, gaps are of comparable magnitude across domains in most countries. In Mongolia, the gap ranges from 113 to 118, whereas it varies between 82 and 90 in Paraguay. In Jordan, the gap varies between 44 and 63 points. In Palestine, the performance gap is larger for Prose and Document reading skills – exceeding 300 points for both literacy assessments – but is relatively lower in Numeracy skills with 200 points difference between persons who completed primary education and those who completed upper secondary education.

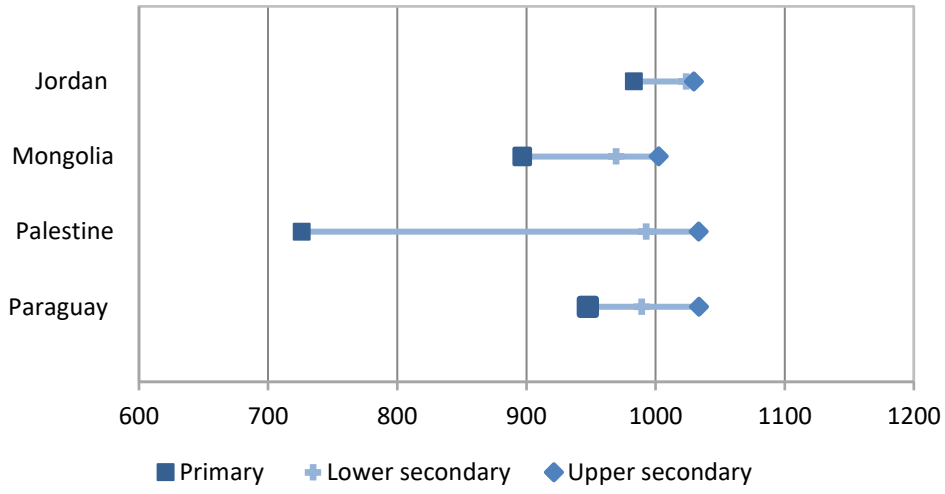
[20] LAMP data were collected in reference to ISCED 1997.

Figure 7.1. Mean Prose Reading scores by highest completed education level



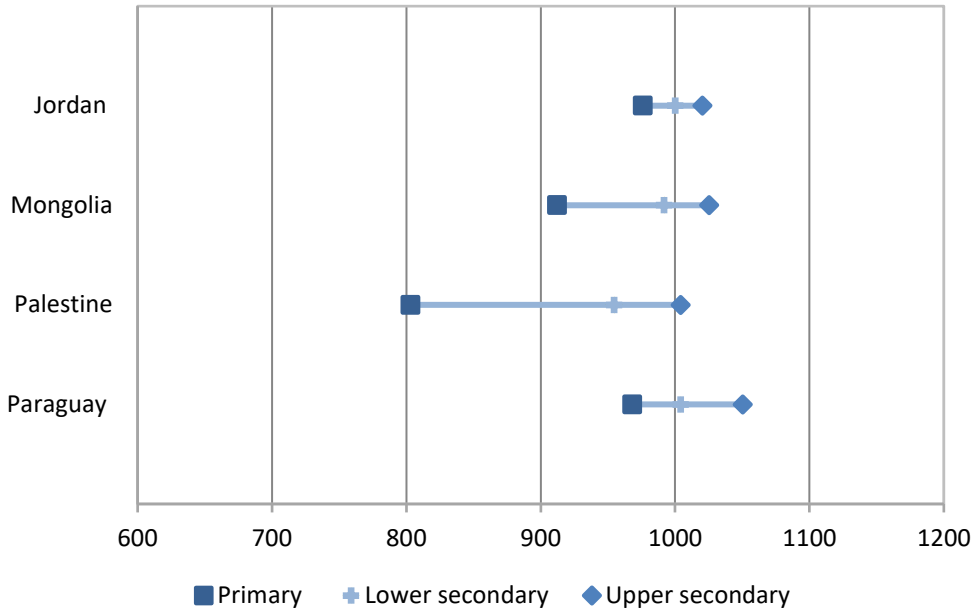
Source: LAMP, 2010-2011.

Figure 7.2. Mean Document Reading scores by highest completed education level



Source: LAMP, 2010-2011.

Figure 7.3. Mean Numeracy scores by highest completed education level

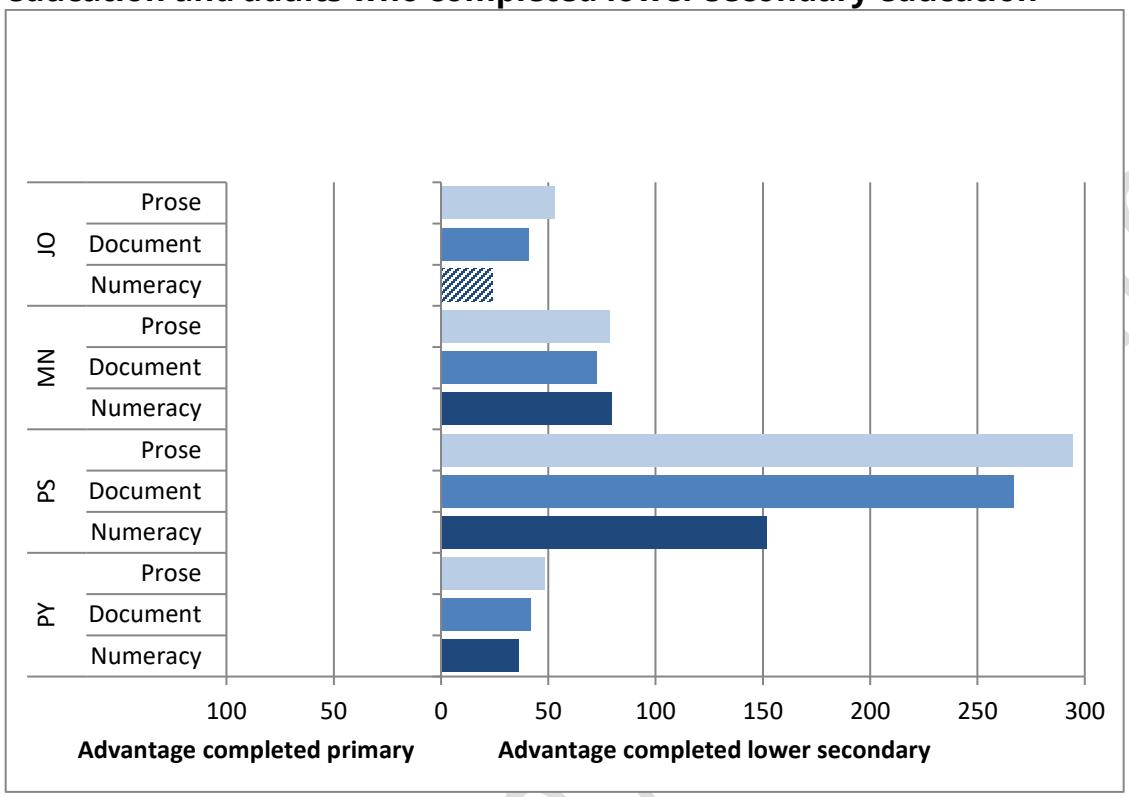


Source: LAMP, 2010-2011.

There is a significant advantage for those who completed lower secondary compared to those who completed only primary education (***see Figure 7.4***). In the figure, the term 'advantage' is the difference between the means of two groups – in this case, those who completed lower secondary and those who completed primary. The advantage is statistically significant in Prose and Document Reading scores in all four countries and it ranges from 40 to 295 points. In Numeracy skills, the mean difference between the primary and lower secondary groups is statistically significant in all countries except Jordan. The average advantage in favour of adults who completed lower secondary education ranges from 35 to 150 points on the Numeracy scale.

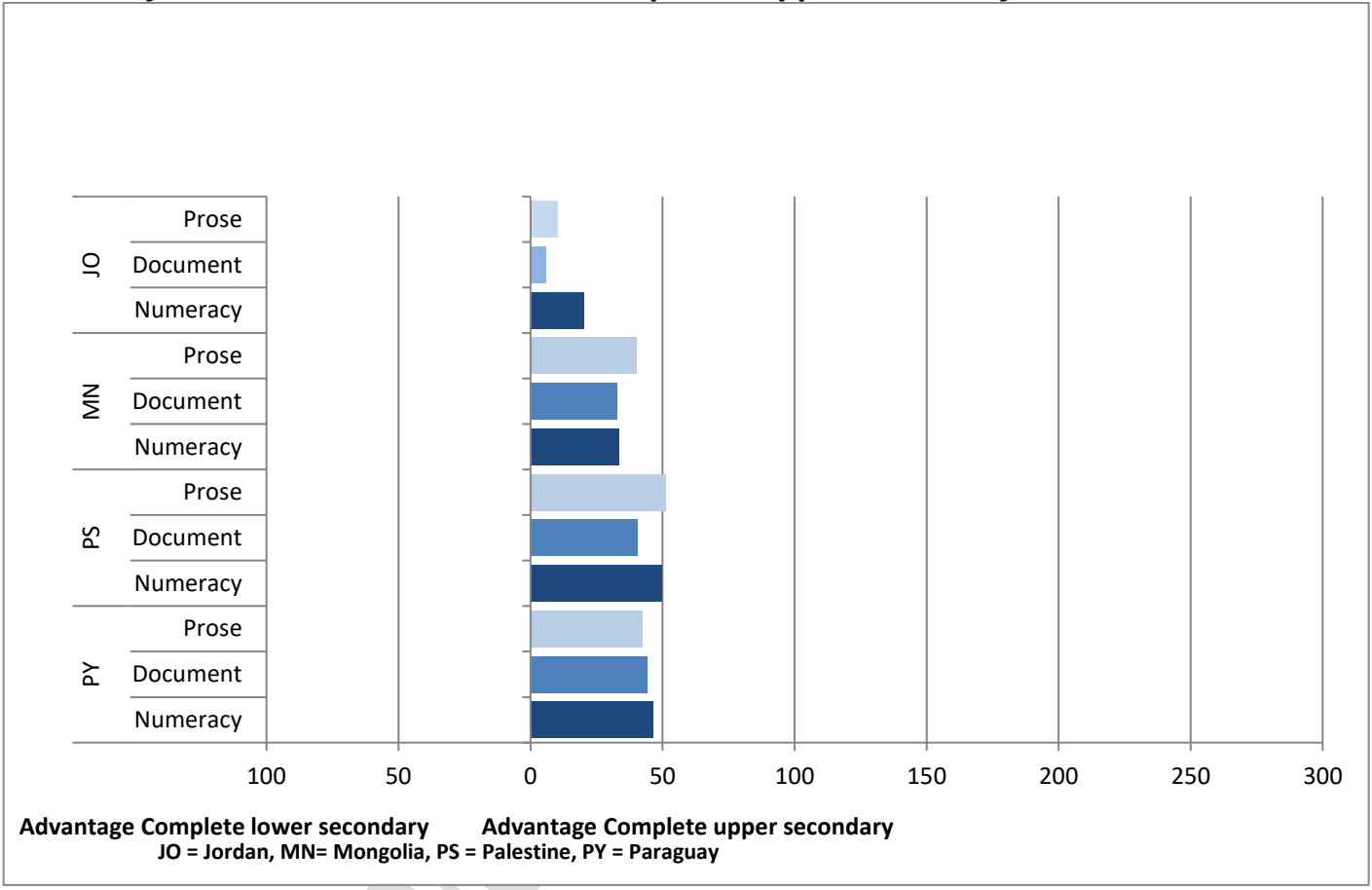
Adults who completed upper secondary education also have higher scores on average compared to those who have completed lower secondary (***see Figure 7.5***). The advantage, although remaining statistically significant, is slightly lower in Mongolia, Palestine and Paraguay – it ranges between 33 and 51 points. In Jordan, there is no statistically significant score difference between those two groups in any domain.

Figure 7.4. Mean scores differences between adults who completed primary education and adults who completed lower secondary education



Source: LAMP, 2010-2011.

Figure 7.5. Mean scores differences between adults who completed lower secondary education and adults who completed upper secondary education



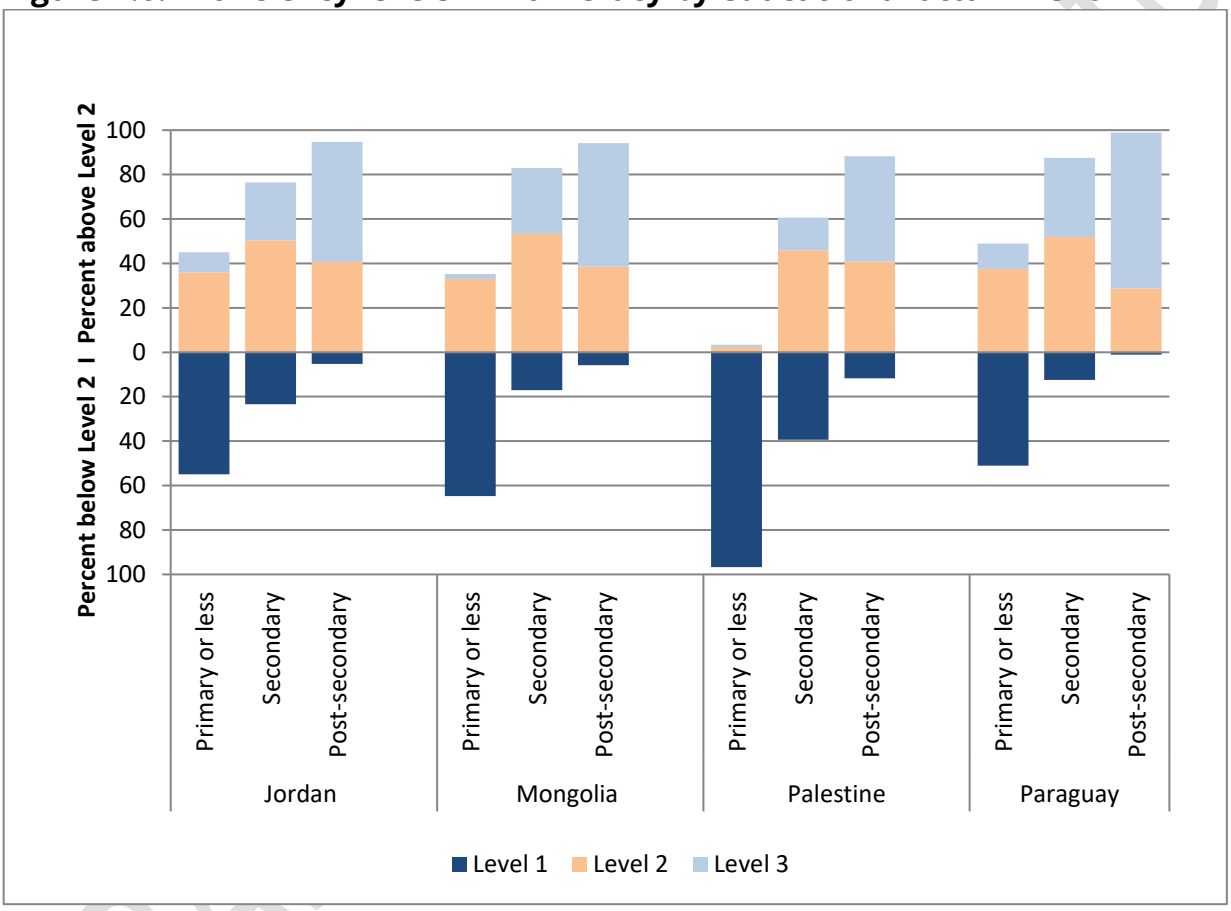
Source: LAMP, 2010-2011.

The findings showing a positive relationship between the amount of formal education and reading and numeracy performance are consistent with results from numerous studies that have shown educational attainment to be a major correlate of adult literacy performance that can be attributed to formal education (OECD and Statistics Canada, 2000; Desjardins, 2003; OECD, 2013b; OECD 2013c; Charette and Meng, 1998; Green and Riddell, 2003; OECD and Statistics Canada, 2005).

However, the relationships between educational attainment and literacy and numeracy skills are complex. A low level of formal educational attainment does not imply low reading or numeracy proficiency in all cases, and post-secondary education does not guarantee high proficiency. In all four countries, there is a non-negligible share of adults scoring at the highest proficiency level within the group who received only primary education, in all three domains. In Jordan and Paraguay, for example, one out of ten adults with low educational attainment score at the highest level (Level 3) in Numeracy. Conversely, 5% to 12% of adults with post-secondary education score at the lowest proficiency level in Jordan, Mongolia and Palestine (*see* ***Figure 7.6***).

Some studies have indicated that the relationship between educational attainment and proficiency can be attenuated by the influence of some individual literacy practices and experience, especially for working adults, and also by the effect of aging (OECD, 2014a). Moreover, the relationship may be observed as the individuals with greater proficiency are more likely to have higher qualifications, given the examination requirements for entry into higher education in many countries (Green and Riddell, 2003; OECD, 2013a). Therefore, skill acquisition, development and maintenance are a complex process, and other factors involved deserve further analysis.

Figure 7.6. Proficiency levels in Numeracy by educational attainment



Source: LAMP, 2010-2011.

7.2 Literacy, numeracy and gender

According to OECD and Statistics Canada, "until recently, men have typically obtained more education than women; and because education is an important determinant of skills development (...), differences in education may be responsible for differences in the skills of men and women" (OECD and Statistics Canada, 2005, p. 46). This is why any analysis of the gender distribution of literacy and numeracy performance should start by describing the situation of men and women within a country – not just in terms of education but also in relation to employment and everyday practices.

i) The situation of men and women in countries that administered LAMP

The socio-demographic profiles of men and women vary considerably across the four countries (*see* ***Table 7.4***).

In terms of education, Mongolia is one of the best known examples of a reverse gender gap as evidenced in this study by the much higher proportion of women with post-secondary education. This is also starting to happen, to a lesser degree, in Paraguay. Palestine is approaching gender parity in education. Jordan still shows women at a disadvantage with lower median years of schooling for women. While in Mongolia and Paraguay women are slightly more likely to be tertiary students than men, the reverse is true for Palestine and Jordan.

As for occupational status, women are less likely than men to be employed in all four countries, but there is also considerable variation among women in the four countries. The female employment rate is much lower in Palestine (6.7) and Jordan (8.9) than in Mongolia (37.4) and Paraguay (40.2), while the male employment rate is less variable. The ratio of women-to-men employment rate is highest in Mongolia.

Among those employed, women are more likely than men to concentrate in high-skilled occupations in all countries but Jordan. In Palestine, this concentration is quite striking, with 89.4% of all employed women in these occupations. However, since such a small proportion of women are employed, they do not represent the majority of the high-skilled workforce. In Mongolia, on the other hand, most professionals are women as are most clerical support, services workers and sales workers.

In all countries but Jordan, women use their numeracy skills at work as much as men do, and they use their literacy skills even more. In Jordan, gender parity is found for the use of literacy skills, while women use their numeracy skills less than men.

In Mongolia and Paraguay, women are slightly more likely than men to be retired, which are consistent with women's marginally higher median age, coupled with their typically lower retirement age.

Regarding the use of literacy skills for leisure, there are also some nuances across genders and countries. While in Mongolia this narrow gap favours women, in Paraguay, there is virtual parity and in Jordan and Palestine, men have the advantage.

The biggest gender gap is not found in schooling in these countries but in employment. However, formal schooling should still be controlled for when comparing results by gender for one simple reason: it remains the single best predictor of skills. However, even after they are adjusted for schooling, the skills of men and women will reveal the importance of other aspects of their situation – mainly their participation in their labour force or lack thereof and the occupational categories in which they tend to concentrate. The use of literacy skills for leisure, however, is promising as one factor that can help sustain or even further develop skills, and which has the potential to be less biased in terms of gender.

Table 7.4. Profiles by gender in medians (in age) or percentages

	Mongolia		Jordan		Palestine		Paraguay	
	Female	Male	Female	Male	Female	Male	Female	Male
Age	34	33	31	31	30	30	34	33
Urban (%)	71.7	68.0	83.2	83.1	73.3	74.3	62.9	57.6
Primary education or less (%)	11.0	11.3	29.1	25.2	10.9	8.6	38.7	37.9
Secondary education (%)	45.5	55.2	47.0	44.1	65.5	69.1	37.4	41.3
Post-secondary education (%)	43.5	33.5	23.9	30.7	23.6	22.4	24.0	20.8
Years of formal schooling	10.0	10.0	11.0	12.0	11.0	11.0	9.0	9.0
Participated in non-formal education in the last 12 months (%)	16.2	12.1	9.2	11.8	9.2	13.0	13.6	12.2
Participated in literacy programme (%)	3.0	2.1	1.6	0.6	1.8	1.1	1.2	0.4
Self-reported to read easily (%)	96.7	96.1	92.6	95.0	93.6	92.7	90.8	89.3
Self-reported to write easily (%)	96.3	95.9	92.2	94.5	91.8	91.5	91.2	89.0
Students of all levels participated in LAMP (%)	18.2	16.1	22.3	27.1	21.6	23.5	20.8	19.4
Employed (%)	37.4	46.8	8.7	51.1	6.8	53.5	40.2	71.7
High-skilled occupation (ISCO 1-5) (%)	67.2	43.8	55.7	56.2	89.4	52.9	67.7	40.5
Managers (%)	7.4	7.8	0.6	4.9	7.0	8.7	8.3	9.5
Professionals (%)	33.7	19.1	3.9	4.8	44.5	11.7	24.9	5.3
Technicians (%)	0.6	6.4	12.6	7.9	15.7	10.0	4.1	8.6
Clerical support workers (%)	8.5	3.7	28.4	16.8	10.3	2.1	7.5	5.4
Service and sales workers (%)	17.0	6.9	10.2	21.7	12.0	20.4	22.9	11.6
Low-skilled occupation (ISCO 6-9) (%)	32.8	56.2	44.3	43.8	10.6	47.1	32.3	59.5
Agricultural workers (%)	0.3	0.3	2.0	2.0	2.3	4.2	5.0	24.9
Craft workers (%)	1.9	1.3	4.1	19.8	1.0	16.1	7.3	18.1
Plant and machine operator (%)	1.6	13.7	0.5	0.9	1.8	7.2	0.8	3.4
Elementary occupations (%)	29.0	40.9	37.8	21.2	5.5	19.7	19.3	13.1
Self-reported literacy practices at work (0-100)	43.8	31.3	25.0	25.0	33.3	25.0	25.0	18.8
Self-reported numeracy practices at work (0-100)	66.7	66.7	62.5	75.0	66.7	66.7	57.1	57.1
Self-reported practices at work (0-100)	55.2	45.8	46.9	50.0	50.7	45.1	41.1	35.7
Retired (%)	11.0	6.7	1.3	10.2	0.4	1.6	5.0	3.2
Practices at home (0-100)	55.9	52.9	52.9	58.8	47.1	55.9	52.9	52.9

Source: LAMP, 2010-2011.

ii) Literacy and numeracy skills of men and women in countries administering LAMP

The relationship between gender and literacy and numeracy skills tends to vary systematically by domain. In IALS and ALL, "when the gender differences are statistically significant … men tend to display an advantage in numeracy and document literacy skills, while women tend to display an advantage in prose literacy" (OECD and Statistics Canada, 2005, p. 46). In PIAAC, "the mean score on the numeracy scale is higher for men than for women … for all [23] surveyed countries. … The difference is statistically significant in all but two countries" (OECD, 2013a, p. 110).

LAMP results offer a unique opportunity to observe the relationship between gender and each of two different domains: Prose (which historically tends to favour women) and Document (which historically tends to favour men) because in the LAMP study, these two domains have been measured separately, whereas in some other studies, they have not been measured separately.

Figure 7.7 shows the distribution of female and male Numeracy performance for each country with regard to LAMP's three performance levels. **Figure 7.8** shows the average differences between women and men on the three LAMP scales. Certain patterns become immediately apparent in these figures, both within and across countries:

1. Within each country, across domains:

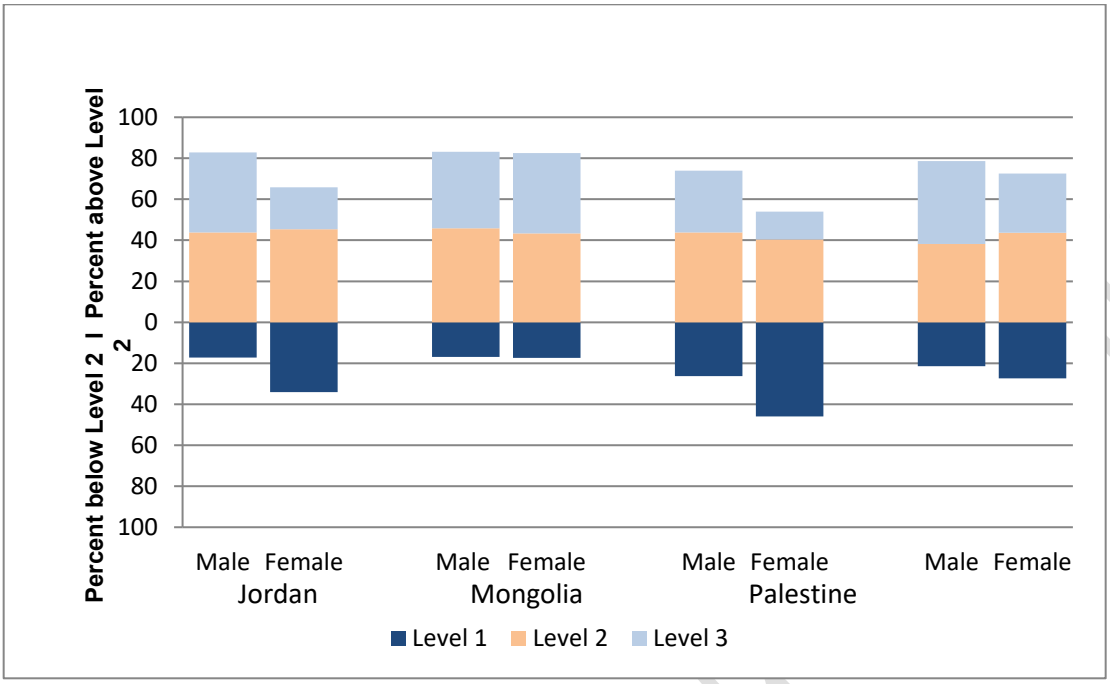
    a. The biggest advantage for men is always found in Numeracy. This difference in favour of men is statistically significant in all countries except Mongolia, where women have higher educational attainment than men.

    b. The opposite is true for Prose reading. Here we find either the smallest advantage for men (in Jordan and Palestine) or even an advantage for women (in Mongolia and Paraguay).

    c. Document reading lies systematically somewhere between Prose reading and Numeracy. However, the only statistically significant difference in Document reading is found in favour of men in Jordan and Palestine.

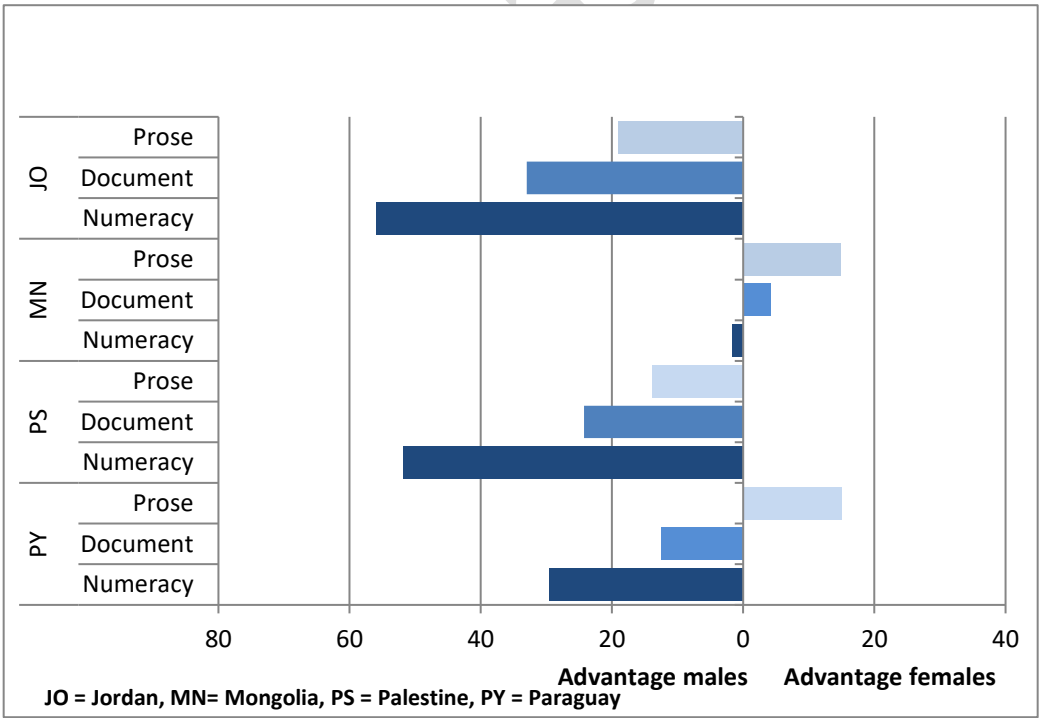
    d. The two countries with lower gender parity in education and female participation in the labour force (Jordan and Palestine) show advantages for men in all three domains. The other two countries show advantages for women in one (Paraguay) or two domains (Mongolia).

Figure 7.7. Performance levels in Numeracy by sex



Source: LAMP, 2010-2011.

Figure 7.8. Differences in mean scores between males and females



Source: LAMP, 2010-2011.

The differences shown in Figure 7.8 can be adjusted for educational attainment. The adjusted mean differences are shown in **Figure 7.9**. After taking into account educational attainment, the patterns become more consistent:

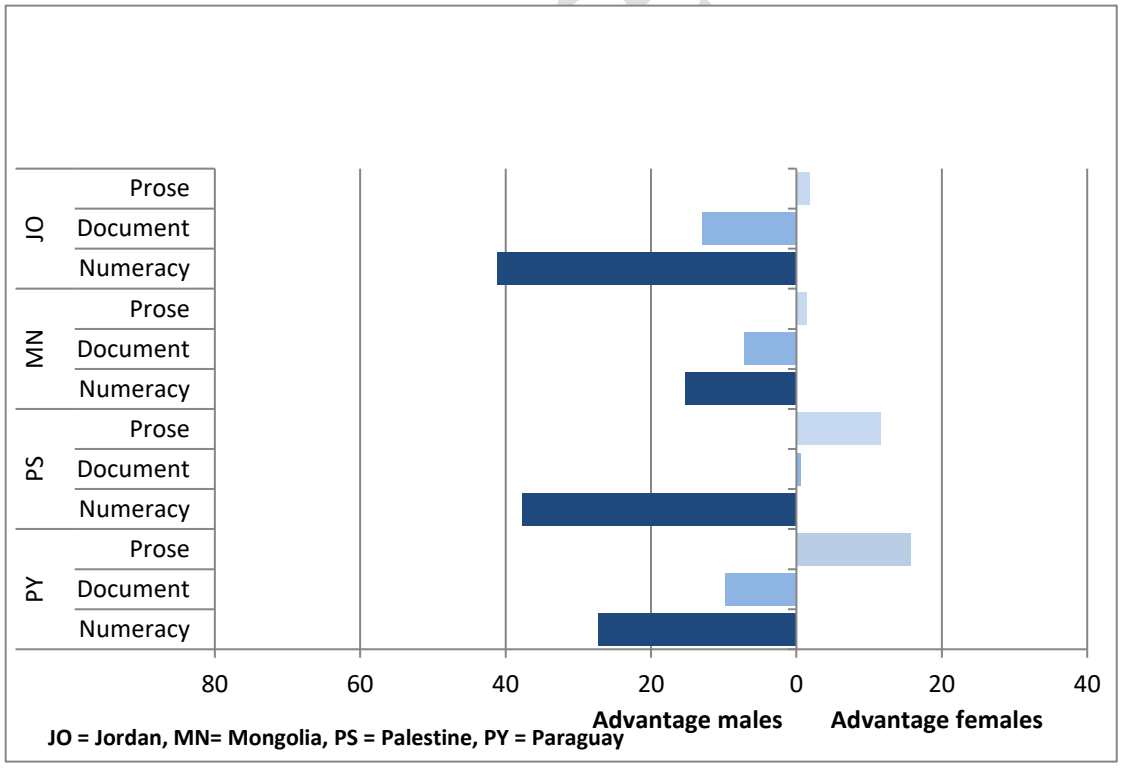
1. In all four countries, men have a statistically significant advantage in Numeracy, ranging from approximately 15 points in Mongolia to approximately 40 in Jordan and Palestine. The bigger gap in these two countries may be related to women's low participation in the labour force, which is not accounted for in the adjustment.

2. In all four countries, women have the advantage in Prose reading but this is only statistically significant in Paraguay.

3. In three out of four countries, men have a slight advantage in Documents reading but this is only statistically significant in Jordan.

These three findings echo those of other household-based international assessments of adults such as IALS, ALL and PIAAC as well as those of school-based assessments of children such as PIRLS, TIMSS, and PISA (OECD, 2006: OECD, 2014b). This also confirms the importance of keeping Prose reading and Document reading as separate domains for LAMP.

Figure 7.9. Mean score (adjusted for educational attainment) differences between males and females



Source: LAMP, 2010-2011.

This report does not provide data as to why there would be a difference in numeracy that persists even after taking schooling into account. There are several possible speculations for explaining this finding that are related to cultural and economic factors rather than biological differences. One of those speculations is that in countries that administered LAMP, as in OECD countries, "women are less likely to participate in the labour force" (OECD, 2013a, p. 109). Perhaps as a result, they may be more likely to lose their numeracy skills once schooling has been completed.

Around the world, it has been found that even highly educated women are less likely than their male counterparts to choose career paths in Science, Technology, Engineering and Mathematics (STEM). This phenomenon may have its roots in gender stereotypes that affect the choices that female and male students make from an early age, consciously or not, to focus their efforts on certain academic subjects over others (Diekman et al., 2010; Saucerman and Vasquez, 2014; Wang et al., 2013). As a result, even when boys and girls get the same quantity of schooling, the kind of schooling may differ. This does not necessarily mean that one gender is afforded a better education than the other (although that may also happen) but that each gender may have a different schooling experience and benefit from it more in some subjects than in others (*see* ***Box 7.1***).

It is worth noting that the two aforementioned speculations may be complementary. Women and men may have different schooling experiences and therefore make different academic choices. Subsequently, they may take career paths that require more or less use of their numeracy skills or even refrain from entering the labour force at all. For women, on average, this may mean less of a focus on numeracy during school, at work and in life.

7.3 Literacy, numeracy and the lifespan: Age and cohort

In analysing the relationship between age, literacy, numeracy skills and years of schooling, it is necessary to distinguish between at least two types of so-called 'effects': age effects and cohort effects. **Box 7.2** discusses these.

LAMP provides a unique opportunity to observe the differences in age effects on measures of literacy and numeracy skills since it is the only international assessment of adult literacy skills that includes those over the age of 65 in the samples. At the same time, it also offers a great opportunity to observe cohort effects on schooling (and indirectly on skills) because it focuses on educational systems that have greatly expanded during the respondents' lifetime.

However, age and cohort effects are difficult to disentangle. This is easier to do in longitudinal studies that follow a given cohort – or even better, a specific sample of people (known as a panel) over time. However, in cross-sectional studies like LAMP (or IALS, ALL, PIAAC and STEP) where respondents are tested only once, we must rely on theory and prior research (especially longitudinal studies) to attribute performance gaps to age effects or cohort effects (e.g. increases in schooling levels due to an expanding education system).

In order to explore some possible cohort effects, we can focus on the youngest age group (ages 15 to 24) and the second oldest one (ages 40-64). The oldest group of those aged 65 or over is more likely to be affected by age effects, both as a result of biological factors and the lack of practice often associated with retirement. The comparison of people aged 40-64 to the youngest group may allow a better identification of the potential cohort effects.

Box 7.1. Towards gender equity in education and learning in Jordan

In 2011, Jordan ranked 117 out of 135 countries for the gender gap index (World Economic Forum, 2014). Despite ranking in the lowest quintile due to low economic participation and political empowerment of women, the country has achieved tremendous progress towards equity in education and health.

Youth literacy rates and enrolment rates in primary, secondary and tertiary education are among the education indicators where females have been making important progress since the 1990s to eventually overcome some disparities with males. In 2011, the same proportion of females and males aged 15-24 years themselves reported being able to read and write (99%). If equality is almost achieved in access to primary education, more females are enrolled in secondary and tertiary education (net secondary enrolment rate of 89.4% and 86.5%, and gross tertiary enrolment rate of 42.8% and 37.2% for females and males, respectively). However, some disparities remain with almost twice as many estimated female out-of-school children of primary school age than male (World Bank, 2014), and a lower school life expectancy until lower secondary for females in 2011 (UIS, 2014b).

Since the mid-2000s, several school-based assessments have shown that Jordanian girls outperform boys in literacy, mathematics and science. PISA results show that 15-year-old girls scored on average 55 points higher than boys in reading and 7 points more in mathematics in 2006 (OECD, 2006). These results are consistent with those of the National Assessment for Knowledge Economy (Independent Evaluation Group, 2011; NCHRD, 2011; NCHRD, 2013) and the Trends in International Mathematics and Science Study (TIMSS) in Jordan. They are also in line with the overall trend observed in many countries where girls tend to have better reading proficiency than their male counterparts. In mathematics, the opposite is often observed in many countries although Jordanian girls still outperform boys in that domain. The gender gap in favour of female pupils in Jordan even tends to grow larger over the years. In 2012, the score difference reached 75 points in reading and 21 points in mathematics (OECD, 2012). However, in mathematics, this trend seems to be more related to a decline in proficiency among boys rather than real progress for girls (Independent Evaluation Group, 2011). Further exploring gender differences among pupils will allow better understanding of these trends for effective future action towards closing the remaining gaps in learning.

Overall, progress towards gender equity in education can be observed in Jordan. To tackle the remaining barriers, the Ministry of Education started the National Strategy for Gender Inclusion in 2010, aimed at promoting gender equity in education administration and schools through targeted policies and programmes, including the development of training materials to bring gender awareness to schools.

Box 7.2. What are age and cohort effects?

Age effects, sometimes called 'maturational effects', refer to the – partly biological – changes that occur mostly as a result of an individual's increasing chronological age. Like our bodies, our minds first grow up (cognitive maturation) and then grow old (cognitive decline). Increased age is thus associated with lower levels of cognitive performance. As a result, the relationship between age and skills is not linear. At the start of the lifecycle, cognitive skills and the reading and numeracy skills that depend on them will tend to increase with age but at some point, as cognitive decline begins, all of those skills will start to decrease with age. This decline will occur among all cohorts as each cohort grows older, independently of time period.

Cohort effects, on the other hand, have less to do with biology and more to do with history. These changes characterise populations born at a particular point in time and are explained by a time-specific common experience, independently of aging. For instance, in both OECD and LAMP countries, younger women perform better in reading and numeracy than older women. This is partly because younger women had more schooling than their mothers' generation – maybe they turned aged 6, 12 or 18 years at a time when more girls were entering primary, secondary or tertiary education, respectively. All of this goes back to the year when they were born – their birth cohort.

The mean differences between these two groups for each domain are shown in **Figure 7.10**. Overall, the younger age group seems to outperform the older one in all four countries and all three skills domains – although not all differences are statistically significant. In addition, some interesting patterns are found across domains within each country:

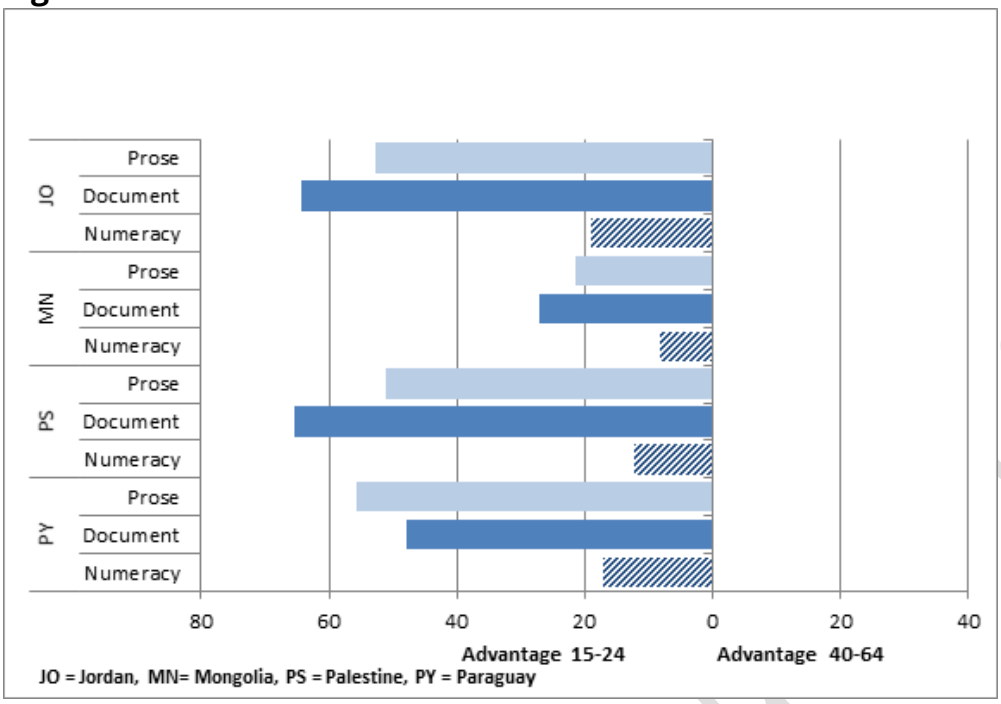
a. The younger cohort's advantage in Prose reading and Document reading is always statistically significant. On the Prose scale, young adults score on average between 21 points and 56 points higher than their older counterparts.

b. The younger cohort's advantage is larger for Document reading than for Prose reading in all countries except Paraguay. Respondents aged 15-24 score on average between 27 points and 65 points higher than their older counterparts.

c. For Numeracy, the difference is never statistically significant and it is always the smallest as compared to the other two domains.

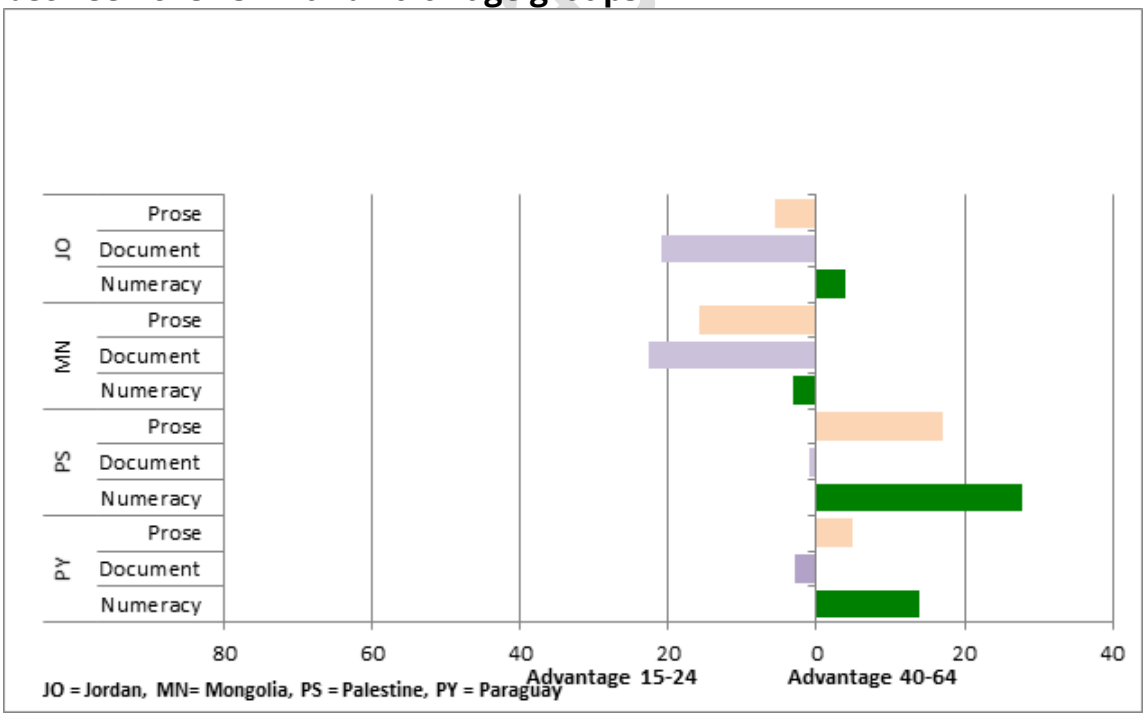
A plausible explanation for this gap is that younger cohorts in these countries have attained more years of formal schooling than older cohorts. All four countries that administered LAMP experienced an increase in the quantity of schooling received by their population for several decades. In Jordan, for instance, the average years of formal schooling of people aged 15-19 increased from six years in 1970 to nine years in 2000 and the percentage of adults that received no education was almost divided by three during the same period (World Bank, 2014). Therefore, it would be advisable to compare these two age groups while controlling for schooling. The results of this adjustment for formal schooling are shown in **Figure 7.11**.

Figure 7.10. Mean scores differences between the 15-24 and 40-64 age groups



Source: LAMP, 2010-2011.

Figure 7.11. Mean scores (adjusted for educational attainment) differences between the 15-24 and 40-64 age groups



Source: LAMP, 2010-2011.

After controlling for formal schooling, there are some changes in the patterns.

a. No consistent pattern is found for Prose reading scores as each of the four countries yielded different results. The gap previously observed in Prose reading disappears in Jordan and is slightly reduced in Mongolia, where the 15-24 age group score is on average 16 points higher than in the older group. In Palestine and Paraguay, the advantage is reversed, with the 40-64 age group scoring respectively 17 points and 5 points higher than their younger counterparts.

b. The younger cohort's advantage in Document reading scores remains statistically significant in Jordan and Mongolia, although it is reduced to 21 points in Jordan.

c. The most remarkable change takes place in Numeracy, where the initial advantage enjoyed by the younger cohort (although not statistically significant in the first place) is now mostly reversed. The older cohort does better in three out of four countries (the exception being Mongolia) but the difference is statistically significant only in Palestine. Adults aged 40-64 score on average 28 points higher than their younger counterparts.

Why do young cohorts outperform older ones in Document reading but not in Prose reading and even less so in Numeracy after taking schooling into account? There are at least two possible speculations. One has to do with the differences in the quality of the formal schooling these two age groups may have received and the other with what happens once people leave school or while they are not in school.

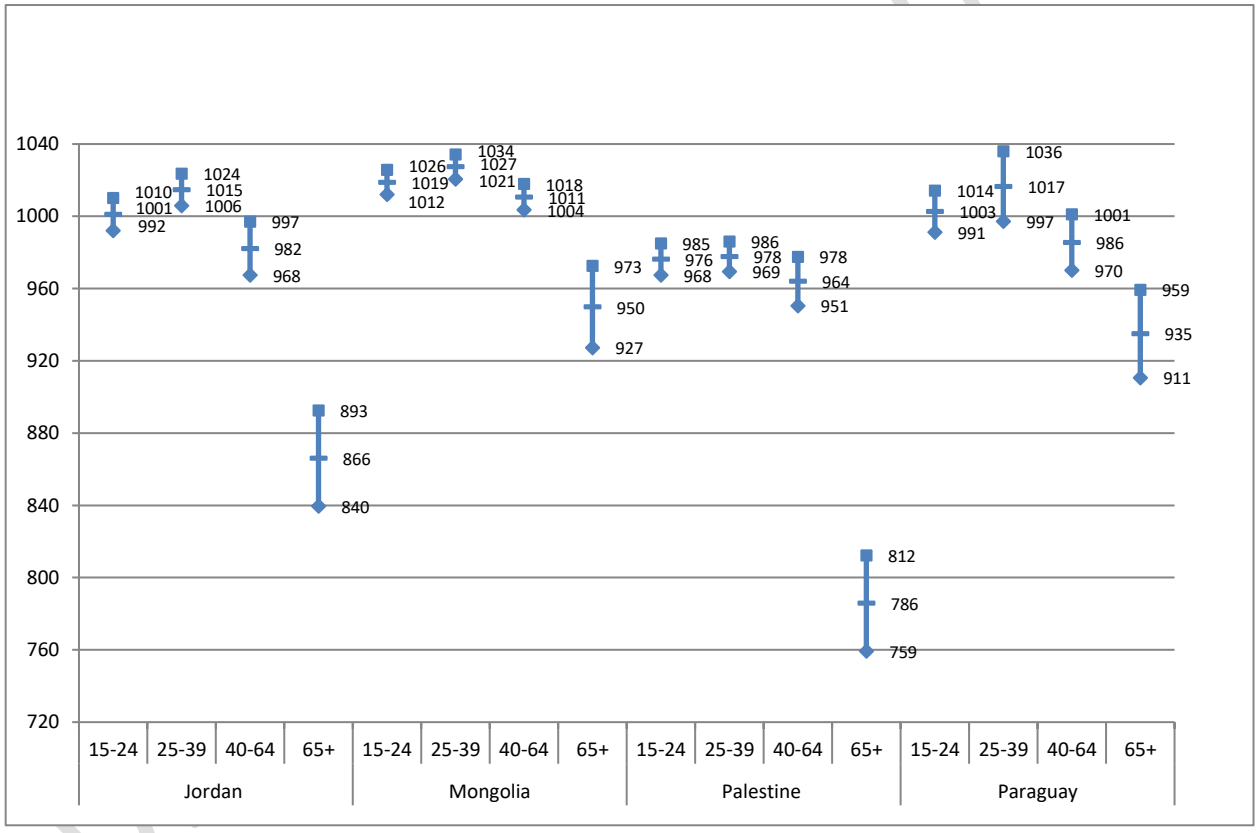
Differences in the quality of formal schooling as opposed to the quantity of schooling do not necessarily mean that one group received better schooling than the other, although that is also possible. What it means is that there may be differences in the school curricula to which each of these age groups were exposed. For example, in recent years students were taught how to read 'document' texts such as tables, charts, schedules and maps but three or four decades ago, the teaching of document reading skills may not have been as prominent. Consequently, two respondents with the same quantity of schooling may have different document reading skills, depending on when they received their schooling. This is another aspect of the cohort effect: the young may do better at document reading not only because they received more formal schooling but maybe also because they were taught how to read them in school.

These two age groups, however, probably also differ from each other in terms of how they use their document skills in everyday life (*see Section 7.6 on leisure*). As we will see later in section 7.6, young people are more likely to use the Internet, for instance, and could possibly gain more exposure to texts that are not organized in linear ways. They may, as a result, be more skilled at finding information in 'document' texts. Is this also a cohort effect or is it an age effect that will subside as these respondents grow older? This study cannot provide an answer to this question. If these cohorts continue to use the Internet throughout their lives with similar intensity, this will mostly be a cohort effect. If, however, their Internet use tends to decline as they age, this will also be, to some extent, an age effect or rather an effect on one's position in the lifecycle. Only time will tell.

Formal schooling and life practices do not exclude each other. We can speculate that current schooling with its greater focus on document reading probably prepares younger cohorts to better face the kinds of texts they find on the Internet, therefore increasing the likelihood of these respondents engaging in that type of reading, thus sustaining and further developing their skills in this way. The LAMP data, however, do not shed light on this speculation.

Older cohorts have a small, inconsistent but statistically insignificant advantage in Numeracy. **Figure 7.12** shows the Numeracy mean scores together with their confidence intervals for all age groups. No statistically significant difference can be observed across the 15-24, 25-39 and 40-64 age groups in any of the countries. However, these groups all show higher proficiency compared to the oldest age group of 65 or over in all countries.

Figure 7.12. Numeracy average score and 95% confidence interval limits by age group and by country



Source: LAMP, 2010-2011.

In some countries around the world, there is some concern among educational practitioners and researchers about the deterioration in the quality of mathematics instruction that younger cohorts are receiving. For instance, Jordan participated in TIMSS in 1999, 2003, 2007 and 2011; its average mathematics score in the most recent year (406) was significantly lower than in its three previous TIMSS administrations (424-428). This drop may be due to a number of factors, such as the on-going expansion of the education system and the influx of refugee populations from neighbouring countries. TIMSS in Jordan also showed some fluctuations in the average science score between 1999 and 2011. Further disaggregation of the youngest age group in LAMP may provide additional information on this issue for young Jordanians as a whole, not just those in school.

On the other hand, a more optimistic speculation is that older cohorts may have kept their numeracy skills fresh and maybe even developed them further by using them at work (*see Section 7.7 on livelihood*).

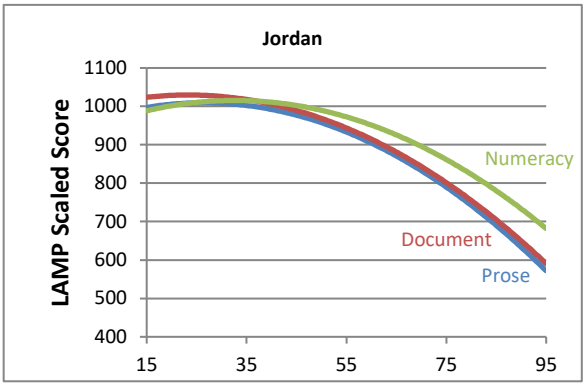
However, as mentioned above, in LAMP this difference between the younger (age 15-24) and older (age 40-64) cohort is not statistically significant, except for Palestine. In fact, in Mongolia, the younger cohort actually does slightly better but the difference is not statistically significant, either.

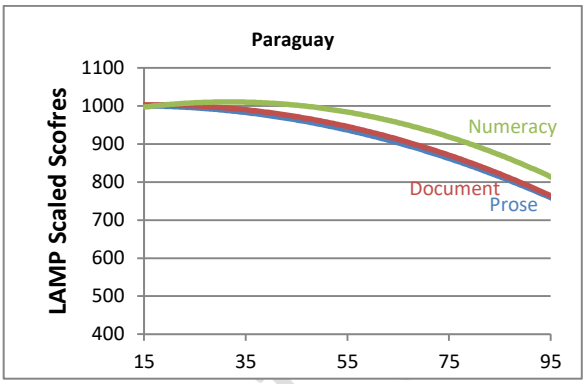
Figure 7.13 shows the relationship between age and performance on the three scales by individual age rather than age groups. The analysis does not control for schooling. If the scores remained the same across all ages or if the scores became lower with age at the same rate, the graphs in Figure 7.13 would be a straight line. In Figure 7.13, however, the relationship between age and proficiency is a quadratic curve: across the lifespan or strictly speaking, across birth cohorts, scores do not increase or decrease at a constant rate.

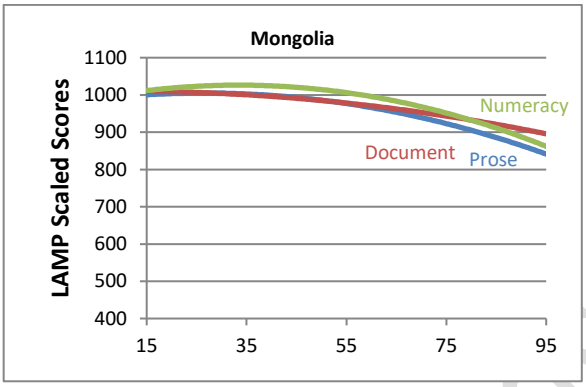
For the most part, literacy and numeracy scores are lower for older cohorts in all countries and all domains. However, this does not always apply for the youngest age group (aged 15 to 24), especially in numeracy. Additionally, in Palestine and Jordan, people aged 15-24 also have lower Prose reading and Document reading compared to the 25-35 age group. Many of these youngest respondents will still be in school, continuing to develop their skills, so it is plausible for 25-year-olds – who are likely to have completed their education and left school – to have better skills than 15-year-olds.

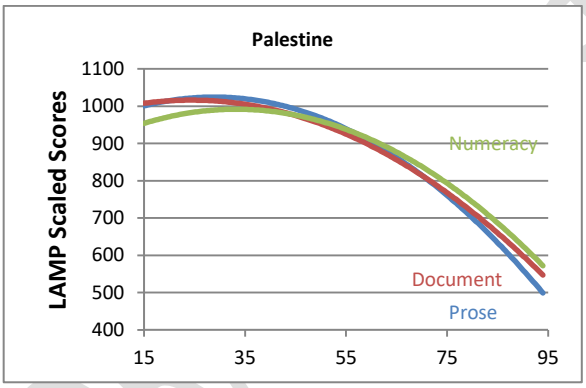
Also, within each country, the curves have slightly different shapes depending on the domain. The reading curves, both in Prose and Document, appear to peak earlier around the ages of 20 or 25. For Numeracy, the curves peak around the ages of 30 or 35. The interpretations mentioned above may also apply here: it may be that the quality of instruction younger cohorts have received in reading is better than in numeracy. But it may also be that numeracy skills are reinforced by participation in the labour force, especially in high-skilled occupations, which tends to happen a little bit later in life. This relationship between age and literacy and numeracy scores, including an increase of proficiency with age to reach a peak followed by a decline, is a common finding in many adult assessments (OECD, 2013a; Shomos and Forbes, 2014). Some studies based on synthetic cohorts, allowing a better approach of age and cohort effects, also showed that scores are likely to deteriorate with age after a certain middle age point (Green and Riddell, 2003; Chesters and Sinning, 2013).

Figure 7.13. Relationship between age and Prose, Document and Numeracy skills in LAMP countries









Source: LAMP, 2010-2011.

To sum up, younger cohorts perform better than older cohorts in all four countries and domains only when we do not control for formal schooling. In most of these countries, the association is statistically significant for the Prose and Document domains but not for Numeracy. However, once we control for schooling, the picture changes, with most of the previously observed negative association between age and reading and numeracy skills being 'explained away' by schooling. The association between age and Prose reading is no longer consistent across countries. The association with Document reading remains consistently negative but is statistically significant in only two countries. The association with Numeracy is reversed, favouring the older cohort although not remaining statistically significant for the most part.

7.4 Literacy, numeracy and legacies: Parental education, occupation and socio-economic status

This section examines the association between parental characteristics, such as education and occupation, and respondents' characteristics, including education, occupation and skills. The section also explores the association between the respondents' socio-economic status and their skills. The information about these variables was obtained from the Background Questionnaire administered to the LAMP sample in each country.

i) Parents' education as an indicator of socio-economic status

Researchers often use the educational attainment of a study respondent's father and/or mother as a proxy for the socio-economic status of the family of origin. Sometimes, parental educational attainment is combined with other variables, such as parental occupation, to produce a composite measure of this latent trait. This socio-economic status (SES) index can then be used as predictor of other variables, including schooling and skills.

The decision to use the father's educational attainment or the mother's or both (separately or by combining them into a single measure in one way or another) is not a trivial one. Many studies have shown that education of both parents (known in combination as 'parental education') yields statistically significant associations with their offspring's educational outcomes, such as schooling, skills or attitudes towards learning (Hausman and Szekely, 1999; Woessmann, 2004). Parental education is likely to affect parental incomes, which in turn modify the share of resources devoted to children's schooling, among other variables (Chevalier, 2004; d'Addio, 2007). Parental education also modifies the value parents attach to the education of children, as well as their willingness and capability to support their children's education (d'Addio, 2007; Green and Riddell, 2003). This variable is thus considered as a general proxy of educational and socio-economic background of children at home (Woessmann, 2004).

The magnitude of the association between parents' education and their offspring's educational outcomes may be larger for maternal education – at least when the respondents are children. In Pakistan, for instance, "paternal education, occupation and students' locality seems to cause no significant difference in attitudes towards science learning of students whereas maternal education and occupation cause significant difference in attitudes towards learning of science" (Shah et al., 2013, p. 35). As Butcher and Case (1994) put it, "the effect of mother's education is larger than that of father's, which may reflect that mothers have a greater influence on children or that mother's education is in part [a proxy] for the wealth of the household". In the United Kingdom, Chevalier (2004) found evidence of a larger effect of maternal education on the probability of not dropping out of school for daughters, whereas paternal education matters for sons only, suggesting a role model played by parents of the same sex.

In addition, the literature suggests that the mechanisms by which parents' education and respondents' skills are related may be different for the father's and the mother's education. Although both paternal and maternal schooling are proxies of SES of the family of origin, the latter may be more relevant as a correlate of reading and numeracy skills. This predominant role of maternal schooling is not only related to SES but to the interactions between parents and their children. "Academic socialization theory … posits that the development of young children is influenced by who parents are through what parents do" (Taylor et al., 2004). In most societies, mothers tend to be the primary caretakers, thus spending more time with their children than fathers. As a result, what mothers do (in terms of stimulation, responsiveness, etc.) may matter more.

Highly schooled people tend to marry other people who are similar to them in that regard and the same happens at the other end of the educational spectrum. This phenomenon is known as 'educational homogamy' and it must be taken into account when analysing the association between parental education and respondents' outcomes because the presence of educational homogamy 'inflates' the apparent effect of each parent's education on the respondent's schooling or skills. One may think that either mothers or fathers have a huge effect on their children but maternal education, in addition to contributing its own effect, may also be acting as a proxy for paternal education – or vice versa, paternal education may also pick up the effects of maternal education.[21]

ii) Parents' education, parents' occupation and LAMP literacy and numeracy measures

Table 7.5 summarises the educational attainment of the parents of respondents in the four countries that administered LAMP.

Table 7.5 Educational attainment (highest completed level of education) and type of occupation of parents (%)

		Jordan	Mongolia	Palestine	Paraguay
Highest education level completed by mother	**Primary education or less**	58.6	10.3	37.4	55.5
	Secondary education	34.0	60.7	57.2	38.5
	Post-secondary education	7.4	29.0	5.4	6.0
Highest education level completed by father	**Primary education or less**	46.4	9.9	21.5	54.2
	Secondary education	37.1	60.2	65.3	38.8
	Post-secondary education	16.5	29.9	13.3	7.1
At least one parent with high-skilled occupation (ISCO 1-5)		48.3	49.9	37.3	29.3

Source: LAMP, 2010-2011.

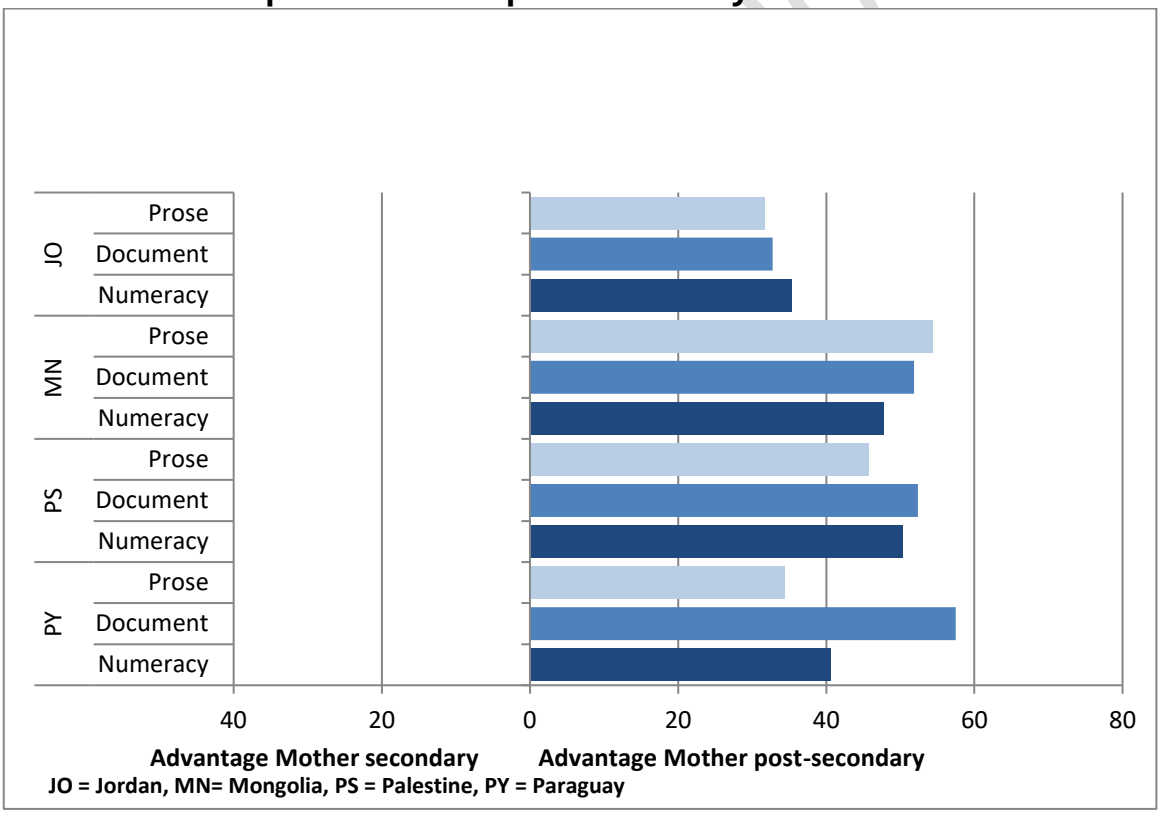
[21] Paradoxically, the somewhat interchangeable nature of these two variables is one reason why data analysts are sometimes forced to choose only one of them as the association between them may create difficulties if they are used together – for instance, when two highly correlated variable are used in a multiple regression analysis. This is known as multi-collinearity.

In Jordan and Paraguay, more than half of all mothers completed primary education or less, whereas around one third completed secondary education. In Palestine, the majority of mothers completed secondary education. Mothers have high educational attainment in Mongolia, with 30% having completed post-secondary education and 60% having completed secondary education. The pattern is very similar for fathers. Regarding parental occupation, nearly half of respondents have at least one parent with a high-skilled occupation in Jordan and Mongolia. This proportion is slightly lower in Palestine and Paraguay at 37% and 29%, respectively.

Maternal education and LAMP scores

The associations described in the previous section between parents' education and the literacy and numeracy scores of their children may linger long enough to be found among adults assessed in LAMP. **Figure 7.14** shows that children of mothers with post-secondary schooling or higher outperform those of mothers with only secondary schooling in all countries and domains. This statistically significant advantage on average score ranges from 32 to 55 points on the Prose reading scale, from 33 to 57 points on the Document reading scale, and from 35 to 50 points on the Numeracy scale.

Figure 7.14. Mean score differences between respondents with secondary educated mothers and respondents with post-secondary educated mothers

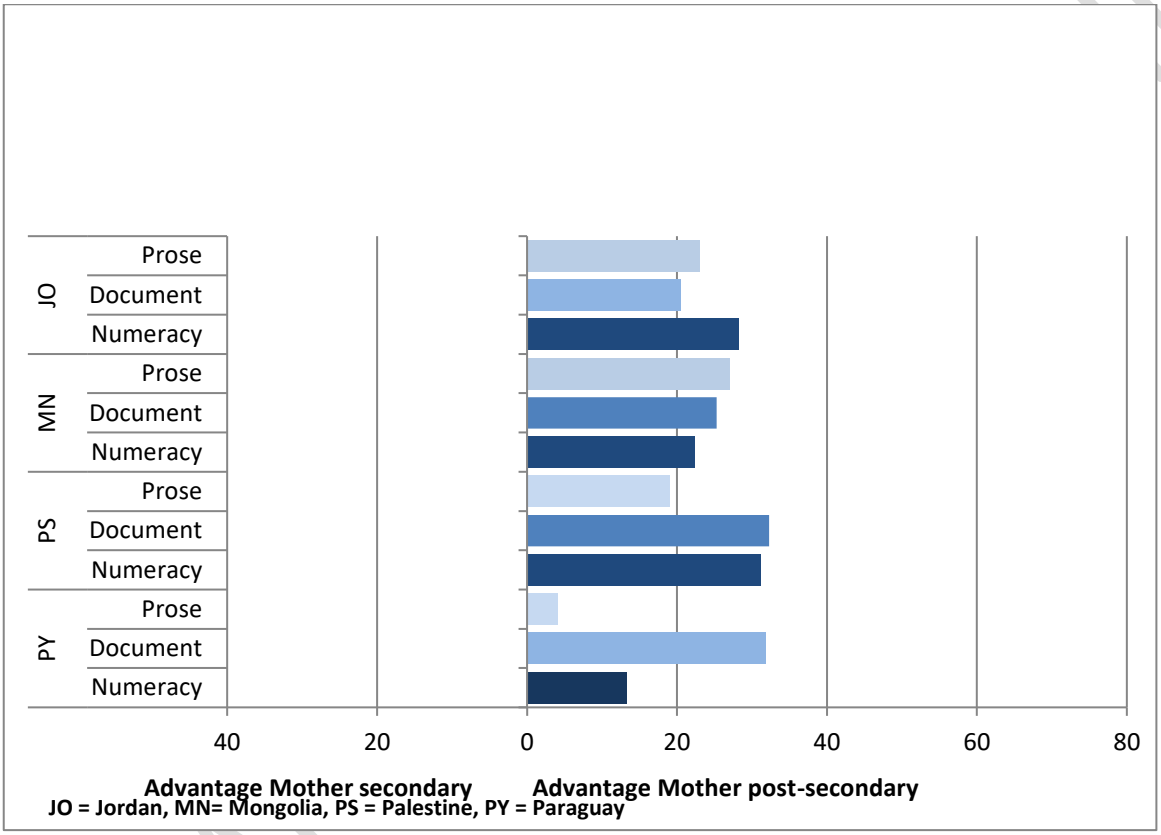


Source: LAMP, 2010-2011.

Maternal education is also strongly associated with the respondent's own educational attainment. Once the latter is controlled for, the association remains statistically significant for most skills domains and countries, with the notable exception of Paraguay (*see* ***Figure 7.15***). On the other hand, the association remains

statistically significant in all three skills domain in Mongolia. However, the average LAMP score advantages of respondents with mothers completing post-secondary education are slightly smaller when the respondents' own education levels are accounted for – advantages range between 4 and 27 points on the Prose reading scale, between 20 and 32 points on the Document reading scale, and between 13 and 31 points on the Numeracy scale.

Figure 7.15. Mean score differences (adjusted for educational attainment) between respondents with secondary educated mothers and respondents with post-secondary educated mothers



Source: LAMP, 2010-2011.

Paternal education and LAMP scores

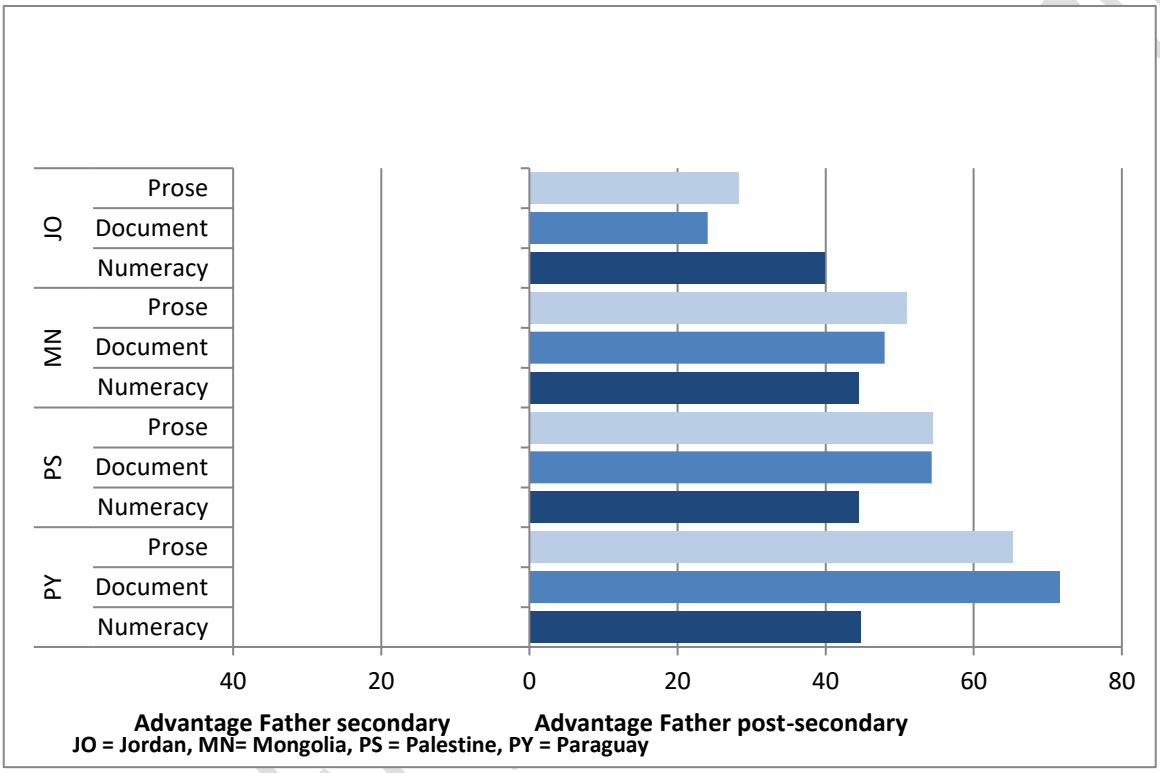
An analysis of the association between paternal education and respondents' skills yields results similar to maternal education. Before controlling for respondents' schooling, respondents with fathers who completed post-secondary education outperform their counterparts with fathers who completed only secondary education in all countries and domains *(see **Figure 7.16**).* This statistically significant average score difference ranges from 28 to 65 points on the Prose reading scale, from 24 to 72 points on the Document reading scale, and from 40 to 45 points on the Numeracy scale.

After controlling for the respondents' own schooling (*see **Figure 7.17***), associations for most countries and skills domains remain significant, except for Document in Jordan and Numeracy in Paraguay. However, the

advantage held by respondents with post-secondary educated fathers becomes slightly lower, ranging from 17 to 34 points on the Prose reading scale, from 8 to 33 points on the Document reading scale, and from 13 to 22 points on the Numeracy scale.

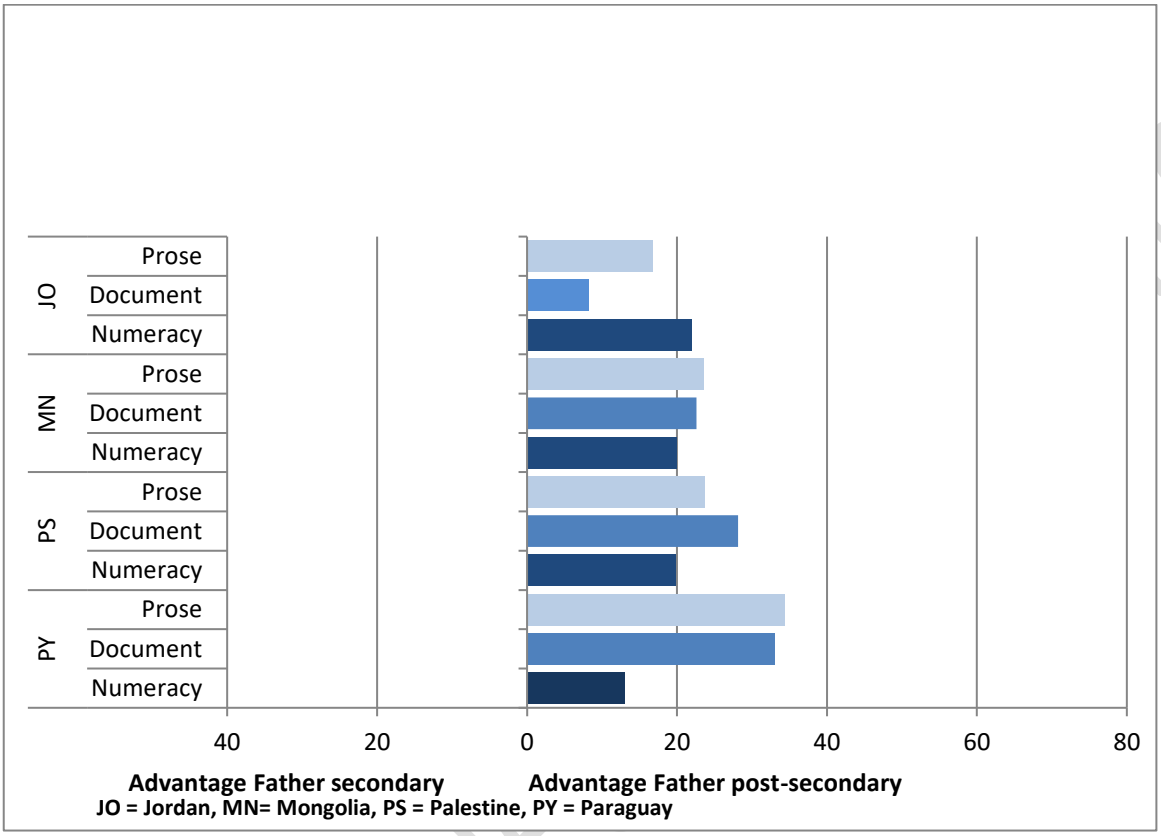
The LAMP findings are in line with previous empirical studies, showing a performance difference in favour of respondents with the highest parental educational attainment (Charette and Meng, 1998; Woessmann, 2004).

Figure 7.16. Mean score differences between respondents with secondary educated fathers and respondents with post-secondary educated fathers



Source: LAMP, 2010-2011.

Figure 7.17. Mean score differences (adjusted for educational attainment) between respondents with secondary educated fathers and respondents with post-secondary educated fathers



Source: LAMP, 2010-2011.

Parental occupation and LAMP scores

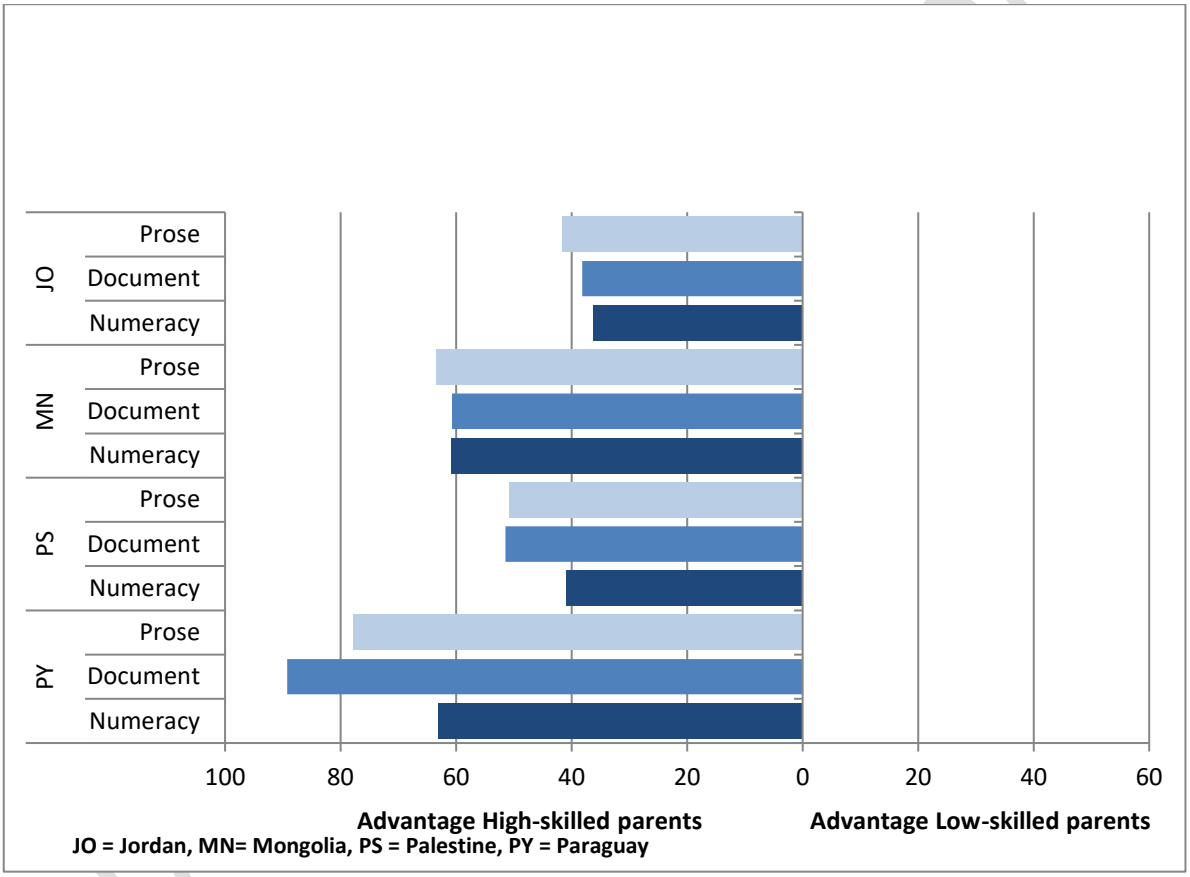
Parental occupation is often used as a proxy for parental income that may have a direct or indirect influence on children's educational outcomes. Parents' level of resources may lead to a greater investment in children's education or particular parents' beliefs and expectations shaping the educational environment at home (Taubman, 1989; Davis-Kean, 2005).

The analysis of parental occupation in the LAMP study posed a challenge as only a small percentage of the LAMP respondents' mothers were employed in the group of respondents that were aged 15 years or older. For this reason, instead of analysing separately mothers' and fathers' occupations, both parents' occupations were used to create a single variable as follows: If either parent had an occupation included in categories 1-5 of the International Standardized Classification of Occupations (ISCO), the household was considered 'high-skilled'; in any other situation (i.e. both parents were not employed or employed in a low-skill occupation), the household was considered 'low-skilled'. As seen in **Figure 7.18**, the level of parental occupation is associated with respondents' scores in all countries and domains. Respondents with at least one parent employed in a high-skilled occupation have a statistically significant score advantage (i.e. mean score difference) compared to their counterparts with parents employed in a low-skilled occupation. This is true

for all domains in all countries. The advantage ranges between 36 and 42 points in Jordan; between 61 and 63 points in Mongolia; between 40 and 51 points in Palestine; and between 63 and 89 points in Paraguay.

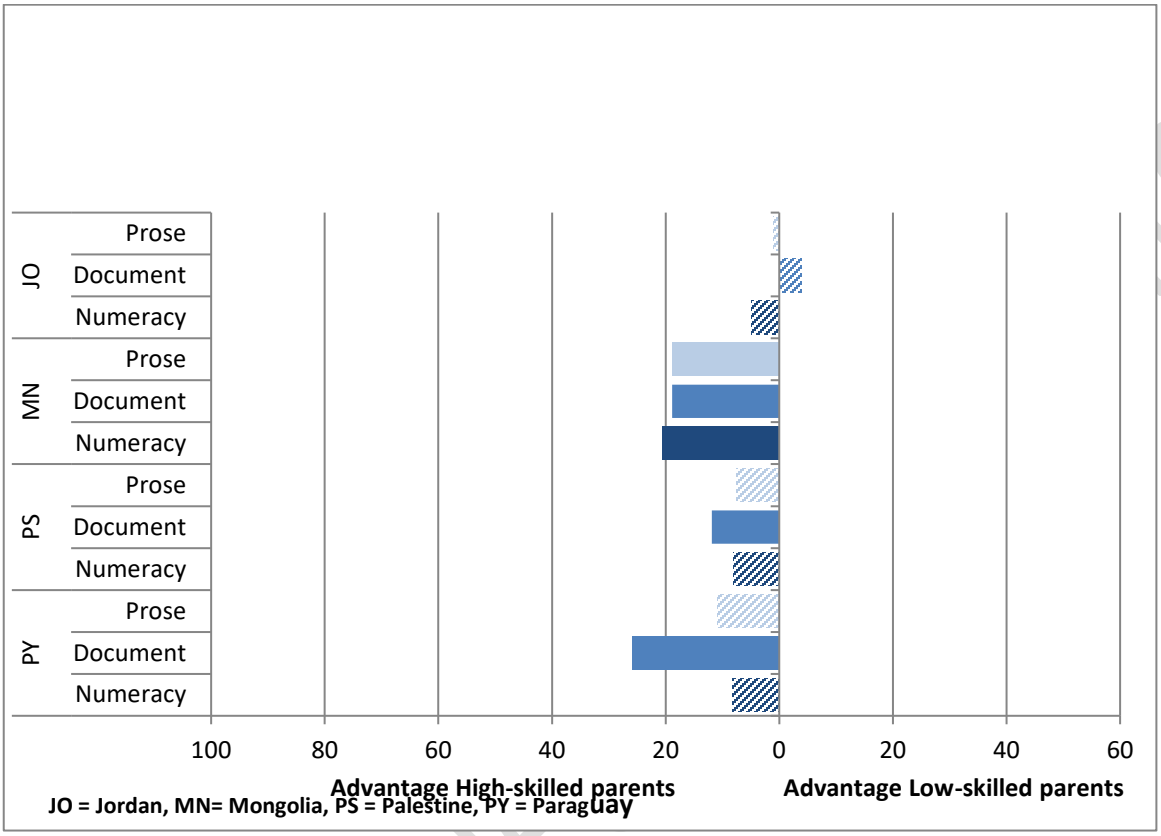
After controlling for the respondent's own level of formal schooling, however, most of these advantages cease to be statistically significant (*see* ***Figure 7.19***). Only in Mongolia do the advantages remain statistically significant in all three domains. In Palestine and in Paraguay, the advantages remain statistically significant only in Document reading. The difference in mean score advantage in favour of respondents with parents employed in a high-skilled occupation becomes slightly smaller, not exceeding 21, 12 and 26 points in Mongolia, Palestine and Paraguay, respectively.

Figure 7.18. Mean score differences between respondents with at least one parent employed in a high-skilled occupation and respondents with parents in low-skilled occupations



Source: LAMP, 2010-2011.

Figure 7.19. Mean score (adjusted for educational attainment) differences between respondents with at least one parent in a high-skilled occupation and respondents with parents in lower-skilled occupations



Source: LAMP, 2010-2011.

Socio-economic status and LAMP scores

SES is often measured as a combination of education, income and occupation and is commonly conceptualised as the social standing or class of an individual or group. However, there is no widespread agreement on the definition of SES. Different researchers have different ways of constructing this index, which generally depends on the data collected by a given study.

LAMP data confirm that social stratification is not equal across countries and shows that the discriminatory power of the variables and indicators used to measure SES is country-specific. Unlike traditional household surveys, LAMP data do not use the typical method of SES construction that is centred on household income. The LAMP SES index was created using a variety of household related characteristics.

LAMP excluded the income variable because it was collected in relation to an individual respondent as opposed to the household. Since LAMP assesses adults aged 15 years and up, significant proportions of the respondents are students and retirees who generally do not earn income. Therefore, a single respondent's income cannot be used as a proxy for household wealth.

After exploring several methodologies and taking the structure of the background questions and their response categories into account, we identified 'latent class analysis' as the most suitable methodology for constructing an SES index. The index was constructed separately for each country. In attempting to maximise ordinal rank positions, only indicators of variables that discriminate (in the measurement sense) were included in the computation of the specific country's SES index. While different input indicators were used in the analysis, each country had four ordered categories or classes of SES by using latent class analysis. However, it is important to note that members of the same ordinal SES class cannot be compared across countries.

The SES categories were created using indicators from the following groupings:

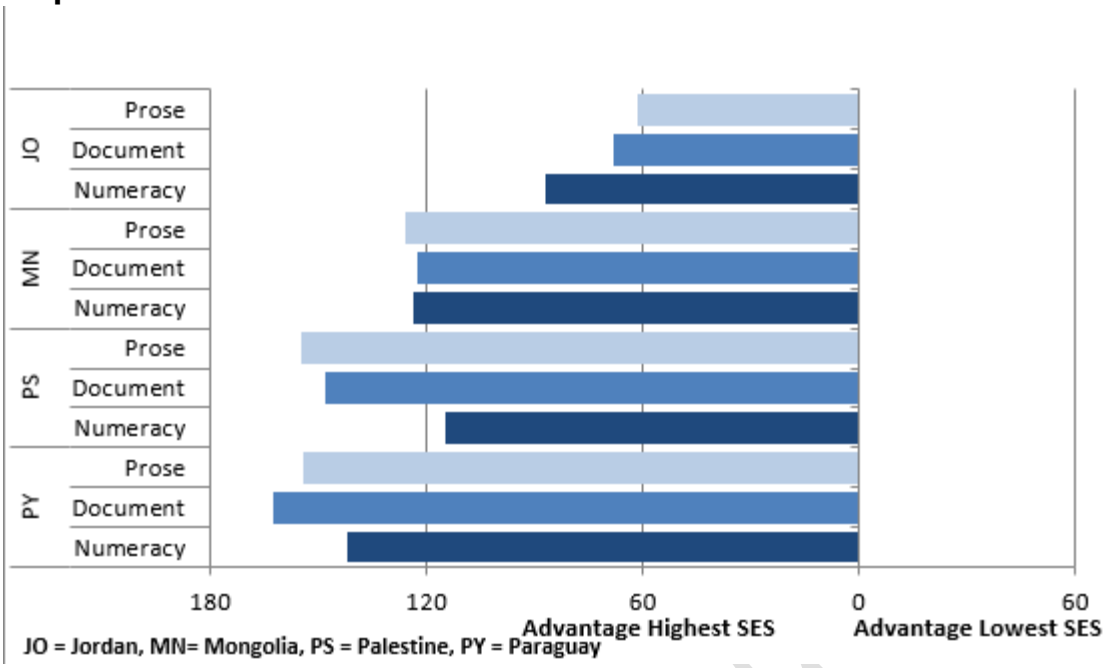
- Household possessions, including the availability of household appliances, communication devices, vehicles used for transportation, agricultural land or animals
- Housing characteristics and demographic conditions, including building materials for floor, roof and walls; number of rooms/bedrooms; and availability of a special room for cooking
- Education level of the head of the household
- Access to utilities and infrastructure, such as sanitation facilities, sources of drinking water, waste disposal, access to electricity, and sources of energy used for cooking.

A detailed description of the indicators and classes by country can be found in **Annex 19**.

The following analysis focuses on the two extreme categories for each country. Socio-economic status is significantly associated with LAMP scores in all countries and domains. Respondents with highest SES have higher average LAMP scores than their counterparts with lowest SES. The magnitude of the difference between these two strata, however, varies substantially, being largest in Paraguay and smallest in Jordan. **Figure 7.20** shows that the score advantage ranges between 61 and 87 points in Jordan; 122 and 124 points in Mongolia; 114 and 155 points in Palestine; and 142 and 162 points in Paraguay.

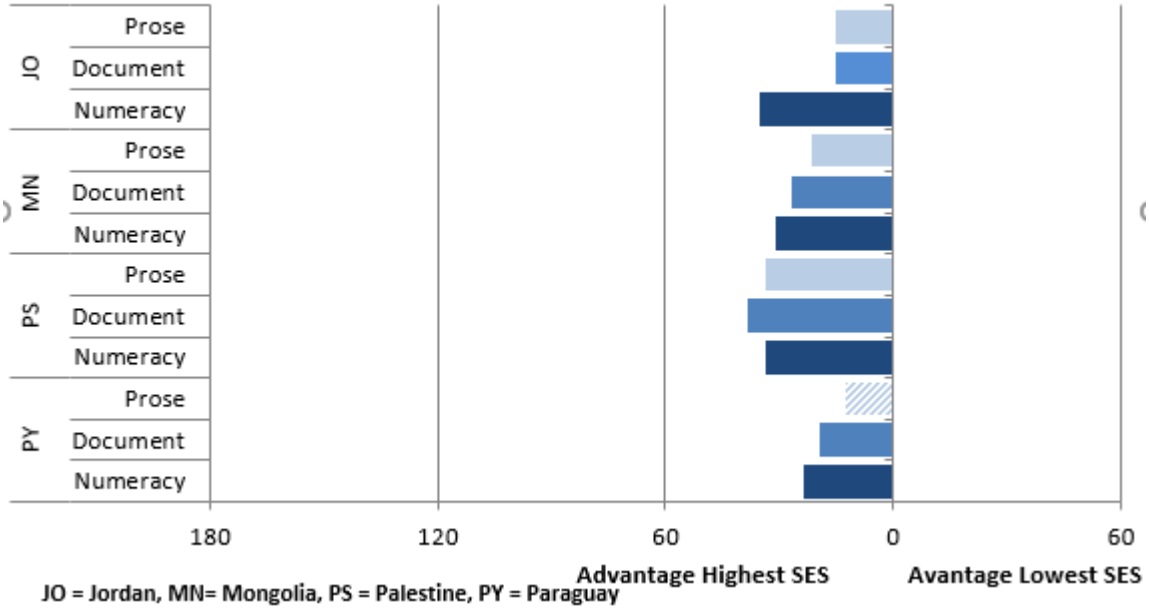
Once respondents' schooling is controlled for, the association remains statistically significant in most domains and countries, with the exceptions of Document reading in Jordan and Prose reading in Paraguay (*see* ***Figure 7.21***). Controlling for respondent's schooling also appears to have an effect on the relative magnitude of the difference across domains within each country. In other words, once schooling is controlled for, SES seems to matter more for Numeracy than for the two reading domains (Palestine being the only exception here). As we will see later, Numeracy also appears to be more closely associated with employment than the other two skills domains and of course, SES is associated with employment.

Figure 7.20. Mean score differences between respondents with the highest SES and respondents with the lowest SES



Source: LAMP, 2010-2011.

Figure 7.21. Mean score differences (adjusted for educational attainment) between respondents with the highest SES and respondents with the lowest SES



Source: LAMP, 2010-2011.

7.5 Literacy, numeracy and location: Urban and rural

The urban-rural gap in skills is found both in household-based assessments and in student assessments. This section starts with a brief review of the literature on urban-rural gaps among students and then presents LAMP results that show similar gaps among the adult population. It should be noted that each of the four countries that administered LAMP had its own definition of rural and urban and the report here reflects these country-specific definitions.

Household-based assessments like LAMP reveal an urban-rural gap among adult (schooled or unschooled) populations. They cannot, however, explain how location and the literate environment density affect the loss, maintenance or further development of skills in adult life.

i) General differences between rural and urban populations in the LAMP sample

Rural populations in Mongolia and Paraguay have different profiles than their urban counterparts (*see* ***Table 7.6***). They have fewer years of formal schooling, participate less in non-formal education and are less likely to report that they read and write easily, or to be students. They report lower levels of literacy practices at home. Their parents are less likely to have had high-skilled occupations while their mothers have lower educational attainment. Rural residents are also slightly less likely to be employed. Among those employed, rural residents are much less likely to have high-skilled occupations (ISCO 1-5) and consistently report lower use of both literacy and numeracy skills at work.

In Paraguay, the language of assessment (Spanish) is much more widespread in urban areas as both mother tongue (60.1% as opposed to 41.7% in rural areas) and home language (54.3% as opposed to 12.1% in rural areas).

This urban-rural divide is much less pronounced in Jordan and Palestine, where the proportion of people living in rural areas is also much smaller than in the other LAMP countries. Here, urban and rural residents have similar levels of schooling and are just as likely to be students.

ii) Literacy and numeracy of rural and urban residents

The urban-rural gap in skills reflects the profiles reviewed above. The association between location and LAMP scores, as shown in **Figure 7.22**, is significant in all countries but Palestine. The magnitude of the mean differences in favour of urban respondents is largest in Paraguay, ranging between 68 and 79 points, followed by Mongolia with mean differences ranging between 52 and 56 points. In Jordan, the mean difference ranges between 28 and 42 points.

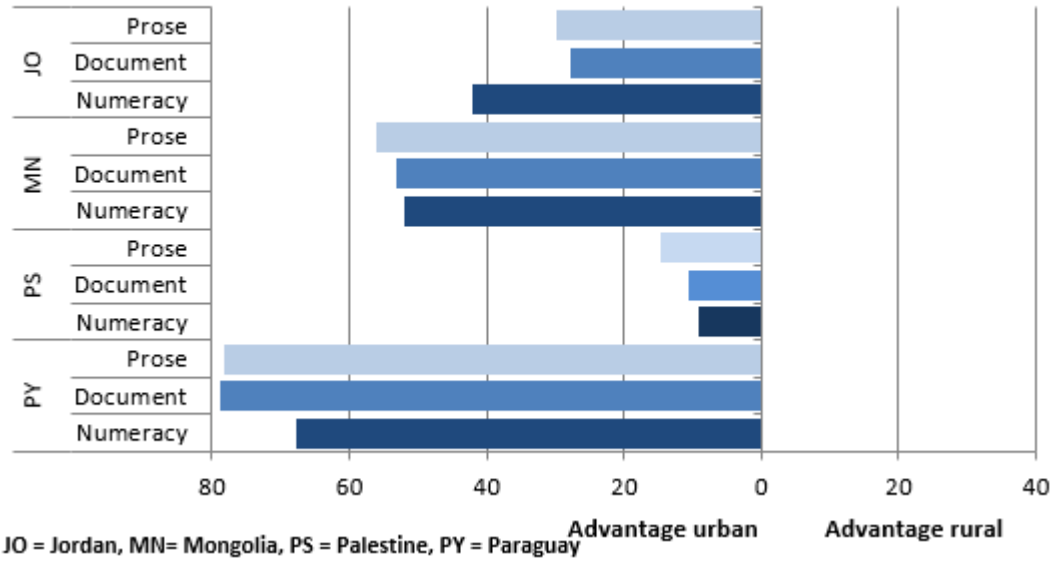
However, once the respondent's schooling is controlled for, associations cease to be statistically significant for most countries and domains (*see* ***Figure 7.23***). Only in Mongolia, the association remains statistically significant for all three skills domains.

Table 7.6. Respondents' profiles by gender in median age or percentages

	Jordan		Mongolia		Palestine		Paraguay	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Male (%)	51.6	51.8	47.9	52.2	50.9	48.5	48.1	53.7
Age	31	30	32	34	30	29	35	31
Primary education or less (%)	25.7	33.9	5.3	24.8	10.1	9.0	25.9	57.1
Secondary education (%)	44.9	48.6	47.7	56.2	68.5	65.0	42.0	35.4
Post-secondary education (%)	29.4	17.5	47.0	19.0	21.4	26.1	32.1	7.6
Years of formal schooling	12	11	10	8	11	11	11	6
Participated in non-formal education (in the last 12 months) (%)	10.9	8.9	17.0	7.6	10.2	13.0	15.6	8.8
Participated in literacy programme (%)	1.0	1.1	2.4	2.7	1.1	2.1	0.4	1.4
Reported to read easily (%)	94.1	92.7	98.4	91.7	93.5	92.4	95.3	81.7
Reported to write easily (%)	93.6	92.0	98.2	91.1	92.6	88.1	95.5	81.4
Student (%)	24.7	25.1	21.3	7.4	21.5	27.7	23.2	15.3
Employed (%)	31.4	27.1	43.0	39.8	30.9	25.7	59.0	51.6
High skilled occupation (ISCO 1-5) (%)	56.2	55.6	63.3	32.1	58.4	43.3	64.7	25.0
Managers (%)	4.4	3.6	8.7	4.9	8.7	8.6	11.4	5.0
Professionals (%)	4.9	3.4	30.1	14.7	15.7	9.6	16.4	5.2
Technicians (%)	9.0	6.3	4.3	2.4	10.5	10.1	9.3	3.1
Clerical support workers (%)	18.1	20.7	6.4	4.4	3.2	2.3	8.5	2.2
Service and sales workers (%)	19.9	21.6	13.8	5.7	20.3	12.6	19.2	9.4
Low skilled occupation (ISCO 6-9) (%)	43.8	44.4	36.8	67.9	41.6	56.7	35.3	75.0
Agricultural workers (%)	0.7	10.4	0.3	0.4	2.6	13.3	5.1	39.9
Craft workers (%)	18.6	10.4	1.8	1.2	16.0	13.4	13.2	16.2
Plant and machine operator (%)	0.9	0.5	9.4	5.2	6.6	6.4	2.3	2.7
Elementary occupations (%)	23.6	23.1	25.3	61.2	16.5	23.6	14.8	16.2
Literacy practices at work (0-100)	25.0	18.8	43.8	18.8	25.0	25	31.3	12.5
Numeracy practices work (0-100)	75.0	62.5	66.7	55.6	66.7	66.7	57.1	57.1
Practices at work (0-100)	50.0	40.6	55.2	35.6	45.8	42.7	46.0	30.8
Retired (%)	5.7	6.8	8.6	9.6	1.1	0.8	6.1	1.1
Practices at home (0-100)	55.9	50.0	61.8	41.2	52.9	50.0	58.8	44.1
Years of schooling of the mother	3	0	12	6	6	6	6	3
High skilled parents (ISCO 1-5)	49.3	43.4	56.7	25.5	38.1	32.5	39.5	13.5

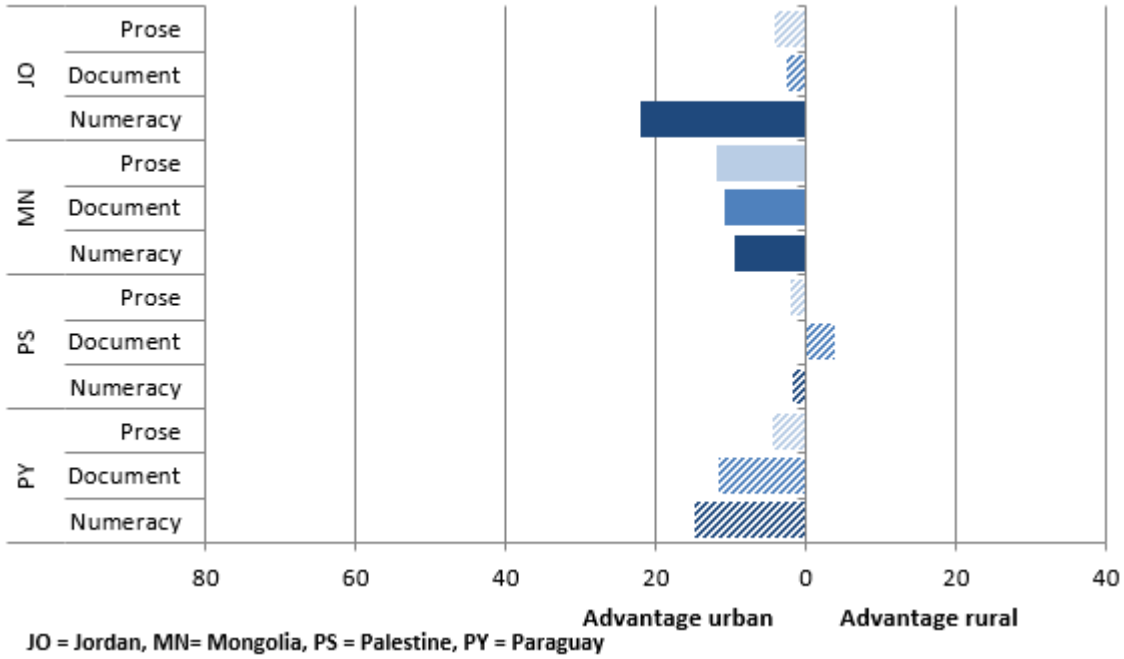
Source: LAMP, 2010-2011.

Figure 7.22. Mean score differences between urban and rural residents



Source: LAMP, 2010-2011.

Figure 7.23. Mean score (adjusted for educational attainment) differences between urban and rural residents



Source: LAMP, 2010-2011.

7.6 Literacy, numeracy and leisure: The use of skills at home

Although schooling remains the most important predictor of skills, what happens after respondents leave school may be just as important. There is a growing body of literature on skill loss. Some of it focuses on the mismatch of skills in the workplace and the subsequent deterioration of the competencies that are not used in that setting (OECD, 2013a). Actual skill loss cannot be measured directly by a cross-sectional assessment like LAMP (this limitation also applies to IALS, ALL, PIAAC and STEP), as this would require at least two measures at different points in time. LAMP can, however, collect information on those practices (at the workplace and beyond) that are likely to prevent skill loss. This section will focus on the use of skills during leisure as an output (or at least a correlate) of schooling and a predictor of skills.

Literacy practices are the activities that expose individuals to written materials or formal language at home and in daily life, outside work. This may be in the form of printed texts, through information and communication technologies (ICTs) or digital media, and through attendance of cultural activities. Respondents were asked a series of questions about the literacy-related activities they engage in during leisure time. These data, which yield information that is subjective and ordinal in nature, was then analysed and used to construct an index of literacy practices.

First, a set of questions was selected – the answers to which provide indicator data to be included in the analysis. Some of the questions include:

- How often do you read instructions before taking medicine or the labels printed on food product packages, such as ingredients or nutritional value?
- Have you communicated via text messaging?
- Have you visited a trade fair, attended a professional conference, visited a museum or an art gallery?
- Have you used a computer? Did this computer have access to the Internet?
- Have you used the Internet to get in touch with other people through social networks? To search for information? To read the news?

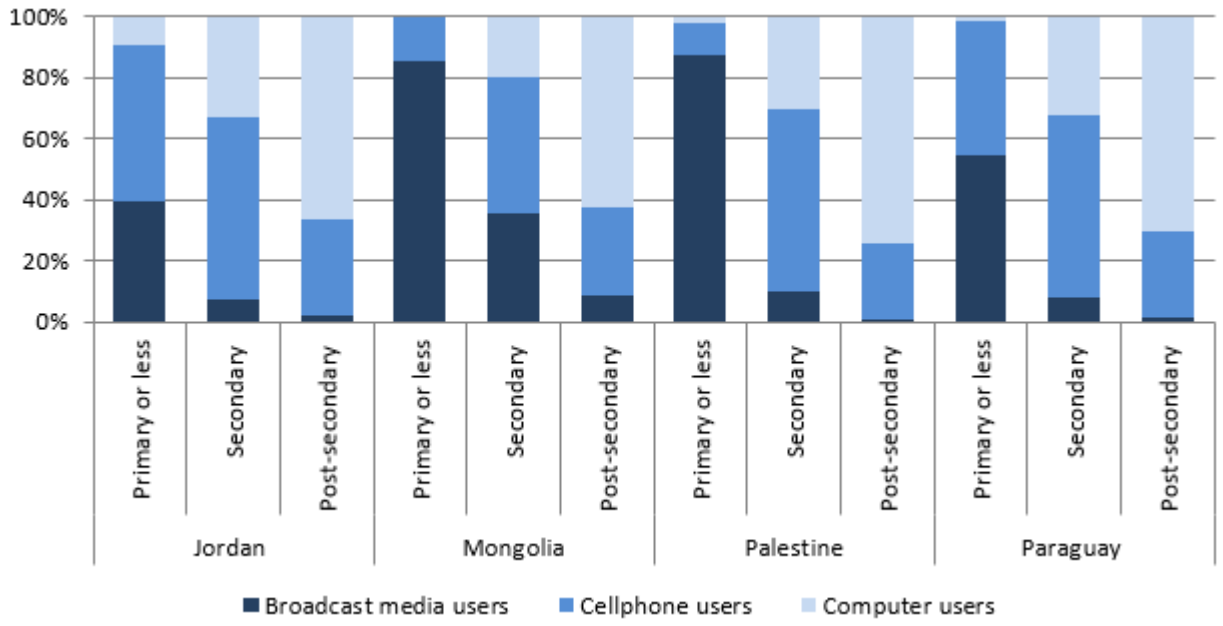
Second, a latent class analysis was performed separately by country using the same set of variables (*see **Annex 20*** for the complete list of variables included in the analysis). This technique affords an understanding of how data cluster together, and highlights the traits that separate groups of users from each other. An identical number of groups with the same traits that separate them were identified across the four countries – although the size of these groups differed across countries. These groups can be characterised as follows:

- Broadcast media users who in their spare time make little use of their literacy skills (if they have them) and as a result, may lose them. Most of the exposure to literacy for this group comes from listening to the radio and watching television.
- Mobile phone users who use their literacy skills when they need them (food and medicine labels, personal finances) but also sometimes for pleasure (books and magazines) and most of all, to stay in touch with others (texting).
- Computer users who rely on their literacy skills for a wide range of leisure activities, involving the Internet, a variety of print media and cultural events.

Third, given that the results of latent class analysis yielded consistent results across the four countries, it became possible to construct a point-scale of engagement in literacy activities using the selected indicators, and to choose cut-points along this scale to define the three categories of users: broadcast media, mobile phone and computer users.

As **Figure 7.24** shows, respondents with higher levels of schooling tend to engage to different degrees in the three practices that involve using reading or numeracy skills. The practices may predict skills independently of schooling.

Figure 7.24. Literacy practices outside work by educational attainment

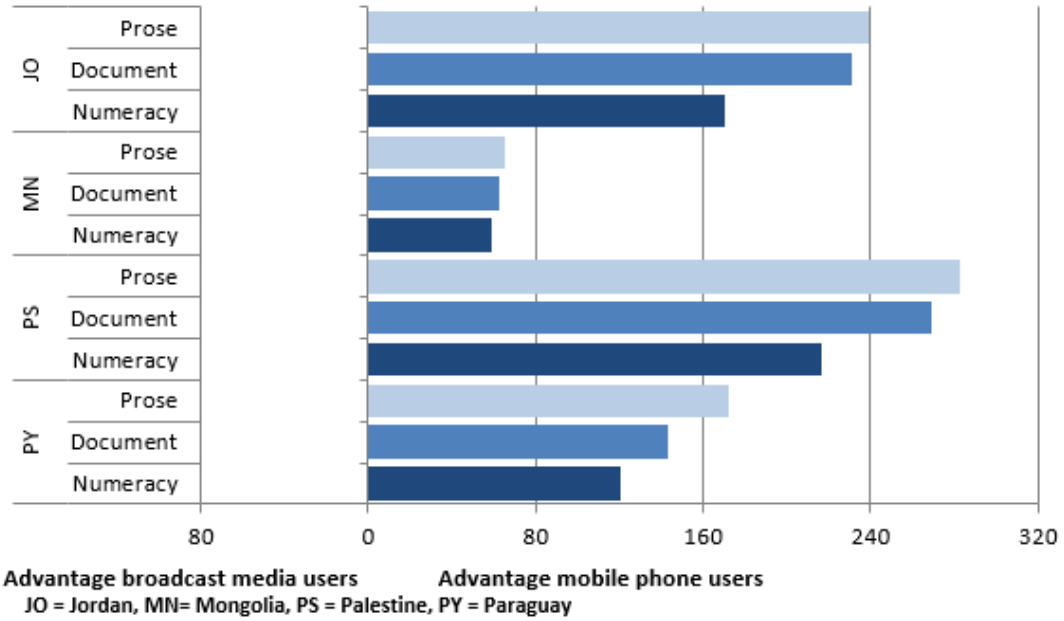


Source: LAMP, 2010-2011.

As seen in **Figure 7.25**, mobile phone users outperform broadcast media users in all countries and domains. All differences are statistically significant. Within each country, the difference is largest in Prose reading, then in Documents reading, while Numeracy always shows the smallest difference. This is consistent with the types of practices that mobile phone users engage in, which involve reading to a greater extent than numeracy. In terms of variations across countries, Palestine shows the largest differences, ranging between 217 and 282 points, closely followed by Jordan with mean differences ranging between 170 and 240 points. Mongolia yielded the smallest differences, which range from 60 to 66 points.

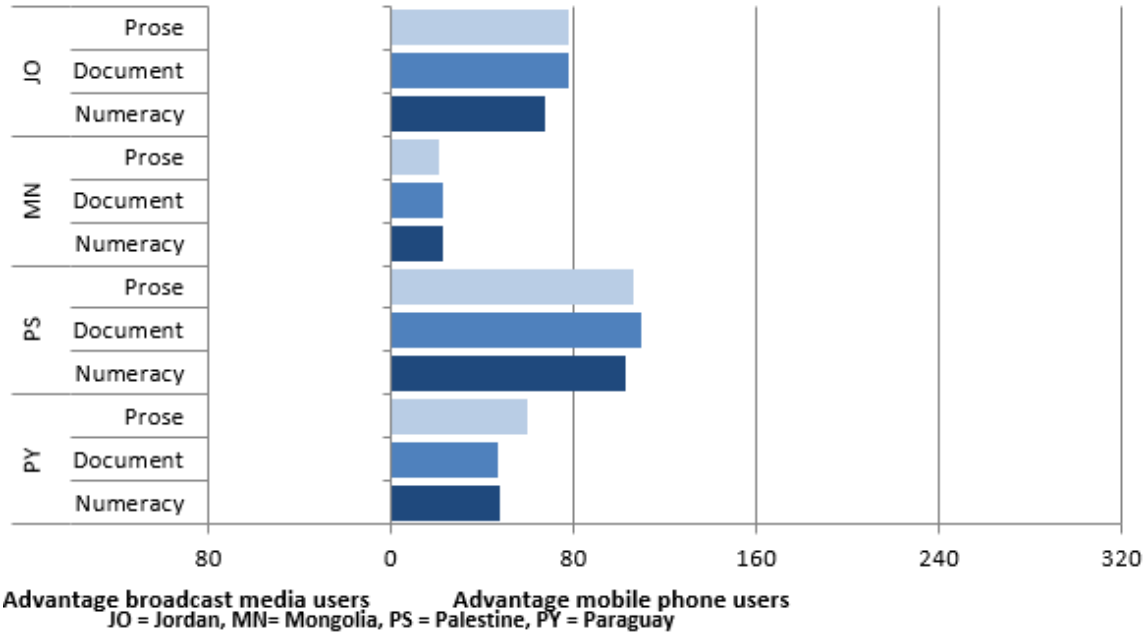
Figure 7.26 shows the difference in means after adjusting for schooling. After controlling for respondents' schooling, all differences remain statistically significant. The relative magnitudes of the differences across countries become even more obvious, from largest in Palestine and Jordan to smallest in Mongolia. However, the score advantage in favour of mobile phone users is largely reduced, falling to 21 points in Mongolia and not exceeding 110 points in Palestine, where that advantage is the largest.

Figure 7.25. Mean score differences between broadcast media users and mobile phone users



Source: LAMP, 2010-2011.

Figure 7.26. Mean score differences (adjusted for educational attainment) between broadcast media users and mobile phone users

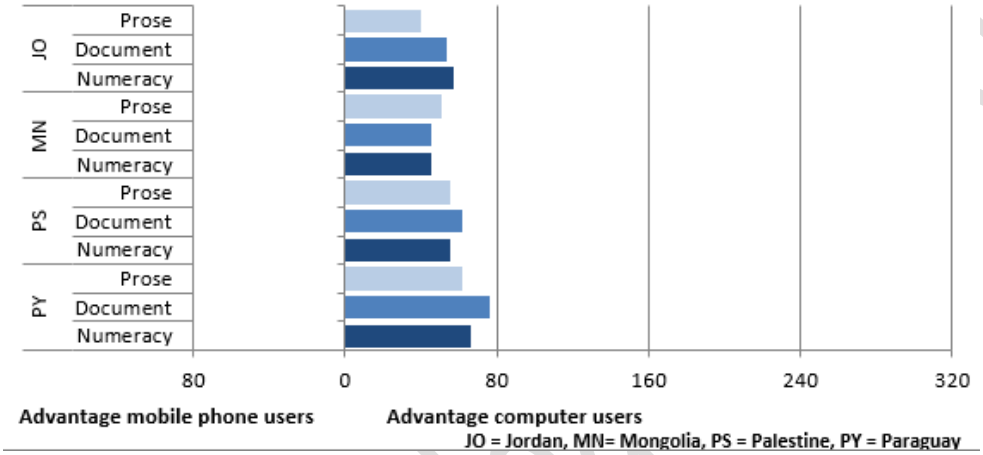


Source: LAMP, 2010-2011.

It is also possible to compare mobile phone users and computer users. **Figure 7.27** shows that computer users outperform mobile phone users in all countries and domains. The mean differences are much smaller between these two groups than between broadcast media users and mobile phone users, varying only between 40 and 76 points.

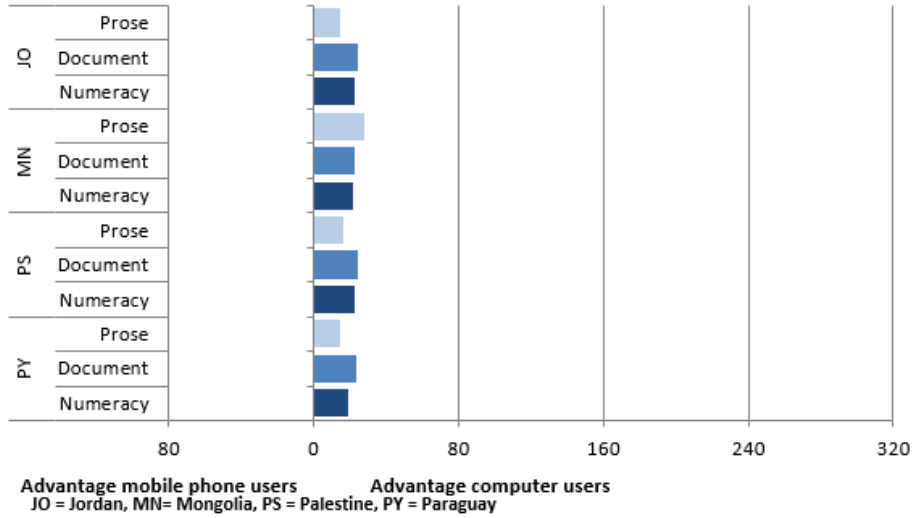
Figure 7.28 shows the mean difference after adjusting for schooling. After controlling for respondent's schooling, all associations remain statistically significant. However, the score advantage in favour of computer users is reduced in all domains and in all countries. As for variations across domains, the magnitude of the difference is largest in Document reading in three of the four countries – the exception being Mongolia.

Figure 7.27. Mean score differences between mobile phone users and computer users



Source: LAMP, 2010-2011.

Figure 7.28. Mean score (adjusted for educational attainment) differences between mobile phone users and computer users



Source: LAMP, 2010-2011.

7.7 Literacy, numeracy and livelihood: The use of skills at work

This section focuses on three aspects of the relationship between employment and skills. First, the analysis presents the differences between respondents who are employed and not employed. Then, for those who are employed, the analysis focuses on the differences between high-skilled and low-skilled occupational categories as defined by ISCO. Finally, also for those who are employed, the focus shifts to the workplace practices reported by the respondents and their association with skills.

i) Employment and literacy and numeracy scores on LAMP

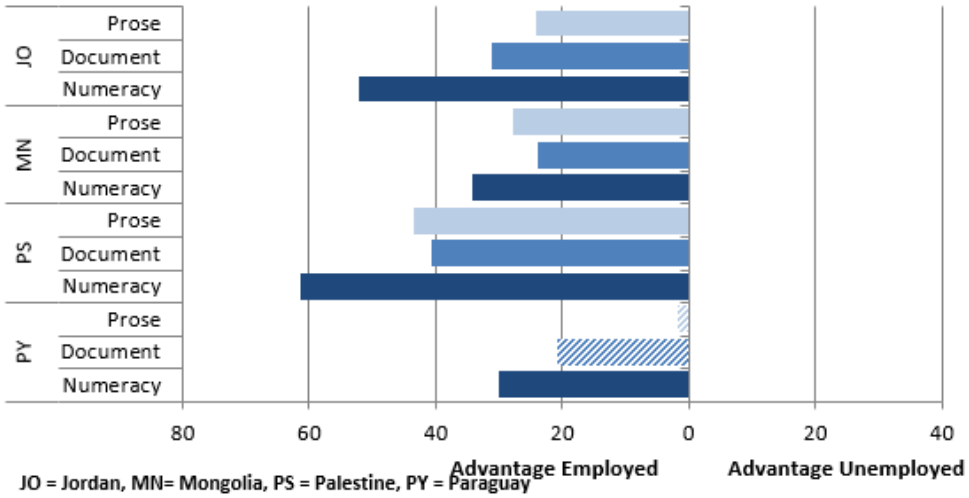
Figure 7.29 shows that respondents who are currently employed systematically outperform those who are not. The differences are statistically significant in all countries and skills domains with the exception of Prose and Document reading in Paraguay. Within each country, the difference is largest in Numeracy. The advantage on the Numeracy scale ranges from 30 to 61 points, with Paraguay having the lowest scores difference and Palestine the largest.

As seen in **Figure 7.30**, after controlling for respondent's schooling, the difference continues to be statistically significant in Numeracy in all countries but not in the reading domains, with the sole exception of Prose in Mongolia. However, the advantage in favour of employed respondents is largely reduced after accounting for educational attainment. The lowest score difference is found in Paraguay, where employed respondents outperform their unemployed counterparts by 16 points. The largest difference (31 points) is observed in Palestine.

ii) Occupational level and literacy and numeracy scores on LAMP

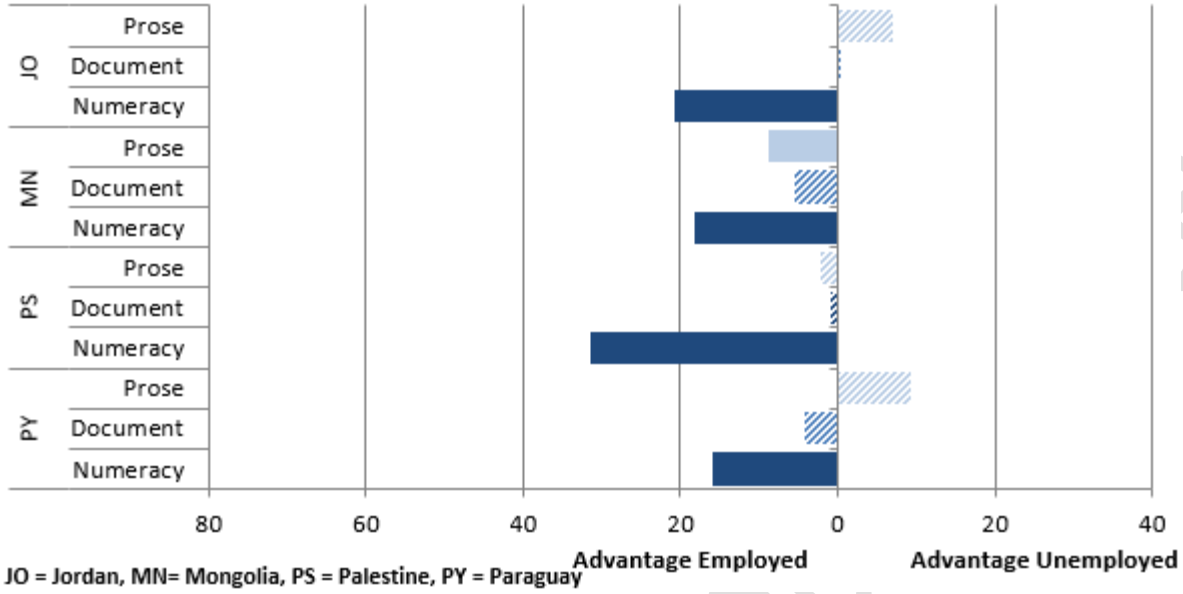
Respondents employed in 'high-skilled' occupations (those in categories 1-5 of ISCO) outperform other employed respondents in all countries and skills domains as seen in **Figure 7.31**. The differences, which are all statistically significant, are largest in Paraguay, ranging between 96 and 108 points, and smallest in Jordan, ranging between 40 and 60 points.

Figure 7.29 Mean score differences between employed and unemployed respondents



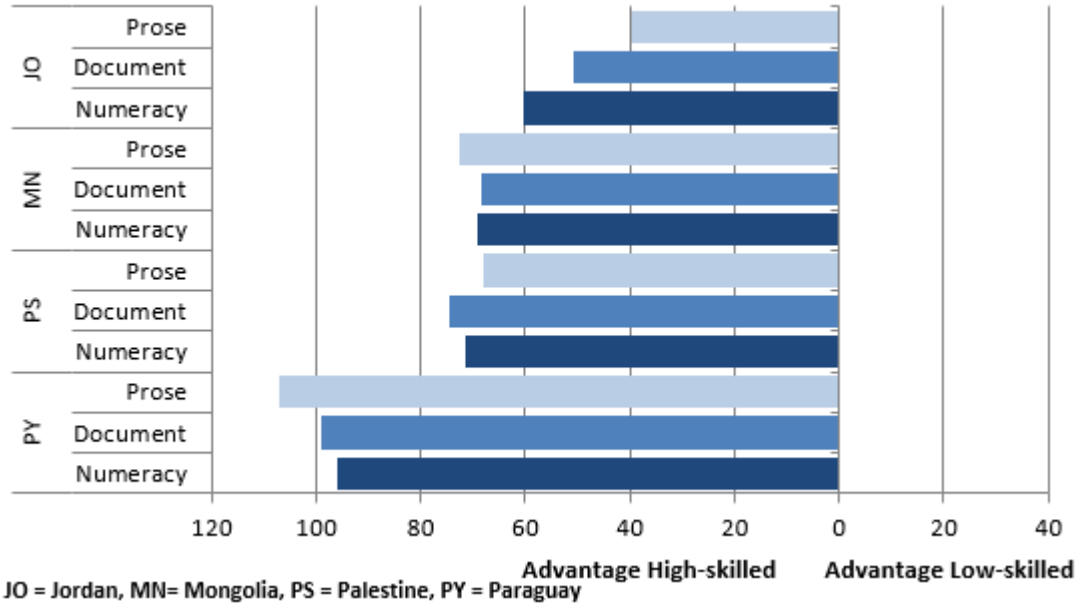
Source: LAMP, 2010-2011.

Figure 7.30. Mean score (adjusted for educational attainment) differences between employed and unemployed respondents



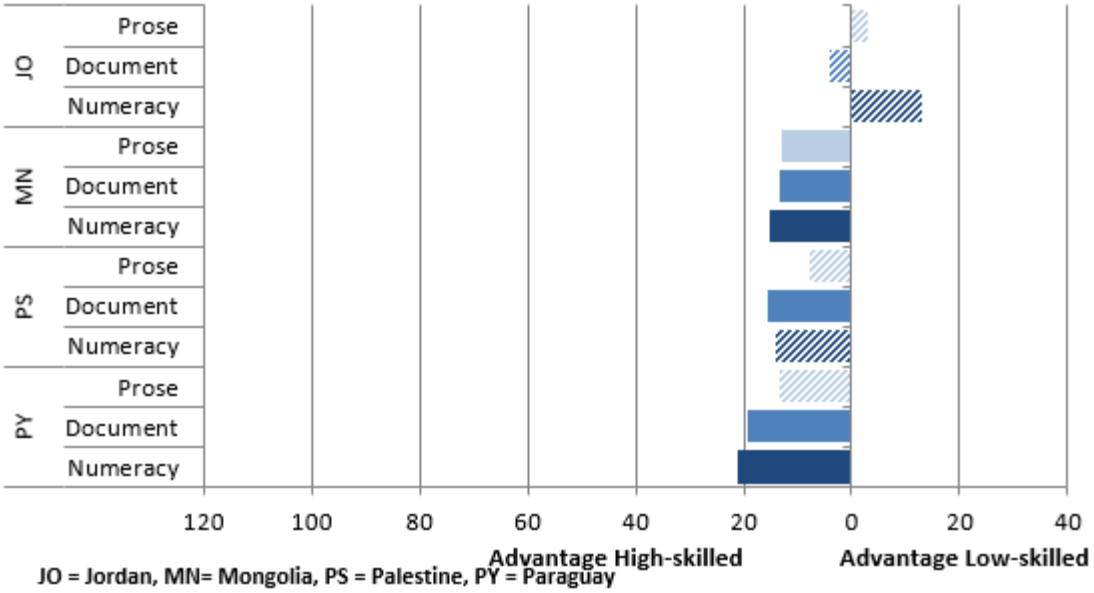
Source: LAMP, 2010-2011.

Figure 7.31. Mean score differences between high-skilled and low-skilled employed respondents



Source: LAMP, 2010-2011.

Figure 7.32. Mean score (adjusted for educational attainment) differences between high-skilled and low-skilled employed respondents



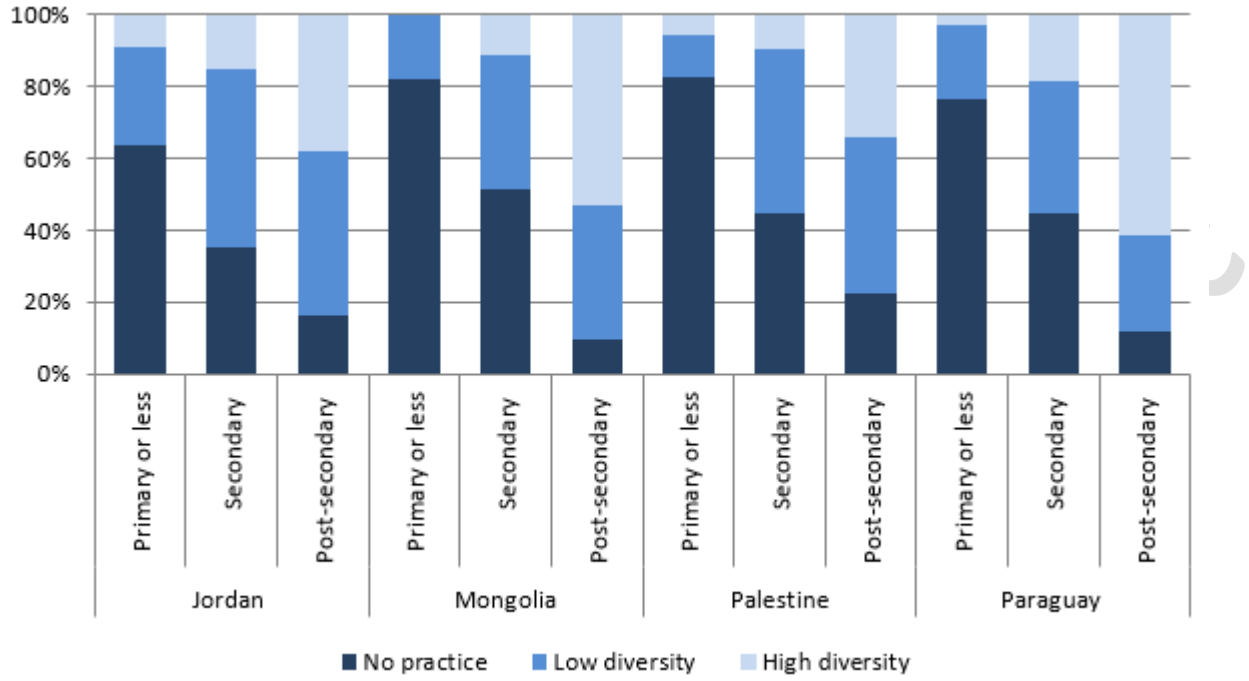
Source: LAMP, 2010-2011.

Figure 7.32 shows the results after adjusting for educational attainment. After adjusting for respondent's schooling, several of those associations are no longer statistically significant. Only in Mongolia, the association between skills and occupational level remains significant in all three domains. Document reading stands out compared to the other domains since its association with the occupational category remains positive in all countries and statistically significant in three of the four countries. For Jordan, Prose reading and Numeracy show an advantage for the low-skilled occupations.

iii) The use of reading and numeracy skills in the workplace related to literacy and numeracy scores on LAMP

For each educational level, participants were classified into one of three literacy and numeracy work practice categories: no practice, low diversity practice and high diversity practice. The information on which to base classification into these categories came from the Background Questionnaire/Literacy and numeracy activities, similar to those used to classify responses in leisure activities but focussed more on the work settings used. The bars in **Figure 7.33** represent the percentage of participants in each educational attainment group that engages in these work practices. As Figure 7.33 shows, respondents with higher levels of schooling tend to engage in a highly diverse array of practices at work that engage their reading or numeracy skills. For post-secondary educated respondents, 34% to 61% engage in highly diverse reading and numeracy tasks in their workplace, whereas less than 10% of primary or less educated respondents do so.

Figure 7.33. Literacy and numeracy practices at work by educational attainment



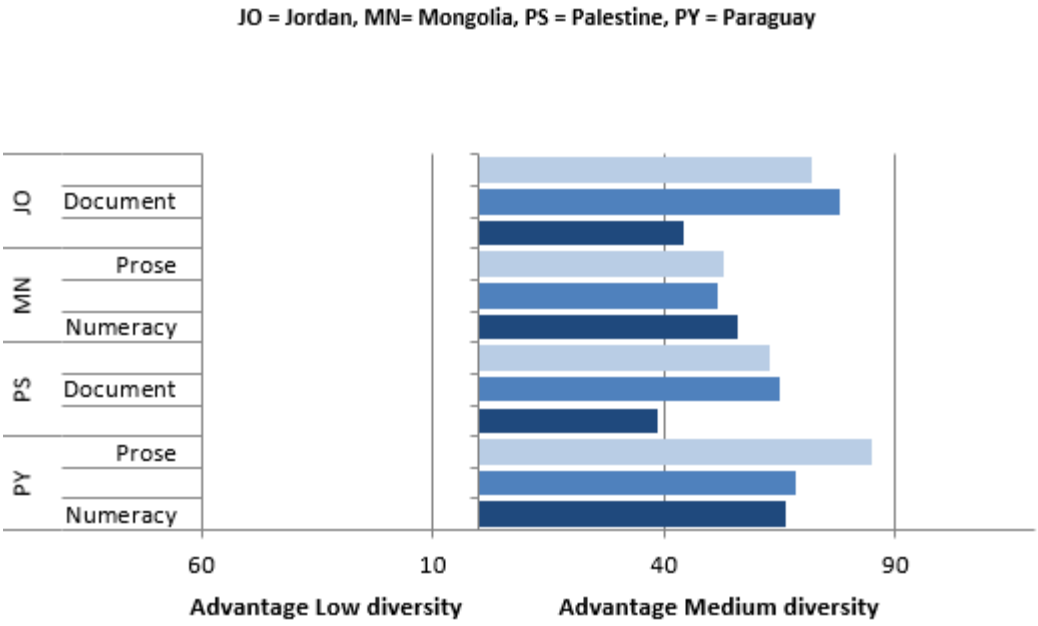
Source: LAMP, 2010-2011.

Figure 7.34 shows the mean LAMP score differences for respondents who engaged in low and medium diversity of literacy and numeracy tasks at work. Those engaged in medium diversity of literacy and numeracy tasks score higher on LAMP in all three domains. The use of reading and writing at work as reported by the respondents is associated with reading skills. Respondents who claim never to read or write at work systematically perform at a lower level in all countries and domains. The smallest differences are in Mongolia and Palestine.

Figure 7.35 shows the difference after adjustment for educational attainment. All differences are much smaller. Thus, educational attainment, which is linked to occupational level, is highly related to the use of literacy and numeracy at work.

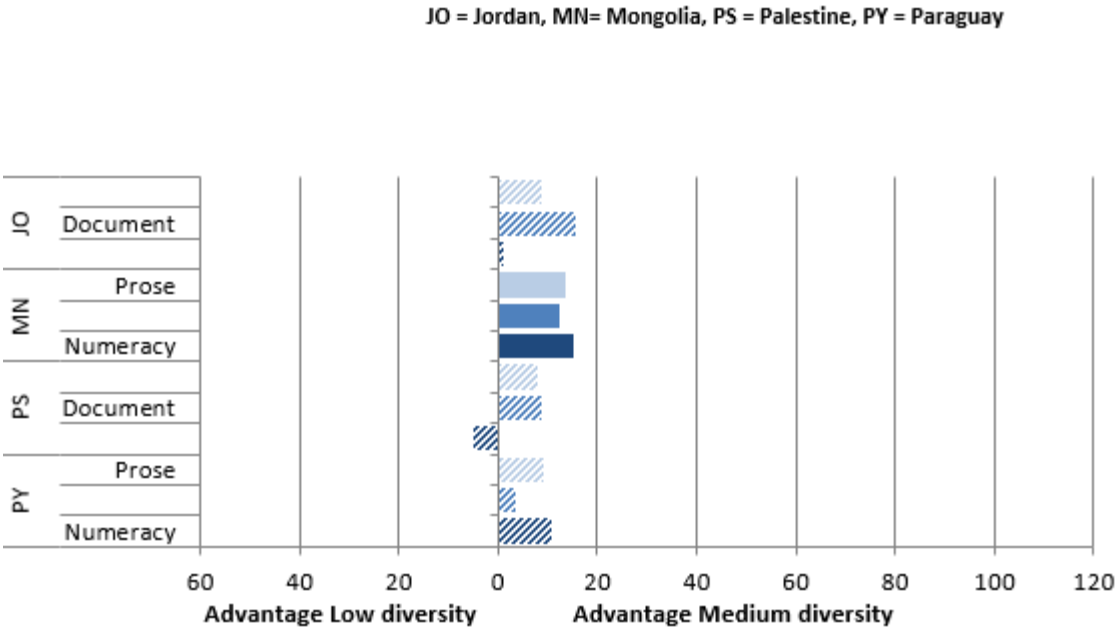
It is also possible to compare LAMP performance for those reporting that they use little or no literacy or numeracy skills at work with those who report a medium level of diverse use of these skills. **Figure 7.36** shows mean differences in each country and in each domain before adjusting for educational attainment. **Figure 7.37** shows the results after adjusting for educational attainment. After controlling for respondents' schooling, half of those differences cease to be statistically significant but no clear pattern emerges.

Figure 7.34. Mean score differences between respondents with low diversity and respondents with medium diversity of literacy and numeracy practices at work



Source: LAMP, 2010-2011.

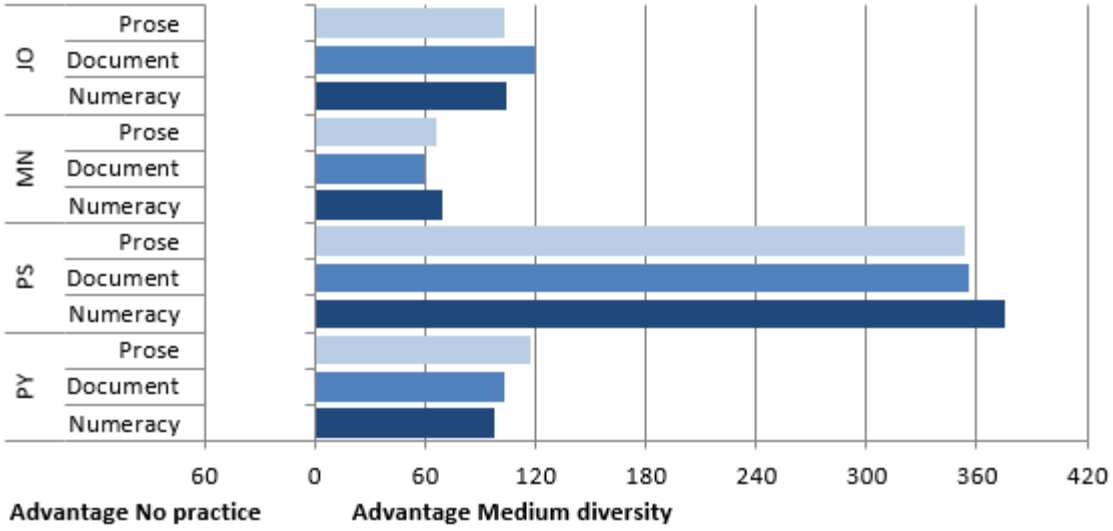
Figure 7.35. Mean score (adjusted for educational attainment) differences between respondents with low diversity and respondents with medium diversity of literacy and numeracy practices at work



Source: LAMP, 2010-2011.

Figure 7.36. Mean score differences between respondents with no practice and respondents with medium diversity of literacy practices at work

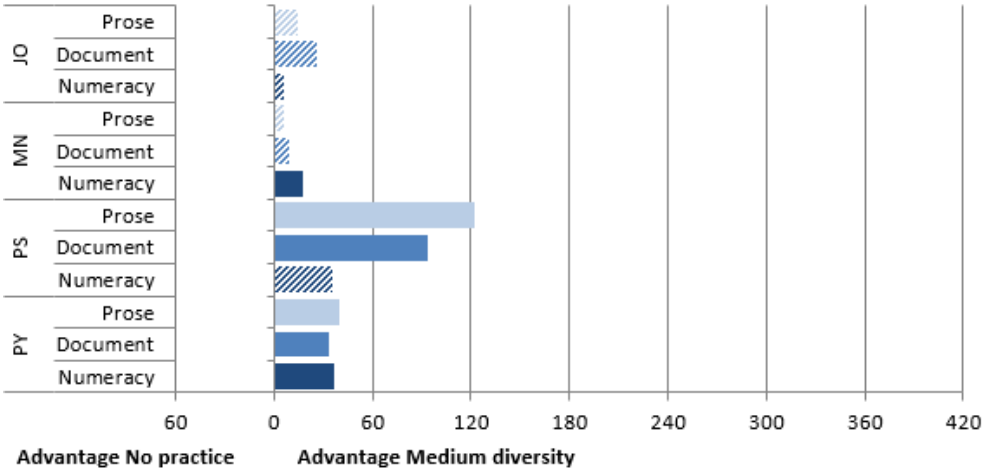
JO = Jordan, MN= Mongolia, PS = Palestine, PY = Paraguay



Source: LAMP, 2010-2011.

Figure 7.37. Mean score differences (adjusted for educational attainment) between respondents with no practice and respondents with medium diversity of literacy practices at work

JO = Jordan, MN= Mongolia, PS = Palestine, PY = Paraguay

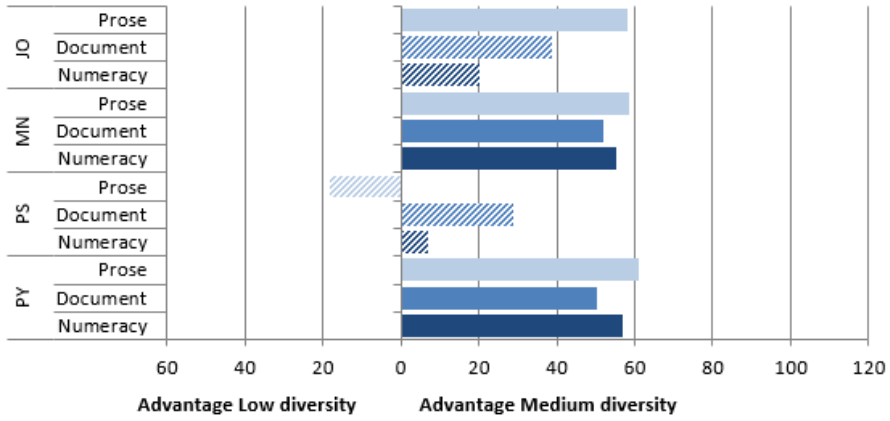


Source: LAMP, 2010-2011.

Figures 7.38 and **7.39** show differences between the low diversity literacy and numeracy practices and medium diversity practices groups. Before adjustment for educational attainment, all differences favour the medium diversity group over the low diversity group in all countries for all domains, except for numeracy in Palestine. In the Palestine sample, respondents with low diversity have larger mean scores on Prose reading. After adjustment for educational attainment, all differences become much smaller – in Palestine, this difference of a larger mean score on average Prose reading still exists. In addition, respondents in Jordan in the low diversity group now have a higher mean numeracy score. The meaning of this result is unclear.

Figure 7.38. Mean score differences between respondents with low diversity and respondents with medium diversity of numeracy practices at work

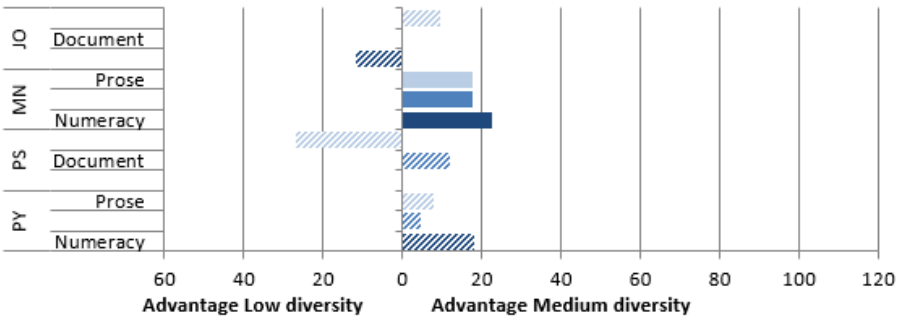
JO = Jordan, MN= Mongolia, PS = Palestine, PY = Paraguay



Source: LAMP, 2010-2011.

Figure 7.39. Mean score (adjusted for educational attainment) differences between respondents with low diversity and respondents with medium diversity of numeracy practices at work

JO = Jordan, MN= Mongolia, PS = Palestine, PY = Paraguay



Source: LAMP, 2010-2011.

7.8 Summary

This chapter reports analyses of several socio-demographic variables that were related to respondents' performance on the three domains measured by LAMP. These variables were gender, learning (educational attainment), lifespan (age and cohort), legacies (parental education, occupation and SES), location (urban and rural), leisure (use of reading and numeracy skills outside of work) and livelihood (use of reading and numeracy skills at work). Consistent with other studies of literacy and numeracy, average LAMP performance in all three domains is higher for respondents with higher levels of education in all countries. In numeracy, significant percentages of those with primary education or less scored at LAMP Level 2 or higher in three of the four countries (Mongolia, Palestine and Paraguay).

When LAMP performance was studied in relation to gender, men scored higher than women in numeracy in all countries except Mongolia, where women have a higher educational attainment than men. When scores were adjusted for level of educational attainment, the advantage of men in LAMP numeracy persisted, even in Mongolia. For Prose reading, there was a small advantage for men over women in two countries (Jordan and Palestine) but an advantage for women in two other countries (Mongolia and Paraguay). After taking educational attainment into account, women generally had an advantage over men in Prose reading. In Document reading, men and women had statistically similar scores in two countries (Mongolia and Paraguay), while in two other countries (Jordan and Palestine), LAMP Document reading was higher for men. After taking educational attainment into account, the advantage of men still persisted.

When age was studied in relation to LAMP performance, it was found that younger participants had a statistically significant advantage in Prose and Document reading. Numeracy was not statistically different for younger and older respondents, and the differences were generally small. When average differences were adjusted for educational attainment, the differences in Prose reading between older and younger participants became smaller and were reversed for Mongolia and Paraguay (i.e. scores for the older comparison groups were higher). When Document reading average scores were adjusted for education level, no differences between younger and older groups remained statistically significant. In Numeracy, there were no statistically significant differences between the age groups except in one country (Mongolia). LAMP is unique in that it studied numeracy for participants aged 65 and older. The results showed that this group had statistically lower average numeracy scores in each country. When the full range of ages was studied in relation to LAMP scores, there was a downward curvilinear relationship. In all four countries, on all domains, there tended to be a slight peak in performance around age 35, then scores became lower as age increased.

The scores of participants in LAMP were related to maternal education level. Participants with mothers who attained post-secondary education scored significantly higher than participants who had mothers with lower educational completion. A similar pattern was observed when fathers' educational attainment was studied in relation to participants' scores. Participants with parents in high-skilled occupations also scored higher in all LAMP domains. This difference favouring high-skilled occupation parents persisted after adjusting scores for the participants' own educational attainment but the differences were smaller. Participants whose parents had the highest SES scored higher than participants whose parents had the lowest SES. This advantage persisted after adjusting the scores for the participants' own level of educational attainment.

Participants from urban areas scored higher on average than participants from rural areas. This was true even after taking into account the participants' educational attainment, though after adjustment the differences between urban and rural participants became very small.

Participants who used mobile phones had higher scores than participants who relied solely on media broadcasts. Further, those using computers had higher scores than those using only mobile phones. This advantage for computer users persisted even after adjusting for educational attainment, though the advantage in mean difference was much smaller.

Employed participants had higher scores than unemployed participants, even after taking into account educational attainment. Participants with high-skilled occupations had higher LAMP scores but when adjusted for education attainment, this advantage became very small. The more participants used their reading and numeracy skills at work, the higher their LAMP scores. This advantage persisted in most countries when scores were adjusted for educational attainment of the participants, although the advantage was not great.

Thus, LAMP scores are related to many socio-demographic variables but the relationships are generally less strong after participants' education levels are taken into account. Education seems to be the key factor for attaining literacy and numeracy as measured by LAMP.

Some policy implications

These data confirm that policies aimed at increasing gender equity in the distribution of reading and numeracy skills should go beyond the schooling system. The policies should also target the labour market and the use of skills both at work and for leisure.

As access to schooling approaches gender parity, female employment rates still lag behind those of males. Given that those women who are already employed tend to be concentrated in high-skill occupations, an increase in their overall participation may reduce the skills gap substantially if their occupational profile is maintained. This may be particularly important for numeracy skills

As for literacy practices for leisure, they have the potential to help narrow the gap in the other two skills domains. This type of use seems to be relatively gender-neutral as compared to the workplace. Policymakers should find ways to foster literacy practices not only among women but among older respondents and rural residents – older rural women, in particular.

Chapter 8. A case study of literacy and language: Mother tongue, home language and bilingual status

Three of the four countries included in this report are fairly homogeneous in the languages spoken at home or as mother tongues. The exception is Paraguay, where a significant proportion of the population is bilingual in Guarani and Spanish, and where interesting differences can be found across geographical locations and social strata.

This chapter will focus on Paraguay to illustrate the kind of in-depth analysis that LAMP data allow. The chapter is concerned with language although similar analyses could be performed in the future by focusing on any of the other variables mentioned in this report, such as gender, age, location and socio-economic status (SES).

The chapter starts with a descriptive analysis similar to other topics presented in this report. Then, in an effort to focus on language issues, a number of control variables introduced in previous sections are added to the analysis.[22]

8.1 A tale of two languages: Bilingualism, *diglossia* and literacy in Paraguay

"Bilingualism and multilingualism are normal, unremarkable necessities of everyday life for the majority of the world's population" (Romaine, 2008, p. 445). Yet, no matter how "normal" this phenomenon may be on a global scale, Paraguay still stands out as a practical example of societal bilingualism.

Table 8.1 shows that among LAMP respondents, 86% report speaking Guarani well enough to carry a conversation (responded "Yes" for Guarani) and that 80% claim to be able to do the same in Spanish (responded "Yes" for Spanish). Based on their self-reports, two thirds of Paraguayan respondents (66.5%) could be considered Spanish-Guarani bilinguals.

Although clearly both languages are widespread, individuals have different degrees of exposure to each language. For instance, they may speak Spanish or Guarani as mother tongue or as a second language.[23] In Paraguay, many people have more than one mother tongue. In the LAMP sample, more than three quarters of Paraguayans (78.7%) report Guarani among their mother tongues while more than half (52.1%) report Spanish as one of them, and almost a third (32%) report both (*see* ***Table 8.2***).

[22] To enable the use of multiple controls, a slightly different methodology will be used for this section. Previous sections have used the methodology of plausible values to estimate means. However, the software used at the UIS for this methodology does not allow for the simultaneous use of several socio-demographic correlates. For that reason, instead of plausible values, this chapter will use a weighted least-squares estimation (WLE) method. The main consequence of using this method (in addition to the possibility of using multiple socio-demographic correlates of skills simultaneously in the analysis) is that these estimates of skills are only available for respondents who were actually administered the Prose, Document and Numeracy instruments. As a result, this analysis does not include respondents for whom the skills estimates were imputed based on their socio-demographic characteristics.

[23] 'Mother tongue' is defined here as the language that someone first learnt to speak and can still understand in adulthood.

Table 8.1. Distribution of the two main spoken languages in percentage among Prose, Document and Numeracy respondents

		Guarani		
		Yes	No	Total
Spanish	Yes	**66.5**	**13.2**	79.7
	No	**19.8**	**0.5**	20.3
	Total	86.3	13.7	100.0

Source: LAMP, 2011.

Table 8.2. Distribution of the two main mother tongues in percentage among Prose, Document and Numeracy respondents

		Guarani is mother tongue		Total
		Yes	No	
Spanish is mother tongue	**Yes**	**32.3**	**19.8**	52.1
	No	**46.4**	**1.5**	47.9
	Total	78.7	21.3	100.0

Source: LAMP, 2011.

Oftentimes bilingualism is not just about who speaks which language(s). It is also about where, when, to whom, and for which purpose: "many bilingual communities are characterized by *diglossia*, … a kind of functional specialization between languages (referred to as High and Low[24]) so that the language used within the home and in other personal domains of interaction between community members is different from the one used in higher functions such as government, media, education (Ferguson, 1959; Fishman, 1967)" (Romaine, 2008, p. 454). Some famous examples of this are French and Creole in Haiti; Standard and Dialectal Arabic; and Ancient and Modern Greek (Romaine, 2008). "For instance, [high or H] is used in public administration, schooling, mass media, business and commerce, while [low or L] is used within the context of home and family, social and cultural activities in the community, and correspondence with relations and friends (Baker, 2006)" (Ito, 2012, p. 3). This distinction is extremely important for literacy.

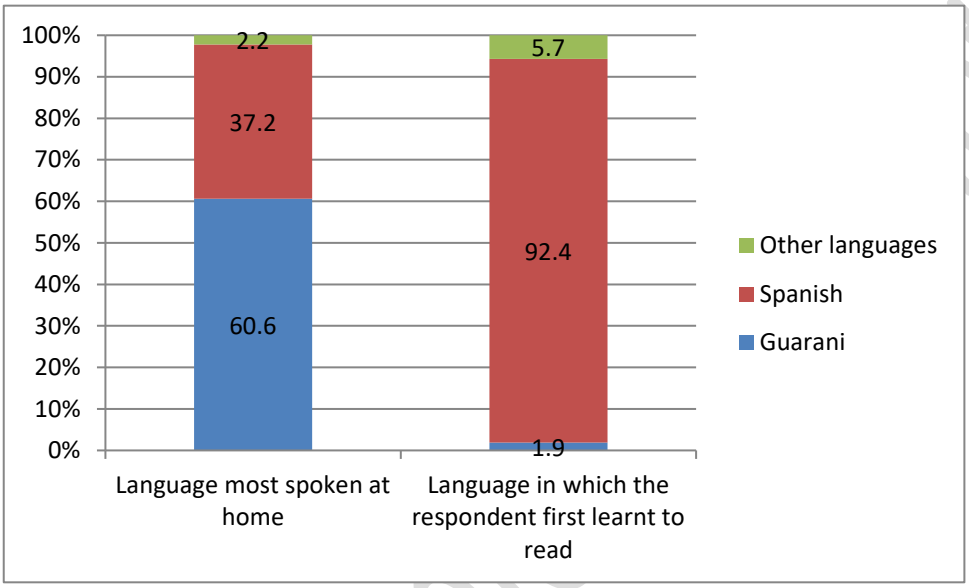
According to Wei, "Examples of simple binary diglossia include Guarani vs. Spanish in Paraguay" (Wei, 2013, p. 31). Even if "Guarani has obtained the same official status as Spanish" (Ito, 2012, p. 3), in terms of their use, Spanish is "the official language of government and education, while Guarani, spoken by 90% of the population, is … the language of most homes and everyday informal interaction" (Romaine, 2013, p. 454).

[24] These terms do not intend to convey a statement of value about the language themselves. They refer to the social status of the languages as a result of their respective uses for formal and informal communication. Although not without controversy, they have become the standard terms used to refer to two languages in a diglossic situation since the introduction of this concept by Ferguson in 1959.

LAMP data in **Figure 8.1** confirm the different social functions of these two languages: Guarani is the predominant home language (61%) while almost all respondents (92%) learnt to read in Spanish first.[25]

Consistently, the vast majority of respondents (86%) declare to be able to read and write "easily" in Spanish yet only one third report having those same skills in Guarani (35% for reading and 31% for writing) (*see **Table 8.3***).

Figure 8.1. Language most spoken at home and language in which the respondent first learnt to read



Source: LAMP, 2011.

Table 8.3 Distribution of home language and first language read in percentage among Prose, Document and Numeracy respondents

Percentage that declares to be able to read easily in…		Percentage that declares to be able to write easily in…	
Guarani	**Spanish**	**Guarani**	**Spanish**
35	86	31	86

Source: LAMP, 2011.

[25] Although LAMP did not collect extensive data on this, Spanish is usually the means of instruction for all levels of schooling while Guarani is sometimes taught as a subject. Spanish is much more prevalent in print media, although there are books and other materials (either translations or originals) published in Guarani as well.

This distinction between languages in terms of their functions and settings is paralleled by a distinction between speakers in terms of their social status. "Given that H is used in official domains, the speakers of H benefit socioeconomically from their ability to speak that language while the speakers of L are disadvantaged. Consequently, the speakers of L start favouring and learning H, usually to the detriment of L" (Ito, 2012, p. 3).

Among LAMP respondents, language exposure and proficiency are associated with socio-demographic factors.[26] Native Spanish-speakers (whether mono- or multi-lingual) are younger and have more years of schooling: 10.5 years as opposed to 7.8 years among non-native speakers (*see* ***Table 8.4***). They are more likely to be students, live in urban areas, use computers and have a high-skilled occupation, as well as to have parents with high-skilled occupations. Their mothers have more schooling: 6.52 years, compared to 3.98 years among non-native speakers. Curiously enough, in a country with relative gender parity in education, they are also more likely to be male. In summary, native Spanish-speakers have, on average, higher social status than respondents who do not count Spanish among their mother tongues.

Table 8.4. Profile of Prose, Document and Numeracy respondents by Spanish mother tongue

Mean	Spanish is mother tongue	
	Yes	No
Years of schooling of the respondent	10.5	7.8
Years of schooling of the respondent's mother	6.5	3.9
Literacy practices at home (0-100)	63.5	48.2
n	2,016	1,757

Source: LAMP, 2011.

It is worth noting that the situation of Guarani speakers in Paraguay is not comparable to that of linguistic minorities in many other countries. To begin with, in quantitative terms, Guarani-speakers are actually the majority.

It may help the reader to compare the Paraguayan situation with other well-known examples of multilingual societies. In Canada, for instance, there are three main types of linguistic minority situations: aboriginal peoples; immigrants with a mother tongue other than English or French; and official-language minority populations (i.e. English speakers in predominantly French-speaking regions such as Quebec, or French speakers in predominantly English-speaking regions such as New Brunswick, Ontario or Manitoba) (Corbeil, Chavez, and Pereira, 2010). The situation of Guarani-speakers in Paraguay does not closely resemble any of those three. Guarani speakers are not necessarily aboriginal – in fact, aboriginal peoples in Paraguay often speak languages other than Guarani or Spanish. Guarani is not an immigrant language as most immigrants in Paraguay speak German, Japanese or Portuguese, although many of them learn Guarani once they are settled. Finally, although Guarani is an official language on par with Spanish, this does not mean the same

[26] Oral language proficiency is as reported by respondents, since it was not directly assessed.

as in Canada.[27] Guarani is not normally used as the means of instruction in school. As a result, based on a decision made by the national LAMP team, and subsequently supported by the UIS, LAMP did not assess reading and numeracy in Guarani but only in Spanish.

8.2 Hypotheses about performance on LAMP

How is all of this relevant to reading and numeracy skills? Oral language is related to literacy skills in a number of ways, including: (1) language as an indicator of social stratification; (2) language match between the respondent's skills and the assessment's demands; and (3) the 'bilingual advantage'. This section explores how these three hypotheses predict performance in the three LAMP domains across different language groups.

1. **Language as an indicator of social stratification**. Exposure to and proficiency in a given language may be associated with other characteristics such as location, age and SES of the family of origin. These are also associated with reading and numeracy skills, as well as with schooling. As a result, part of the association between language and skills may actually be due to some of those other characteristics, for which language may be acting as a 'proxy'.

   Prediction: In Paraguay, where exposure to Spanish is positively associated with SES and other socio-demographic factors, native Spanish-speakers would be expected to outperform other respondents in all three LAMP domains. However, after controlling for socio-economic factors, this association should decrease or even disappear – i.e. cease to be statistically significant – at least in some of those domains (see following hypothesis).

2. **Language match**. Native speakers of the language of assessment tend to outperform other respondents in literacy tests.

   Prediction: In Paraguay, after controlling for socio-economic factors, native Spanish-speakers would be expected to outperform other respondents, especially in the Prose and Document domains but probably less so in Numeracy.

3. **The 'bilingual advantage'**. A growing yet controversial field of research deals with the consequences, either positive or negative, of bilingualism on cognition and literacy development. Although this debate is beyond the scope of this document (Bialystok, 2012; Kousaie et al., 2014), the relevance of this question and the richness of the Paraguayan LAMP data warranted some exploration.

   Prediction: Among respondents with similar levels of command of the language of assessment (namely, Spanish), bilingual respondents will outperform monolingual respondents in one or more skills domains.

[27] In Canada, PIAAC used either English or French as the language of assessment. This reflects the fact that either language is used as means of instruction, depending on the region.

8.3 Results

This section presents basic results for the first two hypotheses and then a slightly more in-depth analysis of the third one.

We will see now how the three hypotheses fare when confronted with LAMP data:

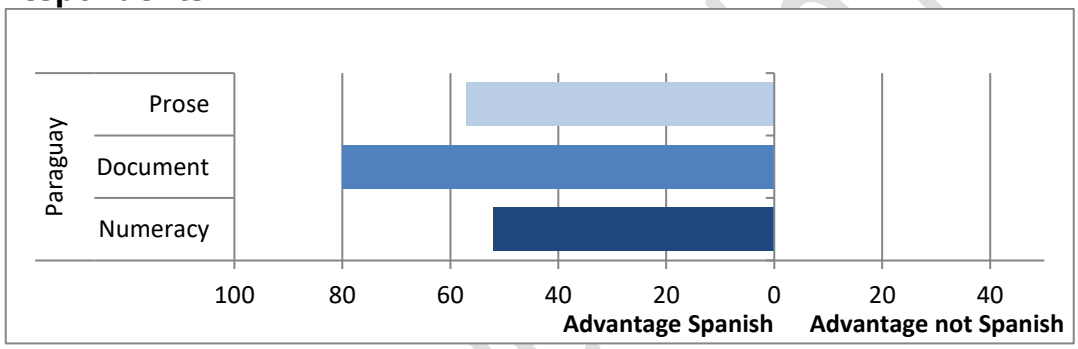
1. Do native Spanish speakers outperform other respondents in Prose, Document and Numeracy?
2. Is that difference independent of other factors for all domains?
3. Do bilinguals outperform comparable monolinguals?

The answers are, to varying degrees, yes, yes and yes.

These are the first two relevant findings:

1. Native Spanish-speakers outperform other respondents by at least 50 points (half a standard deviation) in all domains, before controlling for other factors (*see **Figure 8.2***).

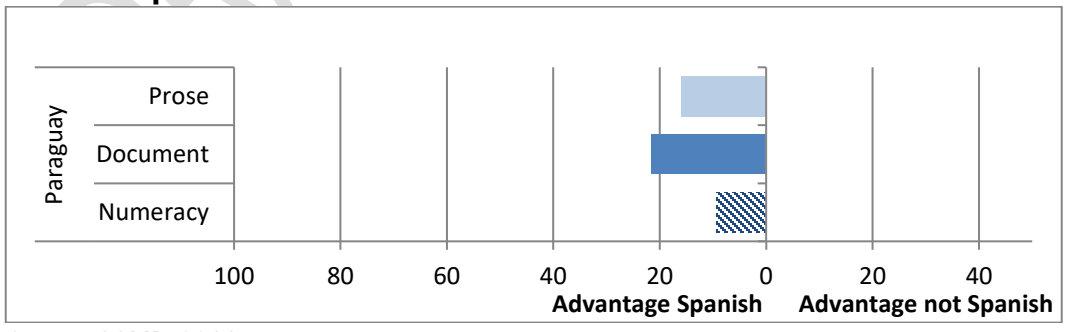
Figure 8.2. Mean score difference between native Spanish-speakers and other respondents



Source: LAMP, 2011.

2. After introducing a number of control variables (gender, age, location, parental occupation, maternal education, respondent's years of schooling, literacy practices at home and occupational skill demand), this advantage is substantially reduced (to 12-15 points) in Prose and Documents, and it ceases to be statistically significant in Numeracy (*see **Figure 8.3***).

Figure 8.3. Mean adjusted score difference between native Spanish-speakers and other respondents



Source: LAMP, 2011.

These two findings, taken together, lead to the conclusion that the first two hypotheses apply. First, having Spanish as mother tongue predicts higher scores in all three skills domains but this may be partly due to SES. Second, in and of itself, after controlling for other factors, mother tongue only predicts those domains most closely related to language skills, namely Prose and Document reading.

As for the 'bilingual advantage', the analysis will then focus on a subpopulation that is abundantly and homogeneously exposed to the language of assessment (e.g. respondents who declare it as both mother tongue and home language) and probe whether within that population, bilinguals score higher than monolinguals in any of the three LAMP scales once socio-demographic factors have been accounted for.

In Paraguay, those who declare Spanish as their mother tongue (or as one of them) made up 53% of all respondents. At the same time, 39% of all respondents declared Spanish as their home language. The intersection of those two groups yields 30% of the total population (weighted sample size = 1,135, unweighted sample size = 1,373). They will be called 'home/native Spanish-speakers' for the remainder of this chapter.

Table 8.5. Distribution of respondents by home language and mother tongue in percentage

Home language	Spanish as mother tongue		Total
	Yes	No	
Guarani	22.4	36.9	59.4
Spanish	**30.1**	8.4	**38.5**
Other	0.9	1.2	2.1
	53.4	46.6	100.0

Source: LAMP, 2011.

Among home/native Spanish-speakers, bilinguals represent 53%.[28] The vast majority of these bilinguals (93%) report Guarani as one of their mother tongues. However, some speak German, Japanese, Portuguese or other languages. Finally, about 10% of these 'bilinguals' are actually multilingual because they also report a third or even a fourth mother tongue.

Within this subpopulation, bilinguals and monolinguals have strikingly similar socio-demographic characteristics – this greatly facilitates comparison. Both groups have the same average schooling (12.1 years). The similarities in terms of employment are remarkable when it comes to labour participation (61% and 62%), high-skilled occupations (36% for both groups) and reported use of skills at work (57/100 and 59/100).

When there are differences between the two groups, they are relatively small and favour monolinguals. Bilinguals are slightly older, more likely to be retired and less likely to be students. They report lower use of skills at home, their mothers had slightly lower educational attainment and their parents were less likely to have a high-skilled occupation. Bilinguals are also more likely to be female, which is typically associated with lower performance in Numeracy and Document reading, and better performance in Prose reading.

[28] Spanish-speaking bilinguals are those who declare both Spanish and another language as mother tongues. Declaring proficiency in another language or having it as home language would not be enough to qualify as bilingual.

As for skills among home/native Spanish-speakers, after controlling for a number of other socio-demographic factors, bilinguals outperform monolinguals by 22 points (almost one quarter of a standard deviation) in Document reading – this difference is statistically significant at the 95% confidence level (*see **Figure 8.4***). These bilinguals also have a slight advantage in Numeracy (17 points, significant at the 90% confidence level). Finally, the difference in Prose reading (11 points) is not statistically significant although the lack of statistical association with Prose reading may appear to be counterintuitive, which is in line with some of the literature on the 'bilingual advantage' (Bialystok, 2009; Bialystok, 2013).

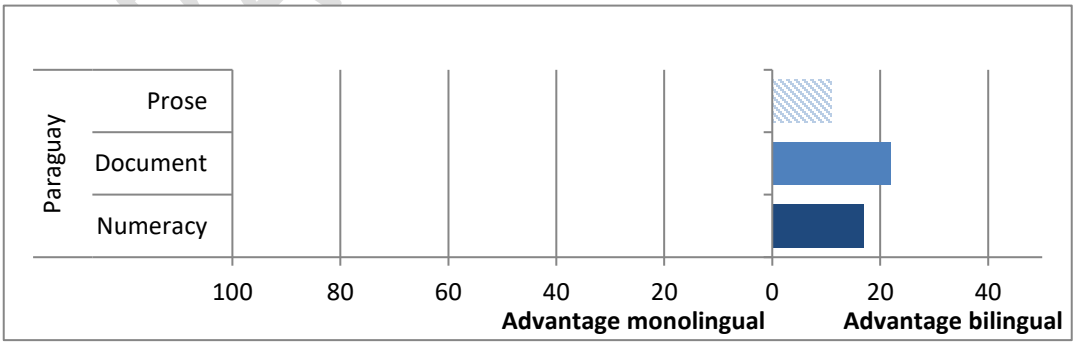
Two conclusions can be drawn from those findings:

1. After controlling for other factors, bilingualism never appears negatively associated with skills. This means that at least it is possible to rule out a 'bilingual disadvantage' in the case of Paraguay.
2. Bilingualism is positively associated with skills in at least one domain, namely Document reading.

However, these findings also raise questions: Why Document reading? Why not Prose reading? As previously mentioned, there is no consensus regarding the consequences of bilingualism on cognition and literacy development. However, these findings may be consistent with some of Bialystok's studies. She finds that bilingualism may bring both positive and negative consequences. On the negative side, bilinguals may have vocabulary deficits. On the positive side, bilinguals may perform better in executive control, especially in task switching and cognitive flexibility, meaning, for instance, the ability to switch back and forth between the demands of two different tasks that may use the same stimulus (Bialystok, 2009).

How do LAMP findings relate to this? Prose reading, where Paraguayan bilinguals do not show an advantage, relies heavily on vocabulary, especially by using synonymous matches between test question and stimulus. The Document reading domain, on the other hand, tends to rely on literal rather than synonymous matches, which makes it less dependent on vocabulary. In addition, some Document reading tasks may require respondents to process charts or tables with more than one variable, which could constitute an example of what Bialystok (2009) refers to as 'task switching'. Is this enough evidence to conclude that there is a bilingual advantage in Paraguay? While this certainly does not settle the matter, it clearly warrants further analysis of this dataset in this regard. In particular, more research is needed to explore the consequences of bilingualism on numeracy.

Figure 8.4. Mean score difference between monolingual and bilingual Spanish-speakers



Source: LAMP, 2011.

This has some important implications. This section has already established that having Spanish as a mother tongue is associated with higher performance in all skills domains, and that after controlling for a number of socio-demographic factors, this advantage persists in the two skills domains most closely related to language, namely Prose reading and Document reading. At the same time, for those who possess sufficient command of the Spanish language, having a second mother tongue (which in most cases is Guarani) is associated with higher performance in at least one domain (Document reading) or even two (Document reading and Numeracy). This is extremely important because the advantage of having Spanish as a mother tongue may be wrongly perceived as a disadvantage of having Guarani as a mother tongue. No such disadvantage is found in LAMP data. In fact, as mentioned before, for those speaking Spanish well enough, speaking a second language at a similar level of proficiency (whether this is Guarani or another language) is associated with higher performance in at least one domain.

In summary, mother tongue and bilingual status appear associated with literacy skills in Paraguay. Native Spanish speakers outperform other respondents in all domains. Although, after controlling for other factors, this applies only to Prose reading and Document reading and not to Numeracy. Meanwhile, bilingual Spanish speakers outperform their monolingual counterparts in Document reading. This confirms that the relationships between language and literacy are complex yet certainly relevant for policy purposes in the case of Paraguay.

Chapter 9. The LAMP Reading Components assessment

LAMP introduced the Reading Components items as an attempt to measure the pre-reading skills of respondents who would not be able to answer the Prose reading and Document reading questions due to limited reading comprehension skills, limited writing skills, or both but who were not totally lacking in any reading-related skills. As a result, the Reading Components assessment differs from Prose reading and Document reading in two main ways: (1) the Reading Components assessment extends the range of assessed abilities downward to include so-called precursors skills, such as letter naming and word recognition; and (2) it prompts oral rather than written answers from respondents. Although, in theory, the abilities assessed by the Reading Components are necessary to learn the skills tested in the Prose and Document booklets, due to their format the results from the Reading Components cannot simply be put on the same scale as either the assessment of the Prose or Document domain. As such, the Reading Components assessment is analysed separately in this chapter.

9.1 Description of the Reading Components assessment[29]

In its design, LAMP includes a Reading Components module to be administered to those with very low-level literacy skills who cannot respond to the Prose or Document reading assessment modules. The Reading Components module helps identify the elements that contribute to poor performance. The purpose of this assessment is to collect information in order to better customise policy interventions (e.g. literacy programmes) by avoiding the assumption that poor performance is explained in every individual in the same fashion (UNESCO-UIS, 2008). The comprehension or 'meaning construction' processes of reading are built upon a foundation of component skills and knowledge of how one's writing system works. The evidence for this knowledge and these skills can be obtained by administering tasks that examine a reader's ability and efficiency in processing the elements of the written language – letters/characters, words (and non-words), sentences and larger, continuous text segments.

The LAMP Reading Components module mainly asks whether the adults surveyed can apply their existing language and comprehension skills to the processing of printed texts. The component tasks are not designed to assess separately the level of language skills in the target print literacy system. It is assumed that the adults surveyed will have basic oral vocabulary, syntactic/grammatical and listening comprehension skills in the target language. LAMP provides a component measure of basic oral vocabulary to indicate if individuals have a threshold level of language proficiency. However, an independent measurement of language proficiency is not a basic feature of the component framework.

Each country that implemented LAMP developed a set of component measures unique to its language, script and culture, based on the guidelines specified in the Reading Components framework (UNESCO-UIS, 2008). Since the relationship of a language to the corresponding writing system may be very different depending on the language, the components and the nature of items and tasks to assess the components needed to be developed and/or adapted.

[29] Most of this section is an adaptation of material extracted from UNESCO-UIS (2009).

i) General content of the Reading Components assessment

a) General elements involved in measuring reading component skills. In order to measure reading component skills, a basic starting point would be to recognise that reading consists of word recognition and linguistic comprehension. Although each of these components is necessary for reading, neither of them is sufficient by itself. Another key element pertains to measuring speed or rate of response. This is a straightforward behavioural proxy for cognitive constructs of automaticity and efficiency.

In addition, the clarity and speed of oral instructions and items needed to be carefully standardised. It was also important to take into account that dialect, accents and other language variations may make spoken/oral responses more difficult to score. Finally, if the individual struggles to produce spoken responses, this will influence speed/efficiency measurements.

b) Alphanumeric recognition. This is the most basic step of sight-to-sound correspondence – matching the letter name to the printed symbol and vice versa. Letters are a slightly stronger predictor of reading than numbers but they are generally more strongly correlated with each other than with overall reading. However, it is conceivable in some settings (e.g. in communities with minimal availability of printed material) that there is more exposure to and knowledge of printed digits than letters or vice versa. Therefore, LAMP includes both letter and digit recognition tasks.

c) Visual word recognition. There are two basic behavioural skills indicative of proficiency in word recognition: i) the accumulation of sight-word knowledge of real words along with accurate and rapid recognition of frequent words are a strong index of word recognition efficiency and proficiency; and ii) decoding.

d) Word meaning (vocabulary). The measurement of vocabulary in LAMP is not intended to capture the full extent of vocabulary knowledge but to determine whether an individual's component reading skill levels reflect his/her proficiency to read texts that he/she could otherwise understand in a listening context. Respondents are shown line drawings depicting common things and are then asked to provide the verbal label (e.g. book, chair, cat, etc.). Item writers took care to develop items that were expected to be well known by most adults in the population. This is necessary as adults may have varying degrees of exposure to the vocabulary used mostly in the written form of the language in which they are being assessed.

e) Sentence processing. The individual was asked to make true or false judgments based on the content of sentences either in relation to common knowledge about the world or based on the internal logic of sentences. Here, the purpose was to assess if the individual can only decode the words or if he/she is able to grasp the meaning of a sentence.

f) Passage reading. Skilled reading is rapid, efficient and fluent (silent or aloud). LAMP considers fluency to be more of an observable property that emerges from skilled reading. Fluency is an indicator of whether visual word identification processes are efficiently feeding language-processing systems (e.g. working memory) to produce outputs. The tasks were designed to provide a choice between a word that correctly completes a sentence and an incorrect word. The incorrect item is meant to be obviously wrong to a reader with some basic comprehension skills. Distracters may be grammatically or semantically wrong. By giving the participant only a fixed amount of time to perform the task, a measure of reading efficiency is assessed. LAMP items have been mainly designed to measure previously acquired reading components, knowledge and skills. The individual either has the skill level to accurately respond to the item or not. There is not much

additional information in each item that would require time to think about a response. Therefore, hesitation in responding is indicative of weak underlying knowledge and skills.

ii) The languages and scripts assessed

First, it is important to describe the language and orthography in which the Reading Components assessment (RCA) was developed and administered in each country. **Table 9.1** offers a summary that displays the language and the characteristics of each language-specific orthography used in the four countries that participated in LAMP, including:

a) The type of writing system. The linguistic structure represented by the graphemes (a phoneme or sound in alphabetic systems; a syllable in syllabaries; or a morpheme in logographies) (Coulmas, 1989).

b) The type of script. The notational form of each writing system (Roman, Greek, etc.) (Coulmas, 1989).

c) The orthographic transparency. An indication of how shallow (or transparent) or deep (or opaque) is the relationship between graphemes and phonemes (or sounds) in alphabetic writing systems. In other words, the closer an alphabetic system is to a 1:1 correspondence between graphemes (letter) and phonemes (sounds), the more transparent it is.

Table 9.1. Country-specific Reading Components assessment: Languages and orthographies

	Reading Components assessment			
	Language	**Writing system**	**Script**	**Transparency**
Mongolia	Mongolian	Alphabetic	Cyrillic	Very transparent
Paraguay	Spanish	Alphabetic	Roman/Latin	Fairly transparent
Jordan	Standard Arabic, South Levantine Spoken	Alphabetic	Arabic	Opaque* (not vowelized)
Palestine	Standard Arabic, South Levantine Spoken	Alphabetic	Arabic	Opaque (not vowelized)

Note: The only exception to the non-vowelized script was in the Jordan Reading Components assessment where some of the word lists were vowelized.

As can be observed in Table 9.1, the Reading Components assessment was developed in three languages for the four countries – Mongolian, Spanish and Standard Arabic (South Levantine Spoken). The Jordanian and Palestinian versions of the Reading Components are not exactly the same due to decisions made by each national team in order to reflect differences in usage and instructional methodologies. All of these languages use alphabetic systems but they vary in the script used and in the approximate level of orthographic transparency, with the Mongolian Cyrillic script being the most transparent, followed by the fairly transparent Spanish Roman/Latin script and with the Arabic script being the most opaque of the three as a result of it being a non-vowelized alphabetic system (sometimes called a consonantal alphabet or *abjad*).

iii) The nature of the Reading Components tasks

The structure of the Reading Components assessment can be summarised as:

Task	Untimed	Timed
1. Oral receptive vocabulary	26 items (/26)	
2-3. Digit naming	10 digits (/10)	45 digits read twice in 20 seconds (/90)
4-6. Letter naming	28 lower case letters (/28) 28 upper case letters (/28)	45 lower case letters read twice in 20 seconds (/90)
7-8. Word recognition	5 sets of 9 high-frequency words scored (/45)	60 high-frequency words read twice in 60 seconds (/120)
9-10. Decoding	Not administered	Not administered
11. Sentence processing	3 sets of 6 sentences read aloud, each word scored for accuracy, each sentence scored for comprehension (true/false), (/18)	2 sets of 7 sentences read silently within 30 seconds (for each set), scored for comprehension (true/false), (/14)
12. Passage fluency	3 passages (read aloud and timed) each with 6 comprehension questions without time limit, passage was available while answering questions (/18)	The same 3 passages, previously read aloud in 50 seconds (for each passage), each word scored for accuracy/fluency depending on the language (/18)

iv) Why is there no score for Reading Components as with LAMP Prose, Document or Numeracy?

Ability estimates for Prose, Document and Numeracy (PDN) were produced by using Item Response Theory because each of these three domains meet the assumptions of unidimensionality (i.e. all items in each domain measure the same skill, such as the ability to read prose texts) and local independence – because getting the correct or incorrect answer in one test item does not affect the process of answering a different test item.

The Reading Components, however, comprise measures pertaining to reading accuracy, fluency and comprehension, as well as oral vocabulary. Therefore, the Reading Components as a whole cannot be considered to assess a unidimensional construct and consequently cannot be analysed by using item response theory (IRT). Could each subtest then be analysed separately in order to circumvent this problem? It would be possible to do this with the untimed exercises but not with the timed ones.

Moreover, PDN items used in different countries are translations from a common source and therefore it was possible to use IRT to put all countries' results on the same scale for each domain. Reading Components, on the other hand, were developed separately for each language in each country. As a result, it would not have been possible to express each country's results on the same scale, which is one of the main incentives (among others) to use IRT.

v) How the Reading Components profiles were created

Following the example of Strucker, Yamamoto and Kirsch (2007) in their analysis of Reading Components data from the International Survey of Reading Skills (ISRS – a follow-up of IALS), the UIS team made a decision to use latent class analysis (LCA) as a way to score the Readings Components responses. Compared to IRT, LCA has two features that make it particularly attractive for the issue at hand: it makes relatively few assumptions about the data that are used as inputs (in this case, the scores for each exercise of the Reading Components instrument) and it produces a relatively intuitive output in which individuals are grouped in a manageable number of interpretable categories or profiles.

For each country, LCA answered the following three main questions (among others):

1. How many classes (or profiles) are there?
2. How large is each class?
3. Which items distinguish the classes from one another?

The LCA results reflect natural groupings in the data, assigning similar individuals to the same profile.[30] Countries may have different numbers of these naturally occurring groups and as a result, more LCA profiles or fewer. For each country, the decision on the number of profiles will depend on a combination of statistics, theory and policy. For instance, if the Ministry of Education is planning to provide tailor-made literacy programmes for different groups of readers, having a large number of different profiles would be impractical. Thus, the analyst will look for a suitable solution that, while statistically sound, yields fewer profiles. In the analysis presented in this chapter, each country had 3 or 4 profiles.

9.2 Main results of the Reading Components assessment

i) Overview

In this report, each country's results are presented separately. It is important to highlight that these assessments are not directly comparable because they were not designed to allow cross-country comparisons.

It should also be noted that the Reading Components assessments is not administered to all LAMP respondents. It is designed for and administered to only those respondents whose reading and numeracy abilities are too low to be able to be assessed by the other modules of the LAMP assessment.

ii) Country-specific performances in the Reading Components assessment

Paraguay

The RCA in Paraguay was administered in Spanish, a language with an alphabetic writing system, a Latin/Roman script and a fairly transparent orthography. A total of 724 adults participated in the RCA in Paraguay. The total Paraguay sample size was 3,966 respondents.

[30] Although LCA does not necessarily assign each individual fully to one class, it assigns each individual a probability of belonging to each of the different classes.

On the basis of a latent class analysis, four profiles were identified. Since the profiles are country-specific, they are not directly comparable in meaning to other countries' profiles even though they are labelled the same way in this report. If we define "incipient" as "an initial phase in which a skill begins to emerge (above 20% and less than 50% correct)" and "developing" as "a phase in which a skill starts to grow and mature (above 50% correct)",[31] the subgroups captured by the four profiles in the sample from Paraguay could be described as:

- Profile A: incipient text comprehenders
- Profile B: developing sentence comprehenders
- Profile C: incipient letter readers
- Profile D: non-readers

Almost 40% of the participants in this sample were included in Profile A – the highest of the four profiles. Almost a third of the sample (31.4%) was included in the second highest profile, Profile B. Finally, the two lowest profiles, which captured very low performances even at the most basic tasks of letter identification and word recognition, included almost a third of the sample: 16% in Profile C and 12.8% in the lowest profile, Profile D.

Subtest results for each profile

Table 9.2 shows overall results for each untimed subtest of the Reading Components assessment. **Table 9.3** shows the results for each timed subtest of the Reading Component assessment. In the timed subtests, Profile A did well on word reading accuracy and rapid word recognition. However, all profiles did poorly on the other subtests.

Table 9.2 Paraguay's Reading Components assessment: Mean percentage correct for each untimed literacy subtest per profile (n = 724 respondents)

	Profile A	Profile B	Profile C	Profile D
Percentage of sample	39.9	31.4	16.0	12.8
Basic oral receptive vocabulary	97	93	92	89
Alphabetic knowledge	90-92	85	64	15
Decoding/word recognition	94	86	19	2
Sentence comprehension	86	73	No participation	No participation
Passage comprehension	26	3	No participation	No participation

Note: If the listed literacy area was represented by more than one subtest in the Reading Components assessment, the subtest with the highest percentage correct was selected. Green indicates percentage of correct results equal to or higher than 85%. Red indicates percentage of correct results equal to or lower than 49%.

[31] These percentages are clearly arbitrary boundaries. They are not set on any statistical criteria but rather used as a way of summarising the data.

As displayed in Table 9.2, substantial within-sample differences – even in the most basic tasks (i.e. alphabetic knowledge and decoding/word recognition) – were evident in the Paraguayan group, with participants from Profile C correctly identifying, on average, only a little over half of the letters (64%) presented to them and accurately reading, on average, only 19% of the isolated words (8 out of the 45) presented. A more dramatic situation was observed for Profile D, with participants identifying, on average, only 15% of the letters (4 out of 28) presented and, on average, unable to read even a single word out of a total of 45 words presented. The almost absent or very poor alphabetic knowledge and decoding skills of Profile C and D participants was coupled with the inability to participate in reading words in sentences and, not surprisingly, in the more demanding tasks of fluency and comprehension.

It is of special interest to note that even the two highest performing profile groups struggle considerably with passage comprehension, with Profile B participants showing almost no comprehension and Profile A participants answering only a fourth of the questions correctly despite their relatively high performance on fluency.

Table 9.3. Paraguay's Reading Components assessment: Mean score expressed as percentage of the maximum possible score for each timed subtest by profile (n = 724)

	Profile A	Profile B	Profile C	Profile D
Percentage of the sample	39.9	31.4	16.0	12.8
Rapid digit naming (Max. possible score = 90)	44.4	34.4	32.2	23.3
Rapid letter naming (lower case) (Max. possible score = 90)	36.7	24.4	16.7	4.4
Word reading accuracy (60 sec.) (Max. possible score = 79)	83.5	39.2	No participation	No participation
Rapid sight word recognition (Max. possible score = 120)	41.7	25.0	5.8	No participation

Reading Components scores and self-reported reading skills

Out of 3,288 respondents who claimed to be able to read easily in Spanish, the vast majority (91.9%) did not take the Reading Components assessment because they were allocated by the filter test to the higher difficulty test (Module B) (*see* ***Table 9.4***). Out of those who claimed to be able to read easily in Spanish but who did take Reading Components assessment, the majority performed so that they were classified into Profile A, 'incipient text comprehenders', the top-performing profile. The remainder, in order of decreasing frequency, were classified into Profiles B, C and D.

On the other end of the spectrum, out of 173 respondents who claimed not to be able to read at all in Spanish, the biggest concentration was found in Profile D, 'non-readers', followed by Profiles C, B and A, in that order.

Table 9.4. Paraguay's relationship between Reading Components assessment profiles and self-reported reading ability in percentage (n = 3,786)

Reading Components Profile	How well can you read in Spanish?			Total
	Easily	With difficulty	Not at all	
Allocated to Module B (higher difficulty)	91.9	33.5		82.7
Profile A. Incipient text comprehenders	5.3	24	1.7	6.8
Profile B. Developing sentence comprehenders	2.5	27.7	21.4	5.5
Profile C. Incipient letter readers	0.2	10.5	30.1	2.4
Profile D. Non-readers	0.1	4.3	41.0	2.3
Unable to read or write			5.8	0.3
Total	100	100	100	100
n	3,288	325	173	3,786

So far, this shows relatively high consistency between self-report and performance in Reading Components among those who fall on either end of the self-report spectrum.

However, out of those 325 respondents who claim to be able to read in Spanish with difficulty, one third (33.5%) was still able to score 8 points or more out of 17 in the filter test and therefore were allocated to Module B and did not take the Reading Components module. Among those who were administered the Reading Components instruments, the biggest concentration is in Profile B, 'developing sentence comprehenders', closely followed by Profile A, 'incipient text comprehenders', the top-performing category. This shows that those respondents who claim to be able to read in Spanish "with difficulty" form a heterogeneous group, in which different individuals may be referring to completely different types of difficulties. Some may find it difficult to comprehend long, dense articles, others may have trouble understanding sentences and a few may not even be able to name all the letters of the alphabet.

Mongolia

The RCA in Mongolia was administered in Mongolian, a language with an alphabetic writing system, a Cyrillic script and a transparent orthography. A total of 590 adults participated in the RCA in Mongolia.

Subtest results for each profile

On the basis of a latent class analysis, four profiles were identified. Since the profiles are country-specific, they are not directly comparable in meaning to other countries' profiles even though they are labelled the same way in this report.

If we define "incipient" as "an initial phase in which a skill begins to emerge" and "developing" as "a phase in which a skill starts to grow and mature", the subgroups captured by the four profiles in the sample from Mongolia may be described as:

- Profile A: developing text comprehenders
- Profile B: incipient text comprehenders
- Profile C: developing sentence comprehenders
- Profile D: letter readers.

Almost 30% of the participants in this sample were included in Profile A, the highest of the four profiles. The majority of the sample (42.8%) was included in the second highest profile, Profile B. Profile C included 22.6% and the lowest profile, Profile D, only represented 6.8% of the respondents who were administered the RCA.

Subtest results for each profile

Table 9.5 shows overall results for each untimed subtest of the RCA. **Table 9.6** shows the results for each timed subtest of the RCA.

On the untimed subtests, Profiles A and B did well on all subtests except for passage comprehension, where they dipped to 53% and 41% correct, respectively. Profile C did reasonably well but Profile D scored lower across all subtests. On the timed subtests, Profile A and B performed only slightly better on rapid digit naming and rapid letter naming but performed much better than Profiles C and D on word reading accuracy and rapid sight word recognition.

Table 9.5. Mongolia's Reading Components assessment: Mean percentage correct for each untimed literacy subtest per profile (n = 590 respondents)

	Profile A	Profile B	Profile C	Profile D
Percentage of the sample	27.7	42.8	22.6	6.8
Basic oral receptive vocabulary	99	97	93	96
Alphabetic knowledge	99	97	92	59
Decoding/word recognition	99	94	74	11
Sentence comprehension	96	85	58	No participation
Passage comprehension	53	41	No participation	No participation

Note: If the listed literacy area was represented by more than one subtest in the Reading Components assessment, the subtest with the highest percentage correct was selected. Green indicates percentage of correct results equal to or higher than 85%. Red indicates percentage of correct results equal to or lower than 49%.

Table 9.6 Mongolia's Reading Components assessment: Mean score expressed as percentage of the maximum possible score for each timed subtest by profile (n=590)

	Profile A	Profile B	Profile C	Profile D
Sample percent	27.7	42.8	22.6	6.8
Rapid digit naming (Max. possible score = 90)	51.1	38.9	30.0	23.3
Rapid letter naming (lower case) (Max. possible score = 90)	42.2	32.2	23.3	10.0
Word reading accuracy (60 sec.) (Max. possible score = 58)	98.3	79.3	No participation	No participation
Rapid sight word recognition (Max. possible score = 120)	82.5	45.8	16.7	No participation

Reading Components scores and self-reported reading skills

Out of 3,780 respondents who claimed to be able to read easily in Mongolian, the vast majority (89.0%) did not take the Reading Components assessment because the filter test allocated them to the higher difficulty test (Module B) (*see **Table 9.7***). Those respondents who did take the RCA seem to be spread across several different profiles.

On the other end of the spectrum, the 48 respondents who claimed not to be able to read at all in Mongolian are also spread across the various Reading Components profiles although the majority is found in the 'incipient text comprehenders' profile (Profile B).

Similarly, of the 86 respondents who claimed to be able to read in Mongolian with difficulty, one third (33.5%) was still able to score 8 points or more out of 17 in the filter test and were therefore allocated to Module B and did not take the RCA. Among those who were administered the RCA, the biggest concentration was in Profile B, closely followed by Profile A, "developing text comprehenders", the top-performing category. This shows that respondents who claimed to be able to read in Mongolian "with difficulty" form a heterogeneous group, in which different individuals may be referring to completely different types of difficulties when self-assessing their reading ability. Some may find it difficult to comprehend long, dense articles, others may have trouble understanding sentences and a few may not even be able to name all the letters of the alphabet.

Table 9.7. Mongolia's relationship between Reading Components assessment profiles and self-reported reading ability in percentage (n=3,914)

Reading Components Profile	How well can you read in Mongolian?			Total
	Easily	With difficulty	Not at all	
Allocated to Module B (higher difficulty)	89.0	16.1		86.2
Profile A. Developing text comprehenders	3.8	3.3		3.8
Profile B. Incipient text comprehenders	1.7	41.1	55.1	3.3
Profile C. Developing sentence comprehenders	4.9	36.4	24.4	5.8
Profile D. Letter readers	0.6	3.1	18.0	0.8
Unable to read or write			2.5	0.1
Total	100	100	100	100
n	3,780	86	48	3,914

Jordan

A total of 438 adults participated in the RCA in Jordan. Jordan uses an alphabetic writing system and an Arabic script with an opaque orthography. On the basis of a latent class analysis, three profiles were identified. Since the profiles are country-specific, they are not directly comparable in meaning to other countries' profiles even though they are labelled the same way in this report.

As was done with every country, if we define "incipient" as "an initial phase in which a skill begins to emerge" and "developing" as "a phase in which a skill starts to grow and mature", the subgroups captured by the three profiles developed for Jordan could be described as:

- Profile A: incipient text comprehenders
- Profile B: developing sentence comprehenders
- Profile C: incipient letter readers.

About 30% of the participants in this sample were included in Profile A, the highest of the three profiles. The majority of the sample (39.2%) was included in the second highest profile: Profile B. Profile C included 29.8% of the sample.

Subtest results for each profile

Table 9.8 shows overall results for each untimed subtest of the RCA. **Table 9.9** shows the results for each timed subtest of the RCA. In the timed subtests, Profile A did well on word reading accuracy and rapid word recognition. But all profiles did poorly on the other subtests.

The percentage of the sample in each of the profiles is roughly the same, ranging from about 30% to 39% in each profile. Profile A did well on each untimed subtest, except passage comprehension on which it did poorly (44%). The mean percentage correct was higher for Profile A than for the other two profiles. On the timed subtests, Profile A scored higher than the other profiles, but did not do especially well, except in word reading accuracy on which it averaged 87.5%.

Table 9.8. Jordan's Reading Components assessment: Mean percentage correct for each untimed literacy subtest per profile (n=438 respondents)

	Profile A	Profile B	Profile C
Percentage of the sample	31.0	39.2	29.8
Basic oral receptive vocabulary	--	--	--
Alphabetic knowledge	100	94	43
Decoding/word recognition	98	71	No participation
Sentence comprehension	93	68	No participation
Passage comprehension	44	No participation	No participation

Note: If the listed literacy area was represented by more than one subtest in the Reading Components assessment, the subtest with the highest percentage correct was selected. Green indicates percentage of correct results equal to or higher than 85%. Red indicates percentage of correct results equal to or lower than 49%.

Table 9.9. Jordan's Reading Components assessment: Mean score expressed as percentage of the maximum possible score for each timed subtest by profile (n=438)

	Profile A	Profile B	Profile C
Percentage of the sample	31.0	39.2	29.8
Rapid digit naming (Max. possible score = 90)	44.4	37.7	26.7
Rapid letter naming (Max. possible score = 90)	37.7	32.2	No participation
Word reading accuracy (60 sec.) (Max. possible score = 48)	87.5	No participation	No participation
Rapid sight word recognition (Max. possible score = 120)	53.3	19.2	No participation

Reading Components scores and self-reported skills

Out of 2,184 respondents who claimed to be able to read easily in Arabic, the vast majority (95.4%) did not take the Reading Components assessment because they were allocated to the higher difficulty test (Module B) (*see* ***Table 9.10***). Out of those who did take the RCA, the majority was in Profile A, "incipient text comprehenders", followed by, in order of decreasing frequency, Profile B, "developing sentence comprehenders" and Profile C, "incipient letter readers".

On the other end of the spectrum, out of 118 respondents who claimed not to be able to read at all in Arabic, the biggest concentration was found in Profile C, "incipient letter readers".

So far, as in Paraguay's case, these results show relatively high consistency between self-report and performance in reading components among those who fall on either end of the self-report spectrum.

Table 9.10. Jordan's relationship between Reading Components assessment profiles and self-reported reading ability in percentage (n=2,383)

Reading Components Profile	How well can you read in Arabic?			Total
	Easily	With difficulty	Not at all	
Allocated to Module B (higher difficulty)	95.4	20.3		88.1
Profile A. Incipient text comprehenders	2.5	7.5	1.1	2.5
Profile B. Developing sentence comprehenders	1.4	43.3	21.0	3.8
Profile C. Incipient letter readers	0.3	25.8	39.5	3.2
Unable to read or write	0.4	3.2	38.5	2.4
Total	100	100	100	100
n	2,184	81	118	2,383

However, of the 81 respondents who claimed to be able to read in Arabic with difficulty, one fifth (20.3%) was still able to score 8 points or more out of 17 in the filter test and were therefore allocated to Module B and did not take the RCA. Among those who were administered the RCA, the biggest concentration is in Profile B, "developing sentence comprehenders", followed by Profile C, "incipient letter readers", the lowest-performing profile. This shows that respondents who claimed to be able to read in Arabic "with difficulty" form a heterogeneous group, in which different individuals may be referring to completely different types of difficulties. Some may find it difficult to comprehend long, dense articles, others may have trouble understanding sentences and a sizable share is unable to name all the letters of the alphabet.

Palestine

A total of 777 adults participated in the RCA in Palestine. Palestine, like Jordan, uses an alphabetic writing system and an Arabic script with an opaque orthography. On the basis of a latent class analysis, three profiles were identified. Since the profiles are country-specific, they are not directly comparable in meaning to other countries profiles even though they are labelled the same way in this report.

If we define "incipient" as "an initial phase in which a skill begins to emerge" and "developing" as "a phase in which a skill starts to grow and mature", the subgroups captured by the three profiles in the sample from Palestine may be described as:

- Profile A: incipient text comprehenders
- Profile B: developing sentence comprehenders
- Profile C: non readers

About one third (34.2%) of the participants in this sample were classified by the RCA as being in Profile A, the highest of the three profiles. The biggest concentration of respondents (38.6%) was classified into the second highest profile, Profile B. Profile C contained 27.3% of the sample.

On the untimed subtests, Profiles A and B performed better than Profile C on all subtests. On the timed subtests, all profiles performed rather poorly except Profile A on word accuracy.

Table 9.11. Palestine's Reading Components assessment: Mean percentage correct for each untimed literacy subtest per profile (n=777 respondents)

	Profile A	Profile B	Profile C
Sample percent	34.2	38.6	27.3
Basic oral receptive vocabulary	97	91	81
Alphabetic knowledge	98	89	18
Decoding/word recognition	98	80	No participation
Sentence comprehension	88	66	No participation
Passage comprehension	47	No participation	No participation

Note: If the listed literacy area was represented by more than one subtest in the Reading Components assessment, the subtest with the highest percentage correct was selected. Green indicates percentage of correct results equal to or higher than 85%. Red indicates percentage of correct results equal to or lower than 49%.

Table 9.12. Palestine's Reading Components assessment: Mean score expressed as percentage of the maximum possible score for each timed subtest by profile (n=777)

	Profile A	Profile B	Profile C
Percentage of the sample	34.2	38.6	27.3
Rapid digit naming (Max. possible score = 90)	48.9	35.6	27.8
Rapid letter naming (Max. possible score = 90)	40.0	25.6	No participation
Word reading accuracy (60 sec.) (Max. possible score = 57)	89.5	No participation	No participation
Rapid sight word recognition (Max. possible score = 120)	54.2	14.2	No participation

No further information (including self-reported data) is available for Palestine.

9.3. Summary

Although one cannot directly compare countries, some general patterns across countries are worth highlighting.

a. The oral receptive vocabulary task appears to have been too simple to fully capture critical variability in vocabulary knowledge across groups and, in particular, to more insightfully assess the vocabulary knowledge of the highest performing groups. Thus, the vocabulary task is not discussed further.

b. In most countries, even the highest performing subgroups (Profile A) experience difficulty in understanding simple and short passages. That seems to be the case even when, on average, the participants seem to be doing fine in basic vocabulary, alphabetic knowledge, decoding/word recognition and sentence processing.

c. For the two highest performing subgroups in each country, there is a large discrepancy between the performance on the sentence comprehension and the passage comprehension tasks. Sentence comprehension consistently displayed a much higher percentage correct than passage comprehension. Given that different item formats were used by each subtest to assess each construct, it is impossible for our analysis to disentangle whether these discrepancies indicate a true difference in the ability to understand sentences versus passages, or if this difference is – as we suspect – also affected by the 50% chance of getting a correct answer in the sentence comprehension task. Indeed, it is possible that the sentence comprehension item format might have resulted in an overestimation of participants' performances. Additionally, the passage comprehension subtest includes both narrative and expository texts so analysing the comprehension performance of both types of passages separately might also have offered additional insights into the challenges of passage comprehension. According to extensive prior research, it could be hypothesized that expository texts would have posed bigger challenges than narrative texts to participants.

d. The timed subtests which assessed fluency (word reading accuracy, rapid sight-word recognition, rapid letter naming and rapid digit naming tasks) indicate that participants overall displayed slow processing skills across profiles and across countries. One general trend worth highlighting is that even when the fluency mean score (i.e. word reading accuracy) for the highest profile participants is high, just reading words accurately and rapidly does not seem to guarantee passage comprehension. This can be observed by contrasting the passage comprehension performance and the fluency performance (word reading accuracy) of the highest profile group in each country. Consistently, and in line with prior research, it appears to be the case that rapid and accurate word recognition might be necessary yet not sufficient to achieve passage comprehension. This report does not comment any further on the timed tasks. Perhaps including a more challenging measure of academic vocabulary knowledge (in addition to concrete everyday vocabulary) or creating an even more comprehensive measure of academic language would more accurately capture the linguistic knowledge required to process school-relevant connected texts (Uccelli et al., 2015).

Chapter 10. Summary and conclusions

Literacy is at the heart of the right to education. The knowledge and skills of reading, writing and computing are essential to learning continuously throughout one's life span and to one's full participation in the social context in which one lives. Literacy and numeracy cut across the lives of individuals, families, local communities and nations.

10.1 The development and design of LAMP

The UNESCO Institute for Statistics (UIS), with the cooperation of several countries, developed a quantitative measure of literacy and numeracy over a period of six years from 2006 to 2011. This measure, called the Literacy Assessment and Monitoring Programme (LAMP), was described in this report along with the results of its application in four countries: Jordan, Mongolia, Palestine and Paraguay. This report presents a first look at literacy and numeracy through the LAMP lens.

LAMP was created to measure attainment in four domains:

- Two reading skills domains: expressed as the ability to handle various texts, i.e. continuous phrases/paragraphs, called 'prose literacy'; and schematic texts, such as those included in forms, maps or timetables, called 'document literacy'.

- Numeracy skills domain: expressed as the ability to handle basic arithmetic operations and calculations.

- Reading Components domain: Measurement of persons with very low reading ability. This is expressed as the ability to use basic operations involved in decoding and understanding texts and numbers (i.e. alphanumerical perceptual knowledge: letter and number recognition; word recognition; vocabulary; sentence processing; and simple passage fluency).

The procedures that the UIS applied during the development of this assessment assured that LAMP would be:

- Comparable across countries, languages and scripts (for reading and numeracy skills);
- Country-, language-, and script-specific (for pre-reading skills);
- Country-specific for socio-economic and socio-demographic information.

For the each of the three domains (Prose, Document, and Numeracy), LAMP used item response theory methodology to develop the assessment. This allowed all countries' results to be placed on the same metric for easy comparison. LAMP also divided the metric for each domain into three performance levels so that scores on the metric could be described in terms of the specific literacy or numeracy skills that the score represents. These levels of performance are progressive (or developmental) in the sense that if a person scores at a higher level, all skills described as lower level performances can also be performed along with those at the higher level. Chapter 3 defines the skills LAMP respondents scoring at each performance level can perform.

The metric and performance levels that LAMP provides cannot be used to create literacy rates. LAMP does not assess writing skills per se and writing is often part of the definition of literacy rates. LAMP assesses only

one language within each country. Sometimes, several languages are widely used within a country, and a person may be literate in one or more of them. The language LAMP assesses may not be a language in which a person is literate. Further, LAMP measures literacy and numeracy on a continuous metric. Therefore, it does not produce dichotomous results that can be converted easily into a 'rate'.

It should be noted that LAMP assessed literacy and numeracy using a household-based sampling design. Following a carefully designed sampling plan, households were randomly selected to represent the demographics of a country. Then, within a selected household, a randomly selected adult (aged 15 years or older) was administered the LAMP individually. This process is unlike school-based assessments that assess students within selected schools. It is also unlike general household surveys for which literacy assessment is not the main intent but which might include a small module for collecting information on literacy as part of a broader data collection effort.

LAMP was specifically developed to assess literacy and numeracy for adults, whether or not they were currently enrolled or previously attended formal schooling. It focused on assessing prose reading, document reading and practical numeracy skills. Items were selected from several sources for new field testing and revisions were made for some items. Among the sources were items from IALS and ALL, items especially written for LAMP by participating countries with the intention of using them across all countries, and items that were developed specifically for use within only within a specific country.

From 2006 to 2010, the LAMP assessment items were field tested in eight countries with a wide array of languages and scripts. Languages and scripts used included Arabic (Arabic script), Mongolian (Cyrillic script) and languages with a Roman script: French, Fulfulde, Hausa, Kanuri, Spanish, Tamasheq, Vietnamese, and Zarma. Field testing in this diverse context allowed the development team to improve the items and to select items that, when adapted and translated, functioned well across several countries.

In addition to assessing the three domains, there was a country-specific reading literacy assessment, called 'Reading Components', that assessed lower-level or pre-reading skills to evaluate literacy in several language families and in several different scripts that were not yet fully developed. As this latter assessment was country specific, a country's results were not directly comparable to other countries' results. Reading Components scores are not put on a common metric.

To develop the Reading Components assessment, decisions were made to allow each country to produce its own word recognition lists, and to make the decoding exercises optional. The sentence processing items, on the other hand, would be common. The sentence processing items were designed so that a respondent would not need any special knowledge to decide whether the sentence was true or false once it was read. As a result, some of the items were tautological and obviously true, provided that one could read and understand the sentence. Similarly, the false items were obviously false and may appear to be nonsensical once read and understood.

By the end of the field testing process, procedures for administering LAMP were streamlined and fine-tuned. Several instruments had undergone significant improvements following the field testing. The changes include:

- A few Prose, Document and Numeracy items were dropped while several others were modified;
- The Reading Components assessment was reordered with some of its sections streamlined (in particular sentence processing), while others were reformulated (namely, oral vocabulary and passage fluency);
- The Respondent Booklet was removed as parts of it were merged with other tools;
- The Background Questionnaire underwent important improvements;
- An Enumeration Area Information Sheet was added to provide background information on the immediate environment of the respondents;
- A Supervisor Daily Report Form was created to monitor the data collection activities and to track non-responses.

In addition, data from the field tests were used for another important purpose: to identify a suitable cut-score to streamline the decision on matching low and high literate individuals to an appropriately difficult booklet. This resulted in a 'filter test' to reduce assessment time yet provide sufficient accuracy in the estimation of respondents' competencies. Thus, in the main assessments, respondents were allocated to either a low-difficulty (Module A) or a high-difficulty (Module B) form of the test. The decision to allocate a given individual to a given module was based on their score on the filter test, which contained 17 items. The decision to set the cut-off score for the filter test equal to 8 (the minimum score required for allocation to Module B) was made by analysing field test data and incorporating input from subject matter experts.

The final design of LAMP consists of a battery of instruments (see Chapter 5 for more details) that includes:

- The Background Questionnaire: This instrument is administered first to collect information on the respondent and his or her family and settings. This instrument is a key element to gain a meaningful understanding of the social, demographic and economic background of the respondent that may contribute to shaping his or her skills.
- The filter test: This test is administered after the Background Questionnaire. This is a booklet with 17 items that establishes whether the respondent likely possesses lower or higher levels of literacy skills. It is used to decide whether an easier (Module A) or more difficult (Module B) test should be used to gain a more in-depth picture of the respondent's skills.
- Module A for those with lower performance: This module is composed of two instruments. One instrument, the 'locator test', supplements the information produced by the filter test with more detail and establishes more precisely where the respondent stands in relation to the lower skill levels. It includes Prose, Document and Numeracy sections. The other instrument, the Reading Components, enables an in-depth exploration for low scoring persons of the elements that might be preventing the respondent from achieving a better performance.

- The Reading Components: This instrument is part of Module A and is administered to those with lower literacy skills. It aims to collect in-depth information on a reader's ability and efficiency in processing the basic elements of the written language. Each country that implemented LAMP developed a set of component assessment tasks unique to its language, script and culture, based on the guidelines specified in the Reading Components framework (UIS, 2009).

- Module B for those with higher performance: This module is one test but there are two equivalent versions (Booklet 1 and Booklet 2). The respondent is randomly assigned to Booklet 1 or Booklet 2. Both include Prose, Document and Numeracy sections that supplement the information produced by the filter test to establish more precisely where the respondent stands in relation to the higher skill levels.

10.2 Results and implications of implementing LAMP

Four countries implemented the final version of LAMP: Jordan, Mongolia, Palestine and Paraguay. The countries' sample sizes were between 2,666 and 4,666 cases. Response rates were high. In fact, they were above average rates for other international assessments of adult literacy skills (OECD, 2013a, 2013b). The demographics of the countries are described in Chapter 5.

The findings of the LAMP assessment for the four countries can be summarised by describing the estimated percentages of the countries' populations that may perform prose reading, document reading and numeracy tasks. With regard to Prose reading in the four countries:

a. Level 1. Less than 30% of respondents could: identify literal, concrete information in reading-to-do passages (e.g. job vacancy notices, product labels and vaccination information) or simple one-paragraph passages, when (i) the language is identical in passages and questions; (ii) only everyday colloquial vocabulary is required; and (iii) choices or distractors are absent from the questions. Respondents could produce answers that require minimal action (e.g. circling, underlining, or copying a short fragment of text).

b. Level 2. 41% to 51% of the respondents could do everything in (a) and in addition could: Identify literal information in reading-to-do or reading-to-learn passages, when the required information appears in the reading-to-do passages in a brief, clearly marked section or in reading-to-learn passages near the beginning of the text; and when (i) the language is not identical in passages and questions, and (ii) the questions do not have choices. Respondents could paraphrase, understand more 'academic' language and write full-sentence answers.

c. Level 3. 20% to 31% of the respondents could do everything in both (a) and (b) and in addition could: Identify literal information in longer, more challenging reading-to-learn texts (1-10 paragraphs) with linguistically dense passages or when the required information is in the middle or end of the passage (not the beginning) and when questions may or may not have choices or distractors.

With regard to Document reading in the four countries:

a. Level 1. Less than 35% or fewer of could: Identify a single piece of information in simple reading-to-do or reading-to-learn document (passages, graphs or tables) provided that: (i) the language is mostly identical in stimuli materials and questions; (ii) only one or two variables are included in the materials; and (iii) only a few choices or distractors are present in the questions (although potentially these are always present).

b. Level 2. 35% to 54% of the respondents could do everything in (a) and in addition could: Understand reading-to-learn graphs or tables that included two or three variables with descriptive labels; compare or contrast numerical information or processes; and coordinate and match parallel information (e.g. time and activity data in one table), provided that the language is mostly identical to the stimuli and when questions have several distractors present.

c. Level 3. 21% to 38% of the respondents could do everything in both (a) and (b) and in addition could: Understand complex documents and integrate information from complex sources (densely packed tables, multiple graphs) in order to identify numerical values, given a set criterion; and fill out complex forms by turning personal data into categorical variables when the language differs in passages and questions or is 'academic' (e.g. value, rates).

With regard to Numeracy in the four countries:

a. Level 1. 36% or fewer of respondents could: (i) answer explicit questions requiring a one-step, simple operation; (ii) add 3 whole numbers with 2-3 digits or with decimals in a 'money' context; and (iii) subtract 2 whole or decimal numbers in a 'money' context, when presented with material communicating information in familiar contexts, and that has easy access to quantitative information due to its visual representations and minimal text. Questions contained no choices or distractors.

b. Level 2. 42% to 45% of the respondents could do everything in (a) and in addition could: When presented with material communicating information in a familiar context, (i) complete tasks involving some fractions and decimals; (ii) understand and use some simple fractions such as one-half (½) written with numbers or words; (iii) demonstrate some understanding of the meaning of decimal numbers; and (iv) multiply a decimal number and a whole number.

c. Level 3. 22% to 38% of the respondents could do everything in (a) and (b) and in addition could: When presented with complex tasks with several visual representations and when asked explicit questions that may or may not have choices or distractors, (i) perform multiple-step operations that require multiplication (maybe by repeated addition) and then division (maybe by repeated subtraction); (ii) subtract a percent from an initial value; (iii) find a proportion by combining operations in a money context (sometimes with decimals); (iv) add 3 numbers (sometimes with decimals) after computing 2 of them through multiplying by 10 or 2; (v) read time using clocks or in numeric form; (vi) interpret qualitative or quantitative data from tables or price tags with percents, decimals and whole numbers; and (vi) represent money and weight (using appropriate measurement units).

For the four countries participating in the LAMP main assessment, most national averages are similar to one another in all three domains (*see Chapter 6* for details). Few of the small differences between national averages are statistically significant. However, the ordering of the national averages is not the same for each domain. This means that different countries did slightly better in different domains, and no individual country stood out across all domains. But a country's averages do not describe the distribution of skills that its citizens possess.

Each country will need to consider whether the distribution of skills across the three LAMP levels is appropriate for its national literacy and numeracy goals. As noted previously, approximately a third of a country's adult citizens can perform the higher level skills assessed by LAMP. Is this level of performance sufficient for a country to continue its current and future economic and social growth? This is a question policymakers will need to discuss, especially as new technologies may become important to a country's development. New technology requires more skills in reading documents and working with quantitative information (numeracy) than has been the case in the past.

Using the information collected through the Background Questionnaire, LAMP results in the three domains were correlated with several socio-demographic variables. These variables were gender, learning (educational attainment), lifespan (age and cohort), legacies (parental education, occupation and socio-economic status), location (urban and rural), leisure (use of reading and numeracy skills outside of work) and livelihood (use of reading and numeracy skills at work). Consistent with other studies of literacy and numeracy, in all countries, average LAMP performance in all three domains is higher for respondents that have higher levels of education. In numeracy, significant percentages of those with primary education or less scored at LAMP Level 2 or higher in three of the four countries participating.

When LAMP performance was studied in relation to gender, men scored higher than women in numeracy in all countries even when scores were adjusted for level of educational attainment. It should be noted that lack of quantitative skills would limit the entry of individuals into advanced education in quantitative-based occupations and careers, such as science, engineering and medicine, among others. For prose reading, after taking educational attainment into account, women generally had an advantage over men. In document reading, after taking educational attainment into account, men had an advantage over women. A policy question is how to improve performance of women in reading documents as this type of reading becomes more important in the future.

When age was studied in relation to LAMP performance, it was found that after adjustment for educational attainment, the differences between younger (age 15-24) and older (age 40-64) participants were small and generally statistically non-significant in prose and document reading, and in numeracy (*see Chapter 7* for details). LAMP is unique in that it studied numeracy for participants aged 65 and older. The results showed that this group had statistically lower average numeracy scores in each country. When the full range of age was plotted against LAMP scores, there was a downward curvilinear relationship. In all four countries' scores on all domains, there tended to be a slight peak in performance around age 35, then scores became lower as age increased.

The scores of participants in LAMP were related to maternal and paternal education level. Participants with parents who completed post-secondary education scored significantly higher than participants whose parents possessed lower educational attainment.

Participants with parents in high-skilled occupations also scored higher in all LAMP domains, after adjusting scores for the participants' own educational attainment – but the differences were small. Participants whose parents had the highest socio-economic status scored higher than participants whose parents had the lowest socio-economic status, after adjusting the scores for the participants' own level of educational attainment.

Participants from urban areas scored higher on average than participants from rural areas, after taking into account the participants' educational attainment. However, after adjustment the differences between urban and rural participants became very small.

Participants who used mobile phones had higher scores than participants who relied solely on media broadcasts. In addition, those using computers had higher scores than those using only mobile phones. This advantage for computer users persisted even after adjusting for educational attainment, though the advantage in mean difference was much smaller. Thus, access and knowledge on how to use technology improved scores on LAMP-assessed literacy and numeracy.

Employed participants had higher scores than unemployed participants, even after taking into account educational attainment. Participants with high-skilled occupations had higher LAMP scores, although when adjusted for educational attainment, this advantage became very small. The more participants used their reading and numeracy skills in their work, the higher were their LAMP scores. This advantage persisted in most countries when scores were adjusted for the educational attainment of participants, although the advantage was not great.

Thus, LAMP scores are related to many socio-demographic variables but the relationships are generally less strong after participants' educational attainment levels are taken into account. Education seems to be the key factor to attaining literacy and numeracy as measured by LAMP.

These data suggest that policies aimed at increasing gender equity in the distribution of reading and numeracy skills should go beyond attending school. Policies should also target increased participation of both genders in the labour market and the use of skills both at work and for leisure.

As access to schooling approaches gender parity, female employment rates are still lagging behind those of males.

As for literacy practices for leisure, they have the potential to help narrow the gap in the other two skills domains. This type of use seems to be relatively gender-neutral compared to the workplace. Policymakers should find ways to foster it not only among women, but also among older respondents and rural residents – older rural women in particular.

10.3 Results of the Reading Components section of LAMP

LAMP developed the Reading Components assessment because there were participants who had literacy skills that were too low to be adequately assessed using the methodology that was appropriate for higher ability participants. The Reading Components assessment was developed to be specific to each participating country. Although one cannot directly compare countries using the Reading Components assessment results, some general patterns across countries are worth highlighting.

a. The oral receptive vocabulary tasks appeared to have been too simple to fully capture critical variability in vocabulary knowledge across groups.

b. In most countries, even the highest performing subgroups experience difficulty in understanding simple and short passages. That seems to be the case even when, on average, the participants seem to be doing fine in basic vocabulary, alphabetic knowledge, decoding/word recognition and sentence processing.

c. For the two highest performing subgroups in each country, there is a large discrepancy between the performance on sentence comprehension and on passage comprehension. Sentence comprehension consistently displayed a much higher percent correct than passage comprehension.

d. The timed subtests that assessed fluency indicate that participants overall displayed slow processing skills across profiles and across countries. One general trend worth highlighting is that even when the average fluency score (i.e. word reading accuracy) is high, simply reading words accurately and rapidly does not seem to guarantee passage comprehension. Consistently, and in line with other research, it appears to be the case that rapid and accurate word recognition might be necessary yet not sufficient to achieve passage comprehension.

10.4 Possibility of using LAMP for specific in-depth studies

The LAMP performance in Paraguay was studied in more detail, especially in relation to bilingualism. Among LAMP respondents, 86% report speaking Guarani well enough to carry a conversation, and 80% claim to be able to do the same in Spanish. Based on their self-reports, two thirds of Paraguayan respondents (66.5%) could be considered Spanish-Guarani bilinguals. Although clearly both languages are widespread, individuals have different degrees of exposure to each language. For instance, they may speak Spanish or Guarani as mother tongue or as a second language. In Paraguay, many people have more than one mother tongue. In the LAMP sample, more than three quarters of Paraguayans (78.7%) report Guarani among their mother tongues, more than half (52.1%) report Spanish as one of them and almost a third (32%) report both.

Native Spanish-speakers outperform other respondents by at least 50 points (half a standard deviation) in all LAMP domains, before controlling for other factors. After introducing a number of control variables (gender, age, location, parental occupation, maternal education, respondent's years of schooling, literacy practices at home, and occupational skill demand), this advantage is substantially reduced (to 12-15 points) in Prose and Document reading, and it ceases to be statistically significant in Numeracy.

This has some important implications. For those who have sufficient command of the Spanish language, having a second mother tongue, which in most cases is Guarani, is associated with higher performance in at least one domain (Document reading) or even two (Numeracy and Document reading). This is an important finding as the advantage of having Spanish as mother tongue may be wrongly perceived as a disadvantage of having Guarani as mother tongue. No such disadvantage is found in LAMP data. In fact, for those speaking Spanish well enough, speaking a second language at a similar level of proficiency (whether this is Guarani or another language) is associated with higher performance in at least one domain.

Thus, the relationships between language and literacy are complex but certainly relevant for policy purposes in the Paraguayan case. LAMP could be used to study other bilingual situations where more in-depth information is relevant to policymakers.

10.5 Summary of the experience with LAMP

There have been significant advances in the technology of educational assessment over the past 50 years and, specifically, in the comparison of learning achievements across countries. Following the pioneering work of IEA in the 1960s, national, regional and international agencies have built up an impressive and well-established set of comparative assessment tools. Their main focus is literacy, mathematics and science but some also cover citizenship, computer literacy and health-related knowledge. In terms of sector, the most common focus has been on primary and lower secondary schooling, with rather less coverage of early years and adult learning. Many countries have participated in one or more of these assessments but these are primarily high- and middle-income countries. Only a few low-income countries have taken part in the rigorous international comparison of learning achievements.

The particular achievement of LAMP has been to address the comparative assessment of achievement in reading and basic numeracy in low-income countries, and to do so for older populations. Specifically, it developed tests of reading and numeracy skills for young people aged 15 and older and for adults, and administered them along with background questionnaires to substantial samples in four countries – Jordan, Mongolia, Palestine and Paraguay.

This represents significant progress in several respects. Particularly, the focus on out-of-school populations and those with low achievement levels. While tests such as the International Adult Literacy Survey, the Adult Literacy and Lifeskills Survey, and the Programme for the International Assessment of Adult Competences have measured adult literacy, none has focussed on low-income countries in the same way as LAMP. The number of countries involved was small but they are extremely diverse – both culturally and linguistically.

Administration

LAMP faced – and resolved – major organisational challenges. The countries taking part lacked expertise in large-scale assessment and considerable capacity building was required. Item development and translation issues had to be addressed in each country. Extensive field testing was conducted (in six other countries in addition to the four countries participating in the final study), which led to major changes in test items and administration protocols.

Sampling and test administration presented considerable logistical challenges. Samples were household-based, with households randomly selected to represent country demographics; within households, one adult (aged 15 years or older) was randomly selected to complete the tests. National sample sizes ranged from 2,666 to 4,666.

Background variables and policy implications

The collection of contextual information on LAMP participants and its use in analysing test results are a particular strength of the study. A large amount of background data was collected on each participant, ranging from personal details, education and work backgrounds to reading and numeracy practices. This made it possible to analyse participants' achievement levels in terms of (i) prior schooling and non-formal education, (ii) gender, (iii) age and cohort, (iv) parental characteristics and socioeconomic status, (v) urban versus rural location, (vi) use of reading and numeracy skills at home and (vii) use of these skills at work.

These analyses enabled a nuanced account of participants' achievement levels which would not be possible from looking at their raw scores alone. Indeed, accounts based on raw scores are potentially misleading

given the significant impact of some of the background variables. Beyond that, they point to implications for policies on improving literacy and basic numeracy. These data suggest, for instance, that policies aimed at increasing gender equity in reading and numeracy skills should go beyond the school system. They also point to the importance of literacy practices for leisure and their potential to help reduce skill gaps.

It should be noted that the measurement of SES was country-specific. Given the variations in social stratification across the four countries, it was judged necessary to construct a SES index separately for each country. This was based on responses to the background questionnaire which covered household possessions, household characteristics and demographic conditions, education level of the head of household, and access to utilities and infrastructure, with latent class analysis being used to construct the index. While this means that direct comparison of countries in terms of this variable should not be undertaken, the methodology developed is highly relevant to measuring SES and could be adopted with profit in other studies.

Low performance

LAMP's focus on low performance is noteworthy, and instructive. By using a filter test, it was possible to target individuals with limited reading skills and obtain more detailed information on their reading levels than a test designed for the whole population would permit. These individuals were administered a 'Reading Components' test which sought to measure their pre-reading skills. Typical items included letter naming and word recognition. The test tended to involve oral rather than written responses because of these respondents' limited writing skills.

Unlike the other tests used in LAMP, the Reading Components test was specific to each country. This was judged necessary in order to take into account the language, orthography and culture found in each country. The relationship between a language and its writing system, for instance, can be very different depending on the language, and assessment tasks at early reading levels need to be modified accordingly. Thus, while the tests in each country were based on an agreed Reading Components framework, direct comparisons between countries are not possible. In addition, the test lacks unidimensionality and does not lend itself to analysis by using item response theory, further limiting the possibility of cross-country comparisons.

Some general patterns can be discerned, however, and the exercise was valuable for a number of reasons. First, it demonstrated that it is possible to gather detailed information on the reading situation of adults with limited reading skills. Instead of categorising individuals as literate/illiterate, it becomes possible to capture their performance on the different elements of early reading – letter naming, word recognition, word meaning, sentence processing, speed of response, and so on. Secondly, it suggested a number of fruitful hypotheses on the relationships between the different elements of early reading: sentence comprehension seems to be easier than passage comprehension; expository texts are more challenging than narrative ones; and speed of response has little association with passage comprehension. Thirdly, the information yield from the Reading Components test is extremely useful in guiding adult literacy instruction. Individuals with limited reading skills can differ greatly in their profiles of reading skills, and will progress more effectively if instruction takes account of those profiles.

LAMP and literacy rates

Literacy is key to learning and is important both in its own right and as a means to open a gateway to other learning. Measuring literacy has been key to national and international targets, and reading proficiency is an explicit target in SDG 4.1. Conventionally, literacy rates are determined on the basis of self- (or third-party)

reports or a proxy (number of years of schooling). The limitations of these approaches are known. They are indirect, unreliable and prone to substantial over-reporting. They are, moreover, based on a simplistic notion of literacy and do not take into account that literacy skills depend on context and sit on a continuum. They are of course a relatively fast and inexpensive way of generating a measure of literacy that can be expressed simply.

There is a significant trade-off, however, between ease of use and accuracy. If an indicator is neither accurate nor relevant, its utility has to be called into question. LAMP does address the weaknesses of conventional ways of producing literacy rates as it is based on actual competencies rather than reported ones, making it a direct measure and not a proxy. LAMP reflects the complexity of language in use and the collection of background data permits in-depth analyses which can guide reform efforts. It is time-consuming and, for now, relatively expensive. Further work is needed to facilitate its wider use.

LAMP does, however, provide a robust challenge to the use of one-shot and potentially misleading literacy rates. If ways of streamlining its administration, analysis and reporting can be devised, it will certainly prove its worth in informing national reform efforts to improve adult literacy. And it may lead to new thinking on the collection and publication of international comparative data on literacy.

Studying bilingual situations

Given the large number of people worldwide who speak two (or more) languages, the case study of Paraguay in LAMP is particularly instructive. It is interesting in its own right and is a good example of the kind of in-depth analysis that LAMP data permit. In Paraguay, a majority of the population are bilingual and fluent in both Guarani and Spanish (two-thirds of the LAMP sample claimed to be bilingual in the spoken languages). Bilingual situations entail complex relationships between the two languages in terms of status, context of use, literacy levels, exposure, use at home and in the community. Typically, these vary from one bilingual situation to another.

LAMP analysed some of these relationships in Paraguay and produced findings that are relevant to language teaching and learning in Paraguay. More significantly, however, it provides tools and a methodology for doing similar in-depth analyses in other bilingual situations, where the implications for policy and pedagogy may be quite different. Bilingualism is a feature of life in many low-income countries and has implications for both schooling and labour market participation. Many students are schooled in a language that is not their mother tongue and, when they leave school, participate in a society and labour market where they must use a language different from their home language. The Paraguayan case study conducted within LAMP is instructive as it demonstrates how bilingualism and its interaction with reading achievement can be studied in depth. In this way, effective language policies both for schools and for society at large can be formulated on the basis of relevant evidence.

LAMP and the SDGs

LAMP is unlikely to be able to make a direct input to measuring the SDGs. However, it provides valuable information on the development of indicator 4.6.1. LAMP produces relatively detailed information on participants' reading and numeracy profiles, where the learning indicator associated with target 4.6 is couched in terms of the proportion of adults "achieving at least a fixed level of proficiency in functional literacy and numeracy skills". In the end, LAMP requires substantial resources to administer and it is unlikely that a LAMP-like study could be implemented globally.

The experience of LAMP can inform SDG measurement, however. First, it demonstrates that, while meaningful data can be gathered on low performance, cross-national comparisons of individuals with low performance are not readily accessible. Given the policy interest in this group, this is a salutary lesson that must be borne in mind. Policy makers may wish to make comparative statements about this group despite lacking adequate data, but the LAMP experience and the methodology necessary to study low performance should serve to dissuade them from doing so.

Secondly, LAMP demonstrates how a given country can build on a global indicator to advance education reform. Metrics associated with indicator 4.1.1 will locate countries in relation to percentages of students reaching minimum proficiency levels. This is useful information and yet merely marks a starting point. If – as may well be the case for many low-income countries – this percentage is low, it becomes necessary to conduct *separate* investigations into the low-performance population to determine the nature of their low performance, with a view to making targeted, effective interventions. This is where the tools and methodology developed by LAMP become instructive. Even if they cannot be used directly with a school-based population, they offer the possibility of obtaining a structured account of low performance and point to ways in which this can be improved for a younger population.

Thirdly, while LAMP does not lend itself to global comparisons, it does permit some limited benchmarking for countries that are 'statistical neighbours'. Where countries are clustered together on development indexes, it can be instructive to compare each other on LAMP subscores. Such benchmarking is not concerned with rank ordering but with gaining a deeper understanding of a country's performance levels and learning how to bring about improvement from studying neighbouring countries' practices.

Resources

LAMP was resource-intensive and took a great deal of time to complete. If it were to be repeated or carried out in other countries, however, the demands would not be as great as a methodology and set of tools have been developed and there is now a body of implementation experience to draw on. Substantial resources would still be required to run LAMP in a new country. Instruments would need to be translated and some items might have to be adapted. The Reading Components test and elements of the background questionnaire such as the SES measure would need to be developed for that country. Field testing would need to be conducted and modifications made as necessary. In addition, in many countries, capacity development would be required with respect to sampling; test administration; data entry and scoring; analysis; and reporting.

The cost entailed, while considerable, should be seen in perspective. If the purpose was just to produce a national status indicator, the cost might well seem prohibitive and not readily justified. If, however, LAMP was being administered as part of a national reform effort to improve reading and numeracy levels across

a country, its cost as an intelligence-gathering element would be a small proportion of the overall cost of such a programme. Monitoring should in any case be built into such programmes, and it is likely that the intelligence produced by a tool such as LAMP would be cost-effective in helping to maximise the use of programme resources.

Conclusion

LAMP has demonstrated feasibility as a large-scale assessment of adults' reading and basic numeracy skills in low-income countries. As an assessment, it was challenging and resource-intensive, but it was done to a high standard and constitutes an effective proof of concept. It produced detailed information on the distribution of reading and numeracy skills in the participating countries, with a particular focus on individuals with low attainment levels. It collected a wide range of background information which enabled in-depth analyses of patterns of performance which helped both to explain those patterns and to guide policy on literacy programmes. Its case study of a bilingual country shows how bilingualism and its interaction with reading achievements can be studied in depth. Finally, LAMP has produced tools and a methodology which can be used to support literacy improvement in a variety of ways.

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Glossary

Anchor points. Points on the score scale that divide the LAMP scale into segments so that persons whose scores are within the same segment perform in similar ways. The segments are called performance levels. LAMP has three performance levels. Anchor points are sometimes called "cut scores".

Bilingualism. The use of at least two languages by an individual and the frequent use (as by a community) of two languages.

Bilingual advantage. A growing yet controversial field of research that deals with the consequences (either positive or negative) of bilingualism on cognition and literacy development.

Cloze reading assessment format. A reading comprehension assessment method created by replacing every fifth word (excluding verbs, conjunctions, and articles) with blanks of equal length. The examinee's task is to read the passage and put in the missing words.

Continuous text. Narrative, expository, descriptive, argumentative/persuasive or injunctive/instructive text composed of sentences that may be organised in turn into paragraphs, sections, chapters. For example, prose found in books and newspaper articles.

Cohort. A group of persons who have a common experience or characteristic within a given period. For example, all persons who completed primary school between 1995 and 2000.

Confidence interval. A range of values that is a good estimate of an unknown population parameter. A confidence interval for the mean is a range of values that estimates the actual value of the population mean.

Construct. The trait or characteristic that an assessment instrument has been designed to measure.

Correlation coefficient. A statistical index that quantifies, on a scale of −1 to +1, the degree of relationship between the scores from one assessment and the scores from another.

Cut-score. A numerical score on a metric that is used to determine whether an examinee's performance is sufficient for some purpose. For example, on LAMP whether a person's LAMP performance is sufficient to be classified as Level 1, Level 2 or Level 3.

Differential Item Functioning. An approach to studying item fairness at the level of individual test items rather than looking simply at average differences in an item's performance. The approach studies whether persons of the same ability, but from two different groups, performed differently on the item.

Digit naming. The ability to name a numerical symbol or digit (e.g. '2' or '5') when it is used to represent a number.

Diglossia. A situation where two languages (or two varieties of the same language) are used under different conditions within a community – often by the same speakers. The term also can be applied to languages with distinct 'high' and 'low' (colloquial) varieties, such as Arabic.

Dimensionality analysis. A statistical analysis that evaluates whether all of the items on a test measure the same dimension or trait.

Discontinuous texts. Text that is not organized in a continuous fashion. For instance, charts, graphs, diagrams, maps, forms and advertisements.

Document skills. The ability to comprehend discontinuous texts, typically not organized in paragraphs, such as tables, graphs, schedules and forms.

Graphemes. The smallest unit of written language (e.g. letter or group of letters) representing the sounds in words. For example, the sound /ai / in 'rain' is represented by the written letters 'ai'.

Household-based assessment. A test administered at the household level to capture individuals' skills under conditions that are intended to be as standardised as possible to prevent procedural inconsistencies from affecting the results.

Household survey. The collecting of information on a number of variables by sampling households and interviewing individuals from those households.

Human Development Index. A composite statistic of life expectancy, education and income per capita indicators, which are used to rank countries into tiers of human development.

Letter naming. The ability to name letters in an alphabet.

Literacy. The ability to identify, understand, interpret, create, communicate and compute using printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve their goals, develop their knowledge and potential, and participate fully in their community and wider society.

Literacy rate. The number of literate persons in a given age group, expressed as a percentage of the total population in that age group.

Logographies. The use of letters, symbols or signs to represent an entire word (e.g. $ to represent the word 'dollar').

Mean. An average score found by summing all of the scores and dividing by their number. Also known as the arithmetic mean.

Multilingualism. The ability to speak, understand, read and write three or more languages.

Monolingualism. The ability to speak only one language.

Morpheme. The smallest, meaningful unit of language. A morpheme may be a word or a word part. For example, 's' in 'cats' is a morpheme that conveys number.

Mother tongue. This term is used interchangeably with the term 'native language', referring to the first language one learns to speak, primary language used or one's dominant language.

Numeracy skills. The ability to perform mathematical operations with the possibility of written support.

Open-ended question. An assessment task that does not present possible answers from which the examinee is to select and that allows more than one correct answer.

Oral quantitative skills. "Mental calculations" in numeracy that do not include written support.

Oral vocabulary skills. Knowledge of vocabulary that does not involve written support.

Partial correlation coefficient. The correlation index between scores on two variables after controlling for other variables.

Passage fluency exercises. Exercises that capture passage reading fluency that emerges from skilled reading. This is an indicator of whether visual word identification processes are efficiently feeding language-processing systems (e.g. working memory) to produce outputs.

Phoneme. The smallest unit of sound.

Precursors. In assessing literacy, this refers to letter naming and word recognition.

Proficiency/Performance levels. Performance level statements about the things an examinee can perform or do with the subject or content being assessed by the test.

Prose skills. The ability to comprehend continuous texts, typically organized in paragraphs.

Reading Components. Items used to measure the pre-reading skills of individuals who possess limited reading comprehension skills, limited writing skills or both but who are not totally lacking in any reading-related skills.

Reliability coefficient. Any of several statistical indices that quantify the amount of consistency in assessment scores.

Self-report. The information participants provide about themselves regarding a variable in which a researcher is interested.

Sentence processing exercises. An exercise to assess if an individual can only decode words or is also able to grasp the meaning of a sentence.

Skill domains. Literacy skills may be differentiated in relation to the types of material or formats in which written texts appear. For LAMP, this resulted in the identification of three major skill domains: Prose, Document and Numeracy.

Standard deviation. A statistical index that measures the spread of the scores in a distribution calculated by taking the square root of the mean squared deviation of the scores from the arithmetic mean of the scores.

Standard error of the mean. The standard deviation of sample means over all possible samples (of a given size) drawn from the population.

Stimuli. In assessments, this term refers to the question, passage, or prompt that an examinee is given in order to be able to answer the question(s) the test poses.

Syllabaries. Phonetic writing systems consisting of symbols representing syllables.

Validity. The soundness of one's interpretations and uses of examinees' assessment results.

Annex 1. Support for the validity of having three major domains in LAMP

Dimensionality

Educational or psychological assessments/tests usually have several content areas or subscales to measure. Many test frameworks or blueprints often explicitly stipulate that their test items measure several content areas or subscales. For instance, the Literacy Assessment and Monitoring Programme (LAMP) measures three scales: Prose, Document and Numeracy. In operational analysis, items are classified according to their predominant areas, such as prose items, numeracy items, and so forth, and each content-based subset of items is regarded as unidimensional.

Item response theory (IRT) has been used in the analysis of response data from educational and psychological tests, including in LAMP. IRT uses probability models to characterise the interaction between test takers and test items (see Lord, 1980). These models contain both item parameters and examinee parameter(s), called abilities or traits. IRT assumes that examinee performance on a test can be predicted and/or explained by the abilities underlying examinee performance on the items. The structure of response data, resulting from the interaction between test items and test takers, is called the statistical dimensional structure. If the sample of examinees is representative of the population, the statistical dimensional structure is the estimate of the dimensional structure of the test. The purpose of a dimensionality analysis given a set of response data is to identify its statistical dimensional structure of response data and infer the (true) dimensional structure of the test (Zhang, 2010).

Several statistical methods are available for dimensionality analysis: factor analysis, cluster analysis and multidimensional scaling. The intuitive idea behind most dimensionality assessment procedures is that all items within a particular cluster are highly correlated or have high similarities among themselves but have relatively low correlations or similarities with items in a different cluster. The difficulties of grouping items into clusters are how to distinguish between high and low correlations/similarities and how to choose the number of clusters. Therefore, a better similarity measure is needed. DETECT, short for dimensionality evaluation to enumerate contributing traits, is a statistical procedure that is used to identify the number of dominant latent dimensions to estimate the degree of multidimensionality, and to assign items to dimensionally homogeneous clusters when such a structure exists. The DETECT index has been mathematically proven to be maximised at the correct dimensionally based cluster partition of a test, where each cluster in this partition corresponds to a distinct dominant dimension under certain reasonable conditions (Zhang and Stout, 1999; Zhang, 2007).

Due to the two-stage assessment design (respondents completed a first cognitive book, then were assigned another cognitive book based on their performance on the first book) in LAMP, not all respondents answer all items. Therefore, there are a lot of missing item responses. Since the data matrix is very sparse, not every item pair is administered to the same respondents; similarities or distances among some items cannot be calculated. DETECT was modified and adapted to LAMPs two-stage test design and was applied to identify the number of dimensions for the LAMP item response data. A dimensionality analysis was performed on LAMP field test data to provide a solid foundation for the subsequent statistical and psychometric analysis.

Specifically, to (1) identify the number of the dimensions of the LAMP item response data[32]; and (2) provide statistical evidence/information to make an informed decision for reporting scales – two (Prose plus Document and Numeracy) or three (Prose, Document and Numeracy) reporting scales were used. The dimensionality analysis was conducted again on the main survey data. It was applied twice to each of the four countries. The DETECT index consistently implies a three-dimensional structure, therefore, LAMP is reported in three scales: Prose, Document and Numeracy.

Domains and performance levels

Basic explanation for the domains

The identification of three major domains (Prose, Document and Numeracy) was the result of recognising that skills may be differentiated in relation to the types of material or formats in which written texts appear. This idea was reinforced by the fact that different types of written material do not appear in a similar fashion across the different milieus of everyday life. For instance, work-related settings involve using documents such as forms, graphs or charts, while continuous documents are more present in leisure and in the academic field. Text formats are also associated with purpose and this, in turn, is linked to different reading strategies.

Prose-related skills involve the ability to process texts formed by sentences organized into paragraphs. These texts are organized using paragraph setting, indentation and a hierarchy expressed by headings that help the reader recognise the organization of the text. Document-related skills involve the ability to use non-continuous texts organized in a way that allows the reader to employ different strategies to enter and extract information. Rosenthal and Kirsch (1998) suggested that these texts, even if they appear in rather different formats (tables, schedules, charts, maps, forms, etc.) can be classified into four types: simple list; combined list; intersected list; or nested list. Using these types, one can produce matrix (identifiable rows and columns), graphic, locative and entry documents.

Numeracy skills are measured using short tasks with mathematical content that are embedded in hypothetical contexts that simulate real-life situations. Successfully completing these tasks requires computing skills; estimating skills; an understanding of notions of shape, length, volume and monetary units; measuring skills; and understanding some statistical ideas or interpreting simple formulas. Respondents can use, if they wish, a four-function calculator. Measuring numeracy skills in a comparable manner across cultures, however, poses very specific challenges since the way people deal with numbers is also culture-specific. The extreme example of this situation is given by the major differences between operating in decimal and non-decimal systems.

LAMP, therefore, includes a number of tasks that involve operating with continuous and non-continuous texts and mathematical operations.

[32] The UIS commissioned a paper on dimensionality study using LAMP field test data. The technical report, *Literacy Review on Dimensionality Analysis Method*, was completed by Jimning Zhang (University of Illinois at Urbana-Champaign) in 2010.

Annex 2. Anchoring process and performance level definitions

Anchoring process

Constructing scales is important in educational measurement, but interpreting the meanings of scale scores is always required. The basic idea of scale anchoring is to find out what the respondents at certain score points on a performance continuum scale know and can do, based on their responses to items that are located in a segment of the score scale. A few carefully selected scale points define the boundaries of each segment of the score scale, so that performance within the segment can be described. These selected points are called 'anchor points' or 'cut scores' that divide the scale into performance levels, within which persons perform in similar ways. LAMP has three performance levels.

LAMP established its anchor points using a similar process as described in Beaton and Allen (1992). LAMP calculated the anchor points as follows (Brenda Tay-Lim, personal correspondence, 14 June 2016). Within each domain, the four countries' items were calibrated concurrently. Then, within each domain, the IRT abilities were estimated for all respondents in the four countries. After estimation, all respondents' ability estimates were ranked ordered within each domain. The 30th percentile in each distribution became the anchor point or cut score for the boundary between Level 1 and Level 2; the 70th percentile became the cut score for the boundary between Level 2 and Level 3. **Table A.2.1** shows the scale values of the cut scores on both the IRT metric and the LAMP reporting metric.

Table A.2.1. Values of the anchor points (cut scores) that define the boundaries between the LAMP levels

	Cut score for boundary between Levels 1 and 2		Cut score for boundary between Levels 2 and 3	
Domain	Score on IRT ability scale	Score on LAMP reporting scale	Score on IRT ability scale	Score on LAMP reporting scale
Prose	-0.4874	951	0.5256	1,052
Document	-0.5108	949	0.4759	1,048
Numeracy	-0.6505	935	0.5361	1,054

Note: The IRT scale has a mean = 0 and standard deviation = 1. The LAMP reporting scale has a mean = 1,000 and standard deviation = 100.

It is also likely that in most cases, performance is cumulative. Respondents at high score levels generally know and can do all that respondents at lower levels know and can do, but they also know and can do more than respondents at lower levels. Thus, performance level descriptions should describe the increases in performance between the various anchor points. The items that discriminate between adjacent anchor points are usually reviewed to see if the specific tasks that they include can be generalised to describe the level of performance at or above the anchor point from the level of performance below the anchor point. In this way, what respondents at various scale points know and are able to do can be summarised (Beaton and Allen, 1992).

Performance Level descriptions

The scale anchoring process starts with identifying the item location (from easy to difficult) on a continuum ability scale. Second, the cut scores defining the performance level boundaries are calculated. Next, content experts were invited to review the items that are located within each performance level in each domain to provide a description of what respondents within each level could do (Beaton and Allen, 1992). Once the review is completed, the description of the performance levels is used to help the general public understand which skills respondents have if their scaled scores fall within each level. Due to the small number of items in each domain of LAMP (Prose 24 items, Document 29 items, Numeracy 24 items), LAMP's performance levels are limited to three.

Prose Performance Level descriptions

The three performance levels in the Prose domain are described as follows:

- **Level 1:** Typical respondents can identify literal, concrete information in reading-to-do passages (e.g. job vacancy notices, product labels, vaccination information) or simple one-paragraph passages, given certain conditions: i) identical language is used in the passage and the question; ii) only everyday colloquial vocabulary is required; and iii) distractors are absent. These respondents can produce answers that require minimal action (e.g. circling, underlining, copying a short fragment of text).

Since this is the lowest level, respondents with no Prose skills are also included in this category.

- **Level 2:** Typical respondents can identify literal information in reading-to-do or reading-to-learn passages, provided that the required information appears: i) in reading-to-do passages, in a brief and clearly marked section; or ii) in reading-to-learn passages, near the beginning of the text. In addition, distractors are absent; the language of the passage and the question are not identical. Respondents can paraphrase, understand more 'academic' language and write answers that require full sentences.

- **Level 3:** Typical respondents can identify literal information in longer reading-to-learn texts (one to ten paragraphs), even in those with challenging features, such as: i) potential distractors; ii) linguistically dense passages; or iii) required information that appears not at the beginning but in the middle or towards the end of the text. The language of the passage and the question are not identical. Respondents can paraphrase, understand more 'academic' language and write answers that require full sentences.

Document Performance Level descriptions

The three performance levels in the Document domain are defined as follows:

- **Level 1:** Typical respondents can identify a single piece of information in simple reading-to-do or reading-to-learn texts (passages, graphs or tables), given certain conditions: i) mostly identical language is used in the passage and the question; ii) only one or two variables are included; and iii) there is little to distract them (although potential distractors are always present).

Since this is the lowest level, respondents with no Document skills are also included in this category.

- **Level 2:** Typical respondents can handle reading-to-learn graphs or tables that include two or three variables with descriptive labels. They can compare or contrast numerical information or process, coordinate and match parallel information (e.g. time and activity data in one table). They can do this even when several distractors are present. However, the language of the passage and the questions are usually identical.

- **Level 3:** Typical respondents can handle complex texts and integrate information from complex sources, densely packed tables or multiple graphs. They can fill out a complex form by turning personal data into categorical variables or integrate information from dense documents and/or multiple graphs in order to identify numerical values, given a set criterion. They can do this even if several distractors are present, the language of the passage and the questions differs, or some of the language is 'academic' (e.g. values, rates).

Numeracy Performance Level descriptions

The three performance levels in the Numeracy domain are defined as follows:

- **Level 1:** Typical respondents perform well in familiar contexts and when the quantitative information provided is easily accessible (minimal text and the use of visual representations). The question must be explicit and ask for a one-step, simple operation. They can easily add three whole numbers with two and three digits or with decimal numbers in the context of using money. They can subtract two whole or decimal numbers in the context of using money. No distracting information is present.

Since this is the lowest level, respondents with no Numeracy skills are also included in this category.

- **Level 2:** Typical respondents perform well in familiar contexts at tasks where the quantitative information involves some fractional and decimal numbers. They are able to understand and use some simple fractions such as one-half (½) written in numerical form or in words. They have a certain understanding of the meaning of decimal numbers. They can perform multiplications using a decimal number and a whole number.

- **Level 3:** Typical respondents can perform complex tasks involving more than one different visual representation, provided the question is explicit, even when additional (potentially distracting) information is present. They can perform multiple-step operations: multiply (although maybe by repeated addition) and then use this answer to find the quotient of a division (although maybe by repeated subtraction); subtract a percentage from an initial value; find a proportion such as the price of an item using more than one operation in a money context (sometimes with decimals); find the sum of three monetary addends (sometimes with decimals) after computing two of them through multiplication by 10 or 2. They understand measurement units in either the metric or imperial systems (e.g. pounds) and can read time on a clock or in numeric form. They can interpret useful qualitative or quantitative information presented in a table or on supermarket tags containing percentages, decimals and whole numbers, and representing money and weight.

Annex 3. Jordan: Summary of sample sizes, means, standard deviations and standard errors of means

		LAMP Prose Reading Scaled Scores			LAMP Document Reading Scaled Scores			LAMP Numeracy Scaled Scores		
Variable	**n**	**Mean**	**SD**	**SE**	**Mean**	**SD**	**SE**	**Mean**	**SD**	**SE**
Gender (Total)	2,492	983	126	3.220	999	132	3.374	996	106	3.062
----Male	898	993	115	3.935	1,016	125	4.365	1,026	105	4.488
----Female	1,594	974	140	4.267	983	141	4.598	970	103	4.073
Age (Total)	2,492	983	126	3.220	999	132	3.374	996	106	3.062
----15-24	579	1,006	83	4.405	1,030	89	4.698	1,001	85	4.592
----25-39	944	1,004	96	3.575	1,019	110	4.477	1,015	102	4.517
----40-64	714	954	152	7.109	966	154	7.777	982	137	7.519
----65+	255	805	210	16.704	807	200	16.649	866	171	13.540
Location (Total)	2,492	983	126	3.220	999	132	3.374	996	106	3.062
----Urban	1,870	987	123	3.339	1,004	124	3.597	1,004	106	3.349
----Rural	622	958	147	8.173	976	155	8.647	962	108	6.302
Mother tongue (Total)	2,492	983	127	3.066	999	134	3.554	997	107	3.259
----MT is language of assessment only	2,458	984	125	2.954	1,000	132	3.209	998	106	2.984
----MT is other than assessment language only	6	1,024	92	82.163	1,024	92	82.163	1,024	92	82.163
----MT is language of assessment and other	8	1,036	57	27.981	1,059	71	30.392	1,027	76	31.944
SES (Total)	2,492	983	126	3.220	999	132	3.374	996	106	3.062
----High SES	352	1,026	84	5.528	1,045	107	7.382	1,057	91	5.836
----Medium high SES	559	1,003	102	5.182	1,027	117	6.055	1,018	97	5.863
----Medium low SES	593	937	171	8.201	945	177	8.635	956	133	6.992
----Low SES	988	965	131	4.365	978	128	4.391	970	91	3.638
Respondent's literate practices (Total)	2,492	982	127	3.288	998	134	3.663	996	107	3.264
----Broadcast media consumers	508	759	191	13.585	777	195	12.995	823	142	9.487
----Mobile phone users	1,334	998	82	3.132	1,008	85	2.869	993	91	3.240
----Computer users	638	1,038	46	2.970	1,062	77	4.314	1,050	83	4.596
Respondent's literate environment at community level (Total)	2,492	983	126	3.220	999	132	3.374	996	106	3.062
----High density	1,534	990	119	4.294	1,007	126	4.616	1,009	107	3.996
----Low density	958	966	142	4.860	983	144	4.727	970	108	4.469

Employment status (Total)	2,492	982	126	2.955	998	133	3.067	996	107	3.102
----Employed in a high-skill job	337	1,015	95	6.027	1,040	104	6.036	1,046	95	6.452
----Employed in a low-skill job	2,132	975	133	3.920	989	138	3.986	985	107	3.219
----Not working	16	1,018	117	33.055	1,030	72	24.373	1,006	50	17.574
Literacy self-report - reading (Total)	2,492	983	127	3.043	998	133	3.378	996	107	3.005
----Easily	2,118	1,011	75	2.270	1,028	84	2.752	1,015	89	2.858
----Difficulty or Not at all	357	639	103	10.162	654	108	9.527	697	87	7.031
Literacy self-report - computation (Total)	2,492	983	127	3.096	999	134	3.545	997	107	3.130
----Easily	2,071	1,011	78	2.308	1,028	86	2.655	1,016	90	2.749
----Difficulty or Not at all	413	740	186	14.972	754	189	14.747	795	132	11.365
Educational attainment (Total)	2,492	982	126	3.505	998	133	3.607	996	107	3.313
----Primary (ISCED 1) or less	823	865	183	8.144	884	186	7.870	899	133	6.381
----Secondary (ISCED 2 or 3)	1,074	1,015	57	2.489	1,023	72	3.314	1,004	78	3.366
----Post-secondary (ISCED 4 to 6)	577	1,043	47	3.073	1,066	78	4.710	1,064	87	5.081

Annex 4. Mongolia: Summary of sample sizes, means, standard deviations and standard errors of means

		LAMP Prose Reading Scaled Scores			LAMP Document Reading Scaled Scores			LAMP Numeracy Scaled Scores		
Variable	**n**	**Mean**	**SD**	**SE**	**Mean**	**SD**	**SE**	**Mean**	**SD**	**SE**
Gender (Total)	4,000	994	99	2.492	995	93	2.482	1,017	93	2.110
----Male	1,701	986	100	3.691	993	91	3.325	1,018	93	3.184
----Female	2,299	1,001	98	2.722	998	94	2.511	1,017	91	2.594
Age (Total)	4,000	994	99	2.492	995	93	2.482	1,017	93	2.110
----15-24	788	1,008	81	4.004	1,014	80	3.762	1,019	83	3.461
----25-39	1,516	1,000	103	4.529	999	87	3.311	1,027	92	3.501
----40-64	1,419	987	96	3.355	987	93	3.531	1,011	103	3.675
----65+	277	923	130	10.401	936	106	8.363	950	130	11.576
Location (Total)	4,000	994	99	2.492	995	93	2.482	1,017	93	2.110
----Urban	1,926	1,013	90	2.872	1,012	84	2.586	1,035	85	2.544
----Rural	2,074	957	108	3.467	959	102	3.350	983	97	3.203
Mother tongue (Total)	4,000	994	99	2.253	995	92	2.142	1,017	93	2.084
----MT is language of assessment only	3,752	991	99	2.416	991	92	2.273	1,015	93	2.114
----MT is other than assessment language only	2	971	50	85.569	990	3	5.999	998	38	65.200
----MT is language of assessment and other	211	1,049	72	7.607	1,052	76	7.471	1,060	66	7.566
SES (Total)	4,000	994	99	2.492	995	93	2.482	1,017	93	2.110
----High SES	733	1,046	73	3.536	1,050	79	3.981	1,071	74	3.407
----Medium high SES	1,213	1,000	84	4.456	996	75	3.817	1,020	82	3.943
----Medium low SES	995	990	89	4.806	993	86	4.861	1,016	84	4.434
----Low SES	1,059	920	116	5.645	928	101	5.015	948	93	4.222
Respondent's literate practices (Total)	4,000	994	99	2.725	995	93	2.502	1,017	92	2.225
----Broadcast media consumers	1,510	933	113	3.897	937	100	3.593	962	95	3.237
----Mobile phone users	1,497	998	71	2.888	1,000	71	3.253	1,021	79	3.215
----Computer users	991	1,049	71	3.738	1,045	70	3.425	1,067	75	3.286
Respondent's literate environment at community level	4,000	993	98	3.341	994	92	3.178	1,017	92	2.813
----High density	1,780	1,010	99	3.936	1,010	88	3.384	1,029	88	3.253
----Low density	1,930	974	103	4.052	977	95	4.139	1,003	97	4.003
Employment status (Total)	4,000	994	99	2.401	995	93	2.342	1,017	93	2.140
----Employed in a high-skill job	875	1,043	70	3.430	1,041	72	3.833	1,069	72	3.504
----Employed in a low-skill job	883	971	103	5.560	973	88	4.876	1,000	96	4.709
----Not working	2,239	982	101	3.149	985	94	2.842	1,003	90	2.678

Literacy self-report - reading (Total)	4,000	994	98	2.304	995	92	2.053	1,017	92	1.914
----Easily	3,870	1,002	88	2.096	1,002	83	1.899	1,024	87	2.017
----Difficulty or Not at all	125	731	143	21.212	763	135	17.582	799	106	15.524
Literacy self-report - computation (Total)	4,000	994	97	2.566	995	92	2.278	1,017	91	2.156
----Easily	3,353	1,007	85	2.295	1,005	80	2.102	1,028	85	2.199
----Difficulty or Not at all	641	922	136	8.001	937	133	7.546	958	111	6.638
Educational attainment (Total)	4,000	993	99	2.577	995	93	2.460	1,017	91	2.153
----Primary (ISCED 1) or less	432	846	143	9.828	858	135	9.740	886	117	7.890
----Secondary (ISCED 2 or 3)	2,050	987	77	2.555	988	69	2.424	1,009	78	2.636
----Post-secondary (ISCED 4 to 6)	1,517	1,039	72	2.954	1,036	74	2.983	1,060	76	2.652

Annex 5. Palestine: Summary of sample sizes, means, standard deviations and standard errors of means

		LAMP Prose Reading Scaled Scores			LAMP Document Reading Scaled Scores			LAMP Numeracy Scaled Scores		
Variable	**n**	**Mean**	**SD**	**SE**	**Mean**	**SD**	**SE**	**Mean**	**SD**	**SE**
Gender (Total)	3,585	992	153	5.344	985	143	4.919	968	106	3.613
----Male	1,681	1,000	147	5.095	997	140	4.777	995	107	3.518
----Female	1,904	986	159	7.311	973	144	6.450	943	101	4.247
Age (Total)	3,585	992	155	5.720	985	144	5.142	968	107	3.711
----15-24	1,031	1,016	112	6.253	1,020	108	6.605	976	82	4.445
----25-39	1,284	1,018	127	5.371	1,001	117	5.248	978	95	4.235
----40-64	928	965	180	9.634	955	158	8.311	964	132	6.902
----65+	339	769	215	16.503	769	197	15.124	786	190	13.483
Location (Total)	3,585	992	153	0.028	985	143	4.919	968	106	0.019
----Urban	2,309	995	150	0.035	988	142	6.418	971	105	0.023
----Rural	1,276	981	161	0.050	977	146	8.007	961	112	0.042
Mother tongue (Total)	3,585	992	154	5.388	985	143	5.000	968	107	3.655
----MT is language of assessment only	3,093	980	157	5.654	974	146	5.338	960	108	3.941
----MT is other than assessment language only	3	1,099	99	130.830	1,339	197	220.030	1,065	50	69.059
----MT is language of assessment and other	482	1,071	91	7.721	1,059	93	9.989	1,025	82	7.846
Socio-economic status (Total)	3,585	992	153	5.344	985	143	4.919	968	106	3.613
----High SES	744	1,046	104	5.084	1,036	102	5.989	1,011	88	4.721
----Medium high SES	1,105	1,023	129	6.295	1,018	121	6.291	996	90	4.104
----Medium low SES	1,051	953	169	9.724	943	148	8.199	932	101	6.125
----Low SES	685	891	201	12.370	888	184	11.805	896	133	7.890
Literacy practices (Total)	3,585	992	154	5.514	985	142	4.986	968	107	3.650
----Broadcast media consumers	618	722	187	11.817	724	156	9.815	749	132	8.791
----Mobile phone users	1,748	1,005	110	4.941	993	95	4.175	965	89	3.490
----Computer users	1,215	1,060	85	4.833	1,055	90	5.043	1,021	80	4.568
Literate environment at community level (Total)	3,585	992	153	5.344	985	143	4.919	968	106	3.613
----High density	1,278	1,000	148	8.563	994	138	7.997	973	122	7.163
----Low density	2,307	988	155	7.538	980	144	6.580	964	103	4.477
Employment (Total)	3,585	992	153	5.344	985	143	4.919	968	106	3.613
----Employed in a high-skill job	594	1,053	102	6.389	1,045	102	6.091	1,040	95	6.151
----Employed in a low-skill job	411	985	155	10.860	971	137	10.420	969	111	10.610
----Not working	2,580	979	158	5.582	972	147	5.226	949	102	3.508

Literacy self-report - reading (Total)	3,585	992	155	5.720	985	144	5.142	968	107	3.711
----Can read easily	2,986	1,034	94	3.144	1,023	92	3.161	992	87	2.993
----Read with difficulty or not at all	596	661	120	8.720	680	116	8.873	697	93	7.026
Literacy self-report - computation (Total)	3,585	992	153	5.344	985	143	4.919	968	106	3.613
----Can compute easily	2,791	1,031	103	3.756	1,023	100	3.318	995	90	3.225
----Compute with difficulty or not at all	794	833	212	15.797	831	186	13.632	843	113	7.683
Educational attainment (Total)	3,585	992	153	5.512	985	142	5.122	968	107	3.728
----Primary (ISCED 1) or less	398	642	109	8.260	664	116	10.083	715	81	7.292
----Secondary (ISCED 2 or 3)	2,348	994	126	4.507	985	114	3.868	960	91	2.942
----Post-secondary (ISCED 4 to 6)	837	1,079	84	3.784	1,072	86	3.999	1,044	81	4.501

Annex 6. Paraguay: Summary of sample sizes, means, standard deviations and standard errors of means

		LAMP Prose Reading Scaled Scores			LAMP Document Reading Scaled Scores			LAMP Numeracy Scaled Scores		
Variable	**n**	**Mean**	**SD**	**SE**	**Mean**	**SD**	**SE**	**Mean**	**SD**	**SE**
Gender (Total)	3,966	970	135	7.752	977	119	7.307	998	106	6.667
----Male	1,636	964	136	8.990	985	125	8.109	1,014	110	7.230
----Female	2,330	979	131	7.282	972	114	6.868	984	103	6.967
Age (Total)	3,966	970	135	7.752	977	119	7.307	998	106	6.667
----15-24	1,052	995	96	7.606	998	90	7.069	1,003	89	5.860
----25-39	1,244	1,000	113	9.727	1,005	105	9.812	1,017	102	9.898
----40-64	1,247	940	157	11.105	950	131	9.021	986	118	7.929
----65+	423	877	179	16.292	891	171	14.869	935	139	12.428
Location (Total)	3,966	970	135	7.752	977	119	7.307	998	106	6.667
----Urban	2,090	1,004	114	11.301	1,011	109	10.816	1,026	97	9.702
----Rural	1,876	925	146	7.116	932	122	5.295	959	105	7.115
Mother tongue (Total)	3,966	970	134	7.471	978	119	6.818	997	107	6.719
----MT is language of assessment only	908	1,026	77	8.376	1,035	87	8.842	1,041	94	8.061
----MT is other than assessment language only	1,720	925	151	9.047	932	131	6.711	962	116	7.157
----MT is language of assessment and other	1,332	1,004	106	9.563	1,009	96	10.809	1,019	89	9.364
Socio-economic status (Total)	3,966	970	135	7.752	977	119	7.307	998	106	6.667
----High SES	1,127	1,045	78	6.103	1,060	90	9.115	1,071	86	6.395
----Medium high SES	371	970	125	15.448	970	109	14.564	995	87	10.403
----Medium low SES	1,332	980	113	8.946	985	93	5.273	998	90	5.194
----Low SES	1,136	891	156	12.858	898	128	7.858	929	112	8.638
Literacy practices (Total)	3,966	971	135	7.285	978	120	6.755	998	107	6.586
----Broadcast media consumers	1,013	818	162	12.937	842	148	10.014	882	110	7.958
----Mobile phone users	1,758	990	81	6.042	985	66	4.400	1,003	81	5.923
----Computer users	1,194	1,051	82	5.839	1,061	88	8.565	1,069	86	6.350
Literate environment at community level (Total)	3,966	971	135	7.970	978	120	7.161	998	108	6.580
----High density	2,138	1,008	114	6.525	1,015	108	8.429	1,031	97	7.792
----Low density	1,810	931	141	9.035	938	117	5.508	962	102	6.272

Employment (Total)	3,966	970	133	7.688	978	118	6.977	997	106	6.636
----Employed in a high-skill job	1,153	1,029	101	9.616	1,039	98	9.318	1,059	85	6.812
----Employed in a low-skill job	1,137	921	141	11.193	940	119	6.690	964	111	7.010
----Not working	1,669	969	132	7.392	965	118	7.338	979	101	7.324
Literacy self-report - reading (Total)	3,966	970	134	7.471	978	119	6.818	997	107	6.719
----Can read easily	3,369	1,005	94	5.086	1,007	85	5.433	1,020	90	5.270
----Read with difficulty or not at all	591	734	158	11.444	770	148	9.615	818	111	9.066
Literacy self-report - computation (Total)	3,966	971	135	7.285	978	120	6.755	998	107	6.586
----Can compute easily	3,277	1,000	100	6.122	1,005	88	5.682	1,019	91	5.685
----Compute with difficulty or not at all	688	793	176	11.154	812	167	11.888	855	117	9.038
Educational attainment (Total)	3,966	970	133	7.688	978	118	6.977	997	106	6.636
----Primary (ISCED 1) or less	1,612	865	151	10.779	882	129	6.824	917	105	7.398
----Secondary (ISCED 2 or 3)	1,540	1,014	67	3.136	1,008	62	3.532	1,021	80	5.936
----Post-secondary (ISCED 4 to 6)	807	1,062	74	5.717	1,075	83	7.804	1,081	70	4.071

Annex 7. Jordan: Percentage of respondents at each LAMP Prose Reading level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	2,492	19.8	49.0	31.2	80.2
----Male	898	18.9	47.8	33.4	81.1
----Female	1,594	21.1	48.0	30.8	78.9
Age (Total)	2,492	19.8	49.0	31.2	80.2
----15-24	579	12.5	60.2	27.2	87.5
----25-39	944	12.4	53.6	34.0	87.6
----40-64	714	28.7	41.2	30.0	71.3
----65+	255	67.8	10.7	21.5	32.2
Location (Total)	2,492	19.8	49.0	31.2	80.2
----Urban	1,870	19.8	44.0	36.2	80.2
----Rural	622	22.8	61.1	16.1	77.2
Mother tongue (Total)	2,492	18.8	49.1	32.1	81.2
----MT is language of assessment only	2,458	19.7	47.9	32.3	80.3
----MT is other than assessment language only	6	32.4	32.5	35.0	67.6
----MT is language of assessment and other	8	27.0	5.7	67.3	73.0
SES (Total)	2,492	19.8	49.0	31.2	80.2
----High SES	352	14.4	33.1	52.5	85.6
----Medium high SES	559	13.6	50.2	36.2	86.4
----Medium low SES	593	31.5	40.7	27.9	68.5
----Low SES	988	21.0	65.7	13.4	79.0
Respondent's literate practices (Total)	2,492	19.6	49.7	30.8	80.4
----Broadcast media consumers	508	68.7	30.7	0.6	31.3
----Mobile phone users	1,334	19.3	59.6	21.1	80.7
----Computer users	638	5.7	50.3	44.0	94.3
Respondent's literate environment at community level (Total)	2,492	19.8	49.0	31.2	80.2
----High density	1,534	20.2	43.3	36.5	79.8
----Low density	958	19.0	57.7	23.3	81.0
Employment status (Total)	2,492	19.4	48.9	31.7	80.6
----Employed in a high-skill job	337	7.8	47.1	45.1	92.2
----Employed in a low-skill job	2,132	22.3	49.5	28.2	77.7
----Not working	16	10.7	82.4	6.9	89.3

Literacy self-report - reading (Total)	2,492	19.5	48.2	32.3	80.5
----Easily	2,118	14.1	53.0	32.9	85.9
----Difficulty or Not at all	357	97.0	3.0	0.0	3.0
Literacy self-report - computation (Total)	2,492	19.6	48.6	31.8	80.4
----Easily	2,071	14.0	51.1	34.9	86.0
----Difficulty or Not at all	413	72.4	27.6	0.0	27.6
Educational attainment (Total)	2,492	19.2	49.6	31.2	80.8
----Primary (ISCED 1) or less	823	55.5	44.2	0.3	44.5
----Secondary (ISCED 2 or 3)	1,074	12.3	58.6	29.0	87.7
----Post-secondary (ISCED 4 to 6)	577	3.4	46.2	50.3	96.6

Annex 8. Jordan: Percentage of respondents at each LAMP Document Reading level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At and above cut 1
Gender (Total)	2,492	15.4	46.7	37.9	84.6
----Male	898	10.6	43.2	46.2	89.4
----Female	1,594	19.9	47.6	32.5	80.1
Age (Total)	2,492	15.4	46.7	37.9	84.6
----15-24	579	7.8	52.7	39.5	92.2
----25-39	944	12.2	50.6	37.2	87.8
----40-64	714	22.1	41.5	36.4	77.9
----65+	255	55.7	35.1	9.3	44.3
Location (Total)	2,492	15.4	46.7	37.9	84.6
----Urban	1,870	15.9	44.0	40.1	84.1
----Rural	622	19.2	51.9	29.0	80.8
Mother tongue (Total)	2,492	15.2	46.5	38.2	84.8
----MT is language of assessment only	2,458	15.2	45.0	39.8	84.8
----MT is other than assessment language only	6	30.5	34.5	35.0	69.5
----MT is language of assessment and other	8	19.0	19.8	61.2	81.0
SES (Total)	2,492	15.4	46.7	37.9	84.6
----High SES	352	7.9	39.1	53.0	92.1
----Medium high SES	559	9.4	46.5	44.1	90.6
----Medium low SES	593	29.7	50.7	19.6	70.3
----Low SES	988	18.4	50.1	31.4	81.6
Respondent's literate practices (Total)	2,492	15.3	47.3	37.3	84.7
----Broadcast media consumers	508	63.7	32.2	4.1	36.3
----Mobile phone users	1,334	12.5	60.8	26.8	87.5
----Computer users	638	4.7	34.8	60.5	95.3
Respondent's literate environment at community level (Total)	2,492	15.4	46.7	37.9	84.6
----High density	1,534	15.3	45.0	39.7	84.7
----Low density	958	15.2	51.1	33.6	84.8
Employment status (Total)	2,492	15.2	47.2	37.6	84.8
----Employed in a high-skill job	337	7.5	39.1	53.4	92.5
----Employed in a low-skill job	2,132	17.6	47.4	35.0	82.4
----Not working	16	14.5	31.9	53.7	85.5

Literacy self-report - reading (Total)	2,492	15.3	46.7	37.9	84.7
----Easily	2,118	9.4	51.6	39.0	90.6
----Difficulty or Not at all	357	92.6	7.4	0.0	7.4
Literacy self-report - computation (Total)	2,492	15.3	46.8	37.9	84.7
----Easily	2,071	9.3	51.1	39.6	90.7
----Difficulty or Not at all	413	73.6	23.7	2.7	26.4
Educational attainment (Total)	2,492	15.3	46.9	37.8	84.7
----Primary (ISCED 1) or less	823	39.2	49.9	10.9	60.8
----Secondary (ISCED 2 or 3)	1,074	11.1	56.0	32.9	88.9
----Post-secondary (ISCED 4 to 6)	577	2.9	37.4	59.7	97.1

Annex 9. Jordan: Percentage of respondents at each LAMP Numeracy level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	2,492	25.4	44.6	30.0	74.6
----Male	898	17.2	43.8	39.0	82.8
----Female	1,594	34.1	45.4	20.5	65.9
Age (Total)	2,492	25.4	44.6	30.0	74.6
----15-24	579	26.5	44.9	28.7	73.5
----25-39	944	20.9	50.0	29.2	79.1
----40-64	714	29.2	37.4	33.5	70.8
----65+	255	52.9	25.3	21.8	47.1
Location (Total)	2,492	25.4	44.6	30.0	74.6
----Urban	1,870	23.2	44.2	32.6	76.8
----Rural	622	34.6	48.5	16.8	65.4
Mother tongue (Total)	2,492	25.5	44.1	30.4	74.5
----MT is language of assessment only	2,458	25.4	44.4	30.2	74.6
----MT is other than assessment language only	6	20.6	44.4	35.0	79.4
----MT is language of assessment and other	8	9.4	41.8	48.9	90.6
SES (Total)	2,492	25.4	44.6	30.0	74.6
----High SES	352	11.1	33.0	55.9	88.9
----Medium high SES	559	18.7	46.8	34.5	81.3
----Medium low SES	593	31.7	41.6	26.7	68.3
----Low SES	988	35.2	48.0	16.7	64.8
Respondent's literate practices (Total)	2,492	25.7	44.6	29.7	74.3
----Broadcast media consumers	508	66.4	22.9	10.7	33.6
----Mobile phone users	1,334	29.2	47.7	23.1	70.8
----Computer users	638	10.8	40.9	48.4	89.2
Respondent's literate environment at community level (Total)	2,492	25.4	44.6	30.0	74.6
----High density	1,534	22.2	42.3	35.5	77.8
----Low density	958	34.5	47.6	18.0	65.5
Employment status (Total)	2,492	25.4	45.1	29.5	74.6
----Employed in a high-skill job	337	13.2	42.2	44.5	86.8
----Employed in a low-skill job	2,132	28.3	45.2	26.5	71.7
----Not working	16	0.0	62.4	37.6	100.0

Literacy self-report - reading (Total)	2,492	25.3	45.5	29.2	74.7
----Easily	2,118	19.7	47.9	32.4	80.3
----Difficulty or Not at all	357	96.4	2.7	0.9	3.6
Literacy self-report - computation (Total)	2,492	25.5	44.1	30.4	74.5
----Easily	2,071	19.9	46.5	33.6	80.1
----Difficulty or Not at all	413	79.7	14.9	5.4	20.3
Educational attainment (Total)	2,492	25.9	44.6	29.5	74.1
----Primary (ISCED 1) or less	823	54.9	35.9	9.1	45.1
----Secondary (ISCED 2 or 3)	1,074	23.4	50.4	26.1	76.6
----Post-secondary (ISCED 4 to 6)	577	5.3	40.7	54.0	94.7

Annex 10. Mongolia: Percentage of respondents at each LAMP Prose Reading level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	4,000	26.3	48.1	25.6	73.7
----Male	1,701	29.7	46.7	23.7	70.3
----Female	2,299	24.5	45.9	29.7	75.5
Age (Total)	4,000	26.3	48.1	25.6	73.7
----15-24	788	20.8	55.1	24.2	79.2
----25-39	1,516	25.6	48.5	25.8	74.4
----40-64	1,419	29.7	41.7	28.6	70.3
----65+	277	47.7	36.3	16.0	52.3
Location	4,000	26.3	48.1	25.6	73.7
----Urban	1,926	22.2	43.0	34.8	77.8
----Rural	2,074	38.0	50.9	11.1	62.0
Mother tongue (Total)	4,000	26.9	47.3	25.8	73.1
----MT is language of assessment only	3,752	27.8	47.1	25.1	72.2
----MT is other than assessment language only	2	33.2	56.6	10.3	66.8
----MT is language of assessment and other	211	9.1	46.1	44.9	90.9
SES (Total)	4,000	26.3	48.1	25.6	73.7
----High SES	733	7.4	42.6	50.0	92.6
----Medium high SES	1,213	24.8	54.1	21.0	75.2
----Medium low SES	995	28.7	48.1	23.2	71.3
----Low SES	1,059	53.9	40.5	5.6	46.1
Respondent's literate practices (Total)	4,000	26.3	47.8	26.0	73.7
----Broadcast media consumers	1,510	49.4	39.6	11.0	50.6
----Mobile phone users	1,497	24.9	53.7	21.4	75.1
----Computer users	991	7.0	47.7	45.2	93.0
Respondent's literate environment at community level (Total)	4,000	26.8	47.3	25.9	73.2
----High density	1,780	24.4	42.6	33.0	75.6
----Low density	1,930	29.5	53.6	16.9	70.5
Employment status (Total)	4,000	26.8	47.5	25.7	73.2
----Employed in a high-skill job	875	8.6	47.2	44.3	91.4
----Employed in a low-skill job	883	35.1	44.8	20.1	64.9
----Not working	2,239	31.6	48.2	20.2	68.4
Literacy self-report - reading (Total)	4,000	26.5	47.7	25.8	73.5
----Easily	3,870	24.2	48.8	26.9	75.8
----Difficulty or Not at all	125	94.1	5.4	0.5	5.9

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Literacy self-report - computation (Total)	4,000	26.8	47.7	25.5	73.2
----Easily	3,353	21.4	50.2	28.3	78.6
----Difficulty or Not at all	641	55.0	36.3	8.7	45.0
Educational attainment (Total)	4,000	26.1	48.1	25.7	73.9
----Primary (ISCED 1) or less	432	80.9	19.1	0.0	19.1
----Secondary (ISCED 2 or 3)	2,050	26.3	54.9	18.8	73.7
----Post-secondary (ISCED 4 to 6)	1,517	12.3	44.1	43.6	87.7

Annex 11. Mongolia: Percentage of respondents at each LAMP Document Reading level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	4,000	25.5	51.0	23.5	74.5
----Male	1,701	27.5	49.4	23.1	72.5
----Female	2,299	24.6	50.4	25.1	75.4
Age (Total)	4,000	25.5	51.0	23.5	74.5
----15-24	788	18.7	49.1	32.2	81.3
----25-39	1,516	25.2	49.9	24.9	74.8
----40-64	1,419	28.8	51.4	19.9	71.2
----65+	277	46.6	35.0	18.5	53.4
Location (Total)	4,000	25.5	51.0	23.5	74.5
----Urban	1,926	19.7	49.4	30.9	80.3
----Rural	2,074	38.7	48.9	12.4	61.3
Mother tongue (Total)	4,000	25.8	50.8	23.4	74.2
----MT is language of assessment only	3,752	26.2	51.9	21.9	73.8
----MT is other than assessment language only	2	0.0	100.0	0.0	100.0
----MT is language of assessment and other	211	10.2	40.4	49.5	89.8
SES (Total)	4,000	25.5	51.0	23.5	74.5
----High SES	733	7.7	43.6	48.6	92.3
----Medium high SES	1,213	23.4	52.5	24.1	76.6
----Medium low SES	995	24.3	56.2	19.4	75.7
----Low SES	1,059	53.7	42.7	3.6	46.3
Respondent's literate practices (Total)	4,000	25.3	51.3	23.4	74.7
----Broadcast media consumers	1,510	48.6	45.6	5.8	51.4
----Mobile phone users	1,497	22.4	57.1	20.4	77.6
----Computer users	991	7.6	44.4	48.0	92.4
Respondent's literate environment at community level (Total)	4,000	26.0	50.5	23.5	74.0
----High density	1,780	21.3	47.6	31.1	78.7
----Low density	1,930	31.6	53.0	15.5	68.4
Employment status (Total)	4,000	25.6	50.9	23.5	74.4
----Employed in a high-skill job	875	7.6	47.6	44.8	92.4
----Employed in a low-skill job	883	37.0	49.1	13.9	63.0
----Not working	2,239	27.6	52.5	19.9	72.4
Literacy self-report - reading (Total)	4,000	25.6	50.8	23.6	74.4
----Easily	3,870	22.9	51.7	25.4	77.1
----Difficulty or Not at all	125	97.8	2.2	0.0	2.2

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Literacy self-report - computation (Total)	4,000	25.4	51.2	23.3	74.6
----Easily	3,353	21.1	53.2	25.7	78.9
----Difficulty or Not at all	641	49.2	34.1	16.7	50.8
Educational attainment (Total)	4,000	25.4	51.1	23.5	74.6
----Primary (ISCED 1) or less	432	75.1	24.0	0.8	24.9
----Secondary (ISCED 2 or 3)	2,050	26.8	56.3	16.9	73.2
----Post-secondary (ISCED 4 to 6)	1,517	11.2	45.9	42.9	88.8

Annex 12. Mongolia: Percentage of respondents at each LAMP Numeracy level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	4,000	17.1	45.0	37.9	82.9
----Male	1,701	16.9	45.8	37.3	83.1
----Female	2,299	17.4	43.3	39.3	82.6
Age (Total)	4,000	17.1	45.0	37.9	82.9
----15-24	788	17.0	43.9	39.1	83.0
----25-39	1,516	14.3	43.2	42.4	85.7
----40-64	1,419	20.3	44.5	35.1	79.7
----65+	277	35.2	38.1	26.7	64.8
Location (Total)	4,000	17.1	45.0	37.9	82.9
----Urban	1,926	10.8	44.2	45.0	89.2
----Rural	2,074	29.2	47.7	23.1	70.8
Mother tongue (Total)	4,000	17.3	44.6	38.1	82.7
----MT is language of assessment only	3,752	17.6	45.9	36.5	82.4
----MT is other than assessment language only	2	0.0	86.3	13.7	100.0
----MT is language of assessment and other	211	2.9	41.0	56.1	97.1
SES (Total)	4,000	17.1	45.0	37.9	82.9
----High SES	733	1.8	35.2	62.9	98.2
----Medium high SES	1,213	14.2	50.3	35.5	85.8
----Medium low SES	995	17.7	44.0	38.3	82.3
----Low SES	1,059	41.9	46.5	11.7	58.1
Respondent's literate practices (Total)	4,000	17.1	44.7	38.2	82.9
----Broadcast media consumers	1,510	36.3	47.5	16.2	63.7
----Mobile phone users	1,497	12.9	52.1	35.0	87.1
----Computer users	991	3.9	34.4	61.7	96.1
Respondent's literate environment at community level (Total)	4,000	17.2	45.4	37.4	82.8
----High density	1,780	13.6	44.3	42.1	86.4
----Low density	1,930	22.5	45.7	31.9	77.5
Employment status (Total)	4,000	17.3	45.2	37.5	82.7
----Employed in a high-skill job	875	3.7	36.6	59.6	96.3
----Employed in a low-skill job	883	21.3	46.6	32.1	78.7
----Not working	2,239	22.0	46.8	31.2	78.0
Literacy self-report - reading (Total)	4,000	16.8	45.5	37.8	83.2
----Easily	3,870	15.1	45.0	39.9	84.9
----Difficulty or Not at all	125	82.6	15.8	1.6	17.4

Literacy self-report - computation (Total)	4,000	17.2	44.8	38.0	82.8
----Easily	3,353	13.2	46.7	40.1	86.8
----Difficulty or Not at all	641	40.1	35.7	24.3	59.9
Educational attainment (Total)	4,000	16.8	45.7	37.5	83.2
----Primary (ISCED 1) or less	432	64.7	33.0	2.3	35.3
----Secondary (ISCED 2 or 3)	2,050	17.1	53.2	29.7	82.9
----Post-secondary (ISCED 4 to 6)	1,517	5.8	38.6	55.6	94.2

Annex 13. Palestine: Percentage of respondents at each LAMP Prose Reading level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	3,585	25.9	40.8	33.3	74.1
----Male	1,681	26.3	42.1	31.7	73.7
----Female	1,904	26.3	38.4	35.3	73.7
Age (Total)	3,585	26.2	40.6	33.2	73.8
----15-24	1,031	17.2	49.4	33.4	82.8
----25-39	1,284	18.5	43.9	37.6	81.5
----40-64	928	38.6	33.0	28.3	61.4
----65+	339	73.3	13.1	13.7	26.7
Location (Total)	3,585	25.9	40.8	33.3	74.1
----Urban	2,309	23.0	42.9	34.0	77.0
----Rural	1,276	31.2	38.5	30.3	68.8
Mother tongue (Total)	3,585	26.2	40.7	33.0	73.8
----MT is language of assessment only	3,093	28.8	41.2	30.0	71.2
----MT is other than assessment language only	3	8.9	14.1	77.0	91.1
----MT is language of assessment and other	482	7.1	39.8	53.1	92.9
Socio-economic status (Total)	3,585	25.9	40.8	33.3	74.1
----High SES	744	11.5	40.8	47.7	88.5
----Medium high SES	1,105	19.3	43.0	37.7	80.7
----Medium low SES	1,051	35.5	38.8	25.6	64.5
----Low SES	685	50.9	35.6	13.5	49.1
Literacy practices (Total)	3,585	26.1	41.1	32.8	73.9
----Broadcast media consumers	618	82.2	9.5	8.3	17.8
----Mobile phone users	1,748	27.3	44.8	27.9	72.7
----Computer users	1,215	8.7	42.7	48.6	91.3
Literate environment at community level (Total)	3,585	25.9	40.8	33.3	74.1
----High density	1,278	19.2	42.9	37.9	80.8
----Low density	2,307	30.2	40.8	29.0	69.8
Employment (Total)	3,585	25.9	40.8	33.3	74.1
----Employed in a high-skill job	594	12.2	44.2	43.6	87.8
----Employed in a low-skill job	411	33.0	41.0	26.0	67.0
----Not working	2,580	28.1	40.1	31.8	71.9
Literacy self-report - reading (Total)	3,585	26.2	40.6	33.2	73.8
----Can read easily	2,986	16.6	47.3	36.1	83.4
----Read with difficulty or not at all	596	96.6	3.4	0.0	3.4

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Literacy self-report - computation (Total)	3,585	25.9	40.8	33.3	74.1
----Can compute easily	2,791	16.8	46.1	37.1	83.2
----Compute with difficulty or not at all	794	61.7	25.2	13.1	38.3
Educational attainment (Total)	3,585	25.7	42.1	32.3	74.3
----Primary (ISCED 1) or less	398	96.0	3.3	0.7	4.0
----Secondary (ISCED 2 or 3)	2,348	27.5	45.2	27.4	72.5
----Post-secondary (ISCED 4 to 6)	837	2.6	40.4	57.1	97.4

Annex 14. Palestine: Percentage of respondents at each LAMP Document Reading level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	3,585	35.3	35.4	29.3	64.7
----Male	1,681	30.6	38.1	31.3	69.4
----Female	1,904	38.8	33.6	27.6	61.2
Age (Total)	3,585	36.0	34.0	30.0	64.0
----15-24	1,031	21.6	42.7	35.7	78.4
----25-39	1,284	33.6	36.7	29.7	66.4
----40-64	928	48.0	24.0	27.9	52.0
----65+	339	76.3	16.1	7.6	23.7
Location (Total)	3,585	35.3	35.4	29.3	64.7
----Urban	2,309	32.8	36.1	31.1	67.2
----Rural	1,276	40.6	32.8	26.6	59.4
Mother tongue (Total)	3,585	35.4	35.0	29.7	64.6
----MT is language of assessment only	3,093	39.3	32.5	28.2	60.7
----MT is other than assessment language only	3	0.0	14.3	85.7	100.0
----MT is language of assessment and other	482	8.7	44.1	47.2	91.3
Socio-economic status (Total)	3,585	35.3	35.4	29.3	64.7
----High SES	744	17.2	34.2	48.6	82.8
----Medium high SES	1,105	25.4	41.6	33.0	74.6
----Medium low SES	1,051	51.1	27.1	21.8	48.9
----Low SES	685	59.1	24.9	16.0	40.9
Literacy practices (Total)	3,585	35.3	35.2	29.4	64.7
----Broadcast media consumers	618	88.8	6.8	4.4	11.2
----Mobile phone users	1,748	35.6	38.8	25.6	64.4
----Computer users	1,215	10.2	41.4	48.4	89.8
Literate environment at community level (Total)	3,585	35.3	35.4	29.3	64.7
----High density	1,278	33.0	38.0	29.0	67.0
----Low density	2,307	36.5	34.4	29.0	63.5
Employment (Total)	3,585	35.3	35.4	29.3	64.7
----Employed in a high-skill job	594	14.5	38.5	47.0	85.5
----Employed in a low-skill job	411	39.9	41.7	18.5	60.1
----Not working	2,580	38.8	33.5	27.7	61.2
Literacy self-report - reading (Total)	3,585	36.0	34.0	30.0	64.0
----Can read easily	2,986	23.6	39.0	37.4	76.4
----Read with difficulty or not at all	596	96.3	3.7	0.0	3.7

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Literacy self-report - computation (Total)	3,585	35.3	35.4	29.3	64.7
----Can compute easily	2,791	23.9	38.2	37.9	76.1
----Compute with difficulty or not at all	794	69.4	24.4	6.2	30.6
Educational attainment (Total)	3,585	35.4	35.5	29.1	64.6
----Primary (ISCED 1) or less	398	96.9	2.2	0.9	3.1
----Secondary (ISCED 2 or 3)	2,348	38.6	37.6	23.8	61.4
----Post-secondary (ISCED 4 to 6)	837	6.1	32.6	61.4	93.9

Annex 15. Palestine: Percentage of respondents at each LAMP Numeracy level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	3,585	36.1	42.1	21.8	63.9
----Male	1,681	26.2	43.8	30.1	73.8
----Female	1,904	46.0	40.4	13.6	54.0
Age (Total)	3,585	36.0	41.9	22.1	64.0
----15-24	1,031	33.5	48.7	17.8	66.5
----25-39	1,284	34.7	43.0	22.2	65.3
----40-64	928	38.5	35.2	26.3	61.5
----65+	339	68.0	23.8	8.2	32.0
Location (Total)	3,585	36.1	42.1	21.8	63.9
----Urban	2,309	34.8	43.6	21.6	65.2
----Rural	1,276	39.3	41.0	19.7	60.7
Mother tongue (Total)	3,585	36.3	41.6	22.1	63.7
----MT is language of assessment only	3,093	38.4	41.9	19.6	61.6
----MT is other than assessment language only	3	0.0	18.9	81.1	100.0
----MT is language of assessment and other	482	18.0	45.4	36.6	82.0
Socio-economic status (Total)	3,585	36.1	42.1	21.8	63.9
----High SES	744	21.0	46.9	32.2	79.0
----Medium high SES	1,105	27.0	47.5	25.4	73.0
----Medium low SES	1,051	51.0	36.1	13.0	49.0
----Low SES	685	56.7	28.4	14.9	43.3
Literacy practices (Total)	3,585	36.2	42.2	21.6	63.8
----Broadcast media consumers	618	83.4	15.2	1.4	16.6
----Mobile phone users	1,748	38.7	44.8	16.5	61.3
----Computer users	1,215	17.1	49.1	33.8	82.9
Literate environment at community level (Total)	3,585	36.1	42.1	21.8	63.9
----High density	1,278	32.7	38.8	28.5	67.3
----Low density	2,307	39.8	40.4	19.8	60.2
Employment (Total)	3,585	36.1	42.1	21.8	63.9
----Employed in a high-skill job	594	14.6	41.0	44.5	85.4
----Employed in a low-skill job	411	38.6	39.2	22.2	61.4
----Not working	2,580	42.2	41.9	15.9	57.8
Literacy self-report - reading (Total)	3,585	36.0	41.9	22.1	64.0
----Can read easily	2,986	28.7	46.6	24.7	71.3
----Read with difficulty or not at all	596	96.3	3.6	0.1	3.7

Literacy self-report - computation (Total)	3,585	36.1	42.1	21.8	63.9
----Can compute easily	2,791	27.3	46.0	26.8	72.7
----Compute with difficulty or not at all	794	73.8	22.9	3.3	26.2
Educational attainment (Total)	3,585	36.4	41.6	22.0	63.6
----Primary (ISCED 1) or less	398	96.7	2.4	1.0	3.3
----Secondary (ISCED 2 or 3)	2,348	39.4	45.9	14.7	60.6
----Post-secondary (ISCED 4 to 6)	837	11.7	40.9	47.4	88.3

Annex 16. Paraguay: Percentage of respondents at each LAMP Prose Reading level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender	3,966	29.1	50.8	20.1	70.9
----Male	1,636	35.0	52.6	12.3	65.0
----Female	2,330	25.6	48.0	26.4	74.4
Age	3,966	29.1	50.8	20.1	70.9
----15-24	1,052	23.2	63.3	13.4	76.8
----25-39	1,244	21.9	52.3	25.7	78.1
----40-64	1,247	36.3	39.5	24.2	63.7
----65+	423	55.5	34.1	10.5	44.5
Location	3,966	29.1	50.8	20.1	70.9
----Urban	2,090	20.8	51.0	28.2	79.2
----Rural	1,876	41.8	47.8	10.4	58.2
Mother tongue	3,966	29.4	50.2	20.4	70.6
----MT is language of assessment only	908	13.5	59.8	26.7	86.5
----MT is other than assessment language only	1,720	39.8	43.0	17.1	60.2
----MT is language of assessment and other	1,332	21.3	55.4	23.3	78.7
SES	3,966	29.1	50.8	20.1	70.9
----High SES	1,127	8.0	56.2	35.8	92.0
----Medium high SES	371	22.7	58.9	18.4	77.3
----Medium low SES	1,332	27.3	57.7	15.0	72.7
----Low SES	1,136	55.5	35.2	9.3	44.5
Respondent's literate practices	3,966	29.7	49.8	20.5	70.3
----Broadcast media consumers	1,013	73.0	24.3	2.8	27.0
----Mobile phone users	1,758	23.5	56.9	19.6	76.5
----Computer users	1,194	6.6	63.3	30.1	93.4
Respondent's literate environment at community level	3,966	29.7	49.6	20.7	70.3
----High density	2,138	17.7	55.1	27.2	82.3
----Low density	1,810	42.2	44.3	13.4	57.8
Employment status	3,966	30.3	49.5	20.3	69.7
----Employed in a high-skill job	1,153	17.2	51.7	31.1	82.8
----Employed in a low-skill job	1,137	46.4	46.5	7.1	53.6
----Not working	1,669	25.7	52.1	22.2	74.3
Literacy self-report - reading	3,966	29.4	50.2	20.4	70.6
----Easily	3,369	19.9	56.4	23.7	80.1
----Difficulty or Not at all	591	89.8	7.7	2.5	10.2

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Literacy self-report - computation	3,966	29.7	49.8	20.5	70.3
----Easily	3,277	21.7	55.2	23.0	78.3
----Difficulty or Not at all	688	74.8	24.0	1.2	25.2
Educational attainment (Total)	3,966	30.3	49.5	20.3	69.7
----Primary (ISCED 1) or less	1,612	63.3	30.0	6.7	36.7
----Secondary (ISCED 2 or 3)	1,540	12.3	71.7	16.0	87.7
----Post-secondary (ISCED 4 to 6)	807	2.2	56.0	41.9	97.8

Annex 17. Paraguay: Percentage of respondents at each LAMP Document Reading level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	3,966	24.3	54.4	21.4	75.7
----Male	1,636	24.9	50.0	25.1	75.1
----Female	2,330	25.2	56.7	18.1	74.8
Age (Total)	3,966	24.3	54.4	21.4	75.7
----15-24	1,052	16.2	63.3	20.5	83.8
----25-39	1,244	18.9	53.1	28.0	81.1
----40-64	1,247	33.4	51.2	15.4	66.6
----65+	423	51.8	31.4	16.9	48.2
Location (Total)	3,966	24.3	54.4	21.4	75.7
----Urban	2,090	16.8	53.6	29.6	83.2
----Rural	1,876	35.9	52.2	11.9	64.1
Mother tongue (Total)	3,966	24.6	53.7	21.7	75.4
----MT is language of assessment only	908	8.9	57.6	33.5	91.1
----MT is other than assessment language only	1,720	35.3	51.5	13.2	64.7
----MT is language of assessment and other	1,332	16.6	55.7	27.7	83.4
SES (Total)	3,966	24.3	54.4	21.4	75.7
----High SES	1,127	4.5	49.9	45.7	95.5
----Medium high SES	371	24.0	49.0	27.0	76.0
----Medium low SES	1,332	22.1	60.0	17.9	77.9
----Low SES	1,136	44.9	52.1	3.0	55.1
Respondent's literate practices (Total)	3,966	24.4	54.5	21.1	75.6
----Broadcast media consumers	1,013	62.6	36.2	1.1	37.4
----Mobile phone users	1,758	24.3	60.7	15.0	75.7
----Computer users	1,194	2.5	51.6	45.9	97.5
Respondent's literate environment at community level (Total)	3,966	24.6	53.7	21.7	75.4
----High density	2,138	15.3	54.1	30.6	84.7
----Low density	1,810	34.5	52.8	12.6	65.5
Employment status (Total)	3,966	24.9	53.5	21.6	75.1
----Employed in a high-skill job	1,153	8.2	51.5	40.3	91.8
----Employed in a low-skill job	1,137	38.6	51.9	9.6	61.4
----Not working	1,669	25.4	56.5	18.1	74.6
Literacy self-report - reading (Total)	3,966	24.6	53.7	21.7	75.4
----Easily	3,369	15.3	60.3	24.5	84.7
----Difficulty or Not at all	591	87.3	12.5	0.1	12.7

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Literacy self-report - computation (Total)	3,966	24.4	54.5	21.1	75.6
----Easily	3,277	17.1	58.8	24.1	82.9
----Difficulty or Not at all	688	69.8	24.5	5.8	30.2
Educational attainment (Total)	3,966	24.9	53.5	21.6	75.1
----Primary (ISCED 1) or less	1,612	53.1	43.5	3.4	46.9
----Secondary (ISCED 2 or 3)	1,540	10.6	69.4	19.9	89.4
----Post-secondary (ISCED 4 to 6)	807	2.4	46.5	51.1	97.6

Annex 18. Paraguay: Percentage of respondents at each LAMP Numeracy level for various demographic categories

Socio-Demographic Variable	n	Level 1	Level 2	Level 3	At or above cut 1
Gender (Total)	3,966	23.5	42.3	34.2	76.5
----Male	1,636	21.4	38.2	40.5	78.6
----Female	2,330	27.4	43.6	29.0	72.6
Age (Total)	3,966	23.5	42.3	34.2	76.5
----15-24	1,052	19.6	50.0	30.3	80.4
----25-39	1,244	21.7	38.3	40.0	78.3
----40-64	1,247	27.3	37.5	35.2	72.7
----65+	423	38.6	33.5	27.9	61.4
Location (Total)	3,966	23.5	42.3	34.2	76.5
----Urban	2,090	14.2	41.9	43.9	85.8
----Rural	1,876	37.2	42.4	20.5	62.8
Mother tongue (Total)	3,966	24.3	41.7	34.0	75.7
----MT is language of assessment only	908	11.3	41.4	47.3	88.7
----MT is other than assessment language only	1,720	34.8	40.4	24.9	65.2
----MT is language of assessment and other	1,332	15.6	44.1	40.2	84.4
SES (Total)	3,966	23.5	42.3	34.2	76.5
----High SES	1,127	3.7	33.1	63.3	96.3
----Medium high SES	371	19.7	52.0	28.3	80.3
----Medium low SES	1,332	22.8	48.1	29.0	77.2
----Low SES	1,136	46.5	39.8	13.7	53.5
Respondent's literate practices (Total)	3,966	24.0	41.8	34.2	76.0
----Broadcast media consumers	1,013	62.1	30.2	7.6	37.9
----Mobile phone users	1,758	21.1	48.8	30.1	78.9
----Computer users	1,194	3.3	37.4	59.2	96.7
Respondent's literate environment at community level (Total)	3,966	24.3	41.2	34.5	75.7
----High density	2,138	13.8	41.6	44.6	86.2
----Low density	1,810	35.0	43.7	21.3	65.0
Employment status (Total)	3,966	24.3	41.8	33.9	75.7
----Employed in a high-skill job	1,153	4.9	37.8	57.3	95.1
----Employed in a low-skill job	1,137	34.3	44.7	21.0	65.7
----Not working	1,669	29.7	44.7	25.7	70.3
Literacy self-report - reading (Total)	3,966	24.3	41.7	34.0	75.7
----Easily	3,369	16.0	45.7	38.3	84.0
----Difficulty or Not at all	591	82.9	14.3	2.9	17.1

Literacy self-report - computation (Total)	3,966	24.0	41.8	34.2	76.0
----Easily	3,277	16.3	45.1	38.6	83.7
----Difficulty or Not at all	688	70.4	24.0	5.6	29.6
Educational attainment (Total)	3,966	24.3	41.8	33.9	75.7
----Primary (ISCED 1) or less	1,612	51.1	37.5	11.4	48.9
----Secondary (ISCED 2 or 3)	1,540	12.5	51.9	35.7	87.5
----Post-secondary (ISCED 4 to 6)	807	1.0	28.7	70.2	99.0

Annex 19. How the socio-economic index was computed

Since social stratification is not equal across countries and the discriminatory power of the variables used to measure socio-economic status (SES) varies across countries, the sets of variables used in the computation of the SES are country-specific and the distribution of the population among classes differs.

An SES index was constructed separately for each country. Indices were created to maximise ordinal rank positions and therefore, only variable indicators that discriminate were included in the computation of the SES indexes. After exploring several methodologies, taking into account the structure of the questions and their response categories in the Background Questionnaire, latent class analysis (LCA) was identified as the most suitable methodology for this purpose.

LCA requires an exploratory and iterative process. Initially, several variables are considered for the construction of the index. See **Table A.19.1** for details on the input variables for the construction of each country's socio-economic index. During the process, indicators or variables are included and then discarded, mainly for two reasons: (i) the indicator does not discriminate between people, or (ii) the variation provided by the indicator is captured in a better way by another indicator that is strongly associated with the first. LCA assumes local independence and thus implies that, within each class, the indicators should be independent of each other or in other words, once the classes are identified, all (or almost all) covariance between indicators should occur between classes, not within each class.

The following criteria were used to determine the number and constituents of classes for each country: (i) a good value of entropy, an indicator uses in LCA; (ii) a good 'separation' (discrimination) between classes; and (iii) a result that yields classes that can be ranked on an ordinal scale. Finally, the country teams validated the findings.

In the Background Questionnaire, the LAMP respondents provided information on: (i) household possessions; (ii) housing characteristics and demographic conditions; (iii) education level of the head of household; and (iv) access to utilities and infrastructure.

Household possessions

Questions about household possessions dealt with: (i) the availability, in the household, of a refrigerator, a washing machine, a water heater, an air conditioner, a microwave oven, a television, a computer and an internet connection; and (ii) the possession, by any member of the household, of a mobile phone, a clock, a radio, a bicycle, a motorcycle or motor scooter, an animal-drawn cart, a car or truck, a boat with or without a motor, a bank account, life insurance, land for agricultural or other purposes, and livestock, herds or animals.

Housing characteristics and demographic conditions

Housing characteristics include information on the building materials of floors, roof and walls, the number of rooms in the household, the number of bedrooms, and the availability of a special room for cooking.[33] The number of bedrooms per household member in the household is used as proxy for crowding.

[33] Note that there are three categories of building materials; natural, rudimentary and finished. Each country specified the materials to be included in each of the categories.

Education level of head of household

The respondent answered the question on the head of the household's educational attainment according to the national classification. Responses were later mapped to ISCED levels and included as such in the index.

Access to utilities and infrastructure

Respondents provided information on the sanitation facility, source of drinking water, waste disposal, access to electricity, and source of energy used for cooking.

Table A.19.1 Input variables and indicators used to construct the socio-economic index

		Indicators that discriminated and were retained for further exploration into a latent class analysis (X)				Indicators included in the final latent class analysis			
Variable and indicators	**Indicator Description**	**Jordan**	**Mongolia**	**Palestine**	**Paraguay**	**Jordan**	**Mongolia**	**Palestine**	**Paraguay**
Access to utilities and infrastructure									
D1	Number of rooms in household	X	X	X	X	X		X	
D2	Number of bedrooms in household	X	X	X	X		X		X
D3	Main source of drinking water	X	X	X	X				
D5	Where is the cooking done		X		X		X		
D6	How is the food cooked		X		X				X
D8	Source of energy used for cooking		X		X		X		
D9	Waste disposal				X				
D10	Type of toilet facility	X	X	X	X	X	X		
D11	Availability of a telephone line	X	X	X	X	X			
D12	Electricity								
Household possessions									
D13	Possession of a/an…								
D13_1	… refrigerator	X	X	X	X		X		X
D13_2	… washing machine	X	X	X	X		X		X
D13_3	… water heater	X	X	X	X	X	X	X	X
D13_4	… air conditioner	X	X	X	X	X	X	X	X
D13_5	… microwave	X	X	X	X	X	X	X	X
D13_6	… television	X	X	X	X		X		
D13_7	… computer	X	X	X	X	X	X	X	X
D13_8	… internet connection	X	X	X	X	X	X	X	X
D14	Does anyone in the household have a/an …								
D14_1	… mobile phone								
D14_2	… clock								
D14_3	… radio	X	X	X	X	X			
D14_4	… bicycle	X	X	X	X				
D14_5	… motorcycle or motor scooter		X		X		X		X
D14_6	… animal drawn cart		X		X		X		X
D14_7	… car	X	X	X	X	X	X	X	X
D14_8	… boat without a motor								
D14_9	… boat with a motor								
D14_10	… bank account	X	X	X	X	X	X	X	X
D14_11	… life insurance	X	X	X	X				
D14_12	… land for agricultural purposes	X	X	X	X				X
D14_13	… land for other purposes	X	X	X	X				X
D14_14	… livestock, herds, or farm animals	X	X	X	X	X	X		X

D15	Number of animals owned								
D15_1	Cows, oxen bulls	X	X	X	X				
D15_2	Horses, donkeys and mules	X	X	X	X				
D15_3	Camels/Pigs	X	X	X	X				
D15_4	Goats	X	X	X	X				
D15_5	Sheep	X	X	X	X				
D15_6	Chicken	X	X	X	X				
Housing characteristics and demographics									
D16	Material used for floors of dwelling	X	X	X	X		X		X
D17	Material used for roof of dwelling	X	X	X	X		X		X
D18	Material used for walls of dwelling	X	X	X	X		X		X
INTRO1-5	Number of individuals less than 15	X	X	X	X				
INTRO1-5	Number of individuals in household	X	X	X	X	X		X	
Education level of head of household									
INTRO 14	Education of head of household	X	X	X	X	X		X	X
Constructed variables/indicators									
Bedrooms per HH member	D2 ÷ Number of individuals in household	-	-	-	-	X		X	
Child dependency	#individuals <age 15 ÷ #individuals >=age 15	-	-	-	-	X		X	
D13_P1	Composite of 3 common possessions: D13_1, D13_2 and D13_6	-	-	-	-	X		X	
D14_land	If someone owns either D14_12 or D14_13					X			

Table A.19.2. Recoding of variables that are applicable to more than one country

Variable	Coding scheme
INTRO14 – Education Level of head of household:	
	1: More than complete ISCED 3 2: Incomplete or complete ISCED 2 or ISCED 3 3: Complete ISCED 1 4: Less than Complete ISCED 1
Child dependency - Child Dependency Ratio:	
Formula: child dependency = (Number of individuals less than 15 years old) ÷(Number of individuals equal and greater than 15 years old)	1: No dependents 2: 0 < child dependency ≤ 1 3: 1 < child dependency ≤ 2 4: child dependency > 2
Bedrooms per HH member - Proxy for crowding:	
Formula: Bedrooms per HH member = D2 ÷ Number of individuals in household	1: Bedrooms per HH member ≥ 1 2: 0.5 ≤ Bedrooms per HH member < 1 3: 0.25 ≤ Bedrooms per HH member < 0.5 4: Bedrooms per HH member < 0.25
Number of individuals in the household	
Note: this includes all members of the household, including children	1: 1-2 individuals per household 2: 3-4 individuals per household 3: 5-6 individuals per household 4: 7 or more

Table A.19.3. Country-specific recoding of Indicators

Indicator	Jordan	Mongolia	Palestine	Paraguay
D1	1: 3 or fewer rooms 2: 4 rooms 3: 5 rooms 4: 6 rooms 5: 7 or more rooms	-	1: 2 or fewer rooms 2: 3 rooms 3: 4 rooms 4: 5 or more rooms	-
D2	-	1: 1 room used for sleeping 2: 2 rooms used for sleeping 3: 3 or more rooms used for sleeping	-	1: 1 room used for sleeping 2: 2 rooms used for sleeping 3: 3 rooms used for sleeping 4: or more rooms used for sleeping
D5	-	1: in a special room inside the dwelling 2: not in a special room inside the building, in a separate building or outdoors	-	-
D6	-	-	-	1: with an electric/gas stove 2: with a stove that uses wood or charcoal 3: on an open fire
D8	-	1: Electricity/gas 2: Wood or charcoal 3: Animal dung	-	-
D10	1: Flush/pour type toilet connected to sewage system 2: Flush/pour type toilet connected to septic tank, pit latrine, or other 3: other	1: Flush/pour type toilet 2: Ventilated improved pit latrine 3: Pit latrine with a slab 4: Open pit, composting toilet, bucket toilet, or no facility	-	-
D13_P1	1: Has 3 common possessions 2: Has 2 common possessions 3: Has 1 common possession 4: Has no common possessions	-	1: Has 3 common possessions 2: Has 2 common possessions 3: Has 1 common possession 4: Has no common possessions	-
D14_land	1: Owns land 2: Does not own land	-	-	-

Table A.19.4. Summary of the classification of response profiles for each country

Jordan:

Classification (Proportion of respondents in each class)	Class 1 (0.18)	Class 2 (0.30)	Class 3 (0.15)	Class 4 (0.36)
All common possessions	1.00	0.99	0.93	0.94
Water heater	0.76	0.80	0.57	0.40
Air conditioner	0.50	0.23	0.10	0.04
Microwave oven	0.86	0.61	0.37	0.19
Clock	0.86	0.73	0.54	0.50
Telephone (land line)	0.58	0.33	0.17	0.02
Computer	0.94	0.95	0.31	0.28
Internet	0.80	0.57	0.11	0.03
Bank account	0.89	0.71	0.41	0.27
Car	0.89	0.75	0.29	0.32
Land for agricultural or other purposes	0.45	0.39	0.21	0.20
Type of toilet facility				
Flush/pour type connected to sewage system	0.86	0.66	0.70	0.55
Flush/pour type connected to other	0.14	0.34	0.29	0.43
Number of rooms in the dwelling	5 or more, 0.88	6 or less, 0.84	5 or less, 0.85	5 or less, 0.89
Number of household members	Between 3 and 6, 0.86	7 or more, 0.73	4 or less, 0.84	5 or more, 0.85
Number of Individuals per bedroom	2 or less, 1.00	3-4, 0.88	2 or less, 0.97	3 or more, 0.94
Child-dependency ratio	1 or less, 0.95	1 or less, 0.84	None, 0.84	1 or more, 0.85
Educational attainment of the head of the household				
Less than complete ISCED 1	0.06	0.10	0.24	0.27
Complete ISCED 1	0.01	0.05	0.10	0.11
Incomplete or complete ISCED 2 or ISCED 3	0.36	0.45	0.41	0.51
More than complete ISCED 3	0.55	0.38	0.23	0.10

Notes: (a) The child-dependency ratio represents the number of dependents under 15 years of age per adult in the household. (b) In Jordan, dwellings predominately have finished floors, roofs and walls.

Mongolia:

Classification (Proportion of respondents in each class)	Class 1 (0.24)	Class 2 (0.32)	Class 3 (0.26)	Class 4 (0.18)
Refrigerator	1.00	0.93	0.79	0.02
Washing machine	0.99	0.79	0.65	0.04
Water heater	0.96	0.88	0.75	0.07
Air conditioner	0.71	0.42	0.13	0.21
Microwave oven	0.71	0.26	0.10	0.00
Television	1.00	1.00	0.99	0.70
Computer	0.92	0.38	0.21	0.01
Internet	0.66	0.06	0.03	0.00
Bank account	0.95	0.82	0.75	0.42
Car	0.67	0.47	0.35	0.27
Motorcycle	0.03	0.10	0.21	0.61
Animals	0.10	0.23	0.30	0.87
Animal drawn cart	0.02	0.05	0.06	0.41
Building Materials				
Floor	Finished, 0.96	Finished, 0.76	Rudimentary, 0.94	Rudimentary, 0.59
Roof	Finished, 1.00	Finished, 0.87	Rudimentary, 0.86	Rudimentary, 0.75
Walls	Finished 1.00	Finished 0.93	Rudimentary, 0.98	Rudimentary, 0.79
Energy used for cooking	Electricity/gas, 0.95	Wood/coal, 0.56	Wood/coal, 0.71	Animal dung, 0.43
Cooking done in a separate room	0.95	0.75	0.19	0.06
Type of toilet facility				
Flush/pour type toilet	0.86	0.14	0.04	0.01
Ventilated improved pit latrine	0.19	0.24	0.02	0.09
Pit latrine with a slab	0.11	0.63	0.68	0.49
Open pit, composting/bucket toilet, or no facility	0.01	0.04	0.05	0.41
Number of bedrooms	2 or more, 0.34	1 room, 0.93	2 or more, 0.65	1 room, 0.99

Note: In Mongolia, although the number of animals that individuals own is a sign of wealth, the number of animals was excluded from the LCA. Nevertheless, it can be noted that those in a higher SES class tend to have more animals than those in lower classes.

Palestine:

Classification (Proportion of respondents in each class)	Class 1 (0.21)	Class 2 (0.37)	Class 3 (0.10)	Class 4 (0.32)
All common possessions	0.98	0.98	0.84	0.88
Water heater	0.89	0.80	0.60	0.48
Air conditioner	0.32	0.17	0.07	0.04
Microwave oven	0.65	0.43	0.22	0.16
Computer	0.98	0.99	0.19	0.23
Internet	0.87	0.73	0.04	0.00
Bank account	0.72	0.56	0.27	0.21
Car	0.47	0.33	0.11	0.13
Number of rooms in the dwelling	5 or more, 0.61	5 or more, 0.58	4 or less, 0.72	4 or less, 0.68
Number of household members	6 or less, 0.94	7 or more, 0.75	4 or less, 0.91	5 or more, 0.91
Number of individuals per bedroom	2 or less 0.92	3-4, 0.83	4 or less, 0.90	3 or more, 1.00
Child-dependency ratio	1 or less, 0.94	1-2, 0.85	None, 0.83	1-2, 0.85
Education level of the head of the household				
Less than complete ISCED 1	0.00	0.00	0.23	0.05
Complete ISCED 1	0.28	0.34	0.41	0.58
Incomplete or complete ISCED 2 or ISCED 3	0.37	0.35	0.24	0.29
More than complete ISCED 3	0.33	0.29	0.10	0.05

Notes: (a) The child-dependency ratio represents the number of dependents under 15 years of age per adult in the household. (b) In Palestine, dwellings predominately have finished floors, roofs and walls.

Paraguay:

Classification (Proportion of respondents in each class)	Class 1 (0.25)	Class 2 (0.14)	Class 3 (0.31)	Class 4 (0.30)
Refrigerator	0.99	0.96	0.94	0.58
Washing machine	0.97	0.94	0.83	0.34
Water heater	0.34	0.11	0.07	0.00
Air conditioner	0.71	0.22	0.20	0.00
Microwave oven	0.69	0.48	0.30	0.03
Computer	0.96	0.29	0.06	0.00
Internet	0.86	0.12	0.00	0.00
Bank account	0.58	0.22	0.15	0.00
Car	0.72	0.37	0.19	0.00
Motorcycle	0.51	0.91	0.63	0.58
Animals	0.22	0.98	0.36	0.82
Animal drawn cart	0.02	0.33	0.02	0.13
Land for agricultural purposes	0.22	0.95	0.10	0.60
Land for other purposes	0.36	0.69	0.07	0.21
Building Materials				
Floor	Finished, 0.98	Finished, 0.73	Finished, 0.82	Natural, 0.46
Roof	Finished, 0.96	Finished, 0.75	Finished, 0.78	Rudimentary, 0.53
Walls	Finished, 0.98	Finished, 0.71	Finished, 0.87	Rudimentary, 0.71
Cooking	Electricity/gas, 0.95	Wood/coal, 0.52	Electricity/gas, 0.71	Wood/coal, 0.63
Number of bedrooms	3 or more, 0.69	3 or more, 0.65	3 or less, 0.87	2 or less, 0.68
Educational attainment of head of household				
Less than complete ISCED 1	0.05	0.30	0.31	0.63
Complete ISCED 1	0.20	0.35	0.30	0.32
Incomplete or complete ISCED 2 or ISCED 3	0.36	0.23	0.26	0.04
More than complete ISCED 3	0.38	0.12	0.12	0.00

Notes: (a) In Paraguay, the question about the ownership of a water heater was phrased in a way that named a specific type of water heater. Thus, it does not mean that those who do not possess the specified type of water heater are necessarily without access to hot water. (b) In Paraguay, although variability was observed, sanitation facilities, waste disposal and source of drinking water are strongly associated with urban or rural settings, and were excluded from the analysis.

Annex 20. An explanation of the LAMP ordinal index of literacy and numeracy practices

The LAMP Background Questionnaire includes an array of questions about individuals' literacy practices, both at home and at work. Typically, respondents answer the questions based on the frequency of engagement: "Daily", "At least once a week", "Seldom" or "Never".[34]

Section A focuses primarily on age, language, and self-reporting of literacy skills, but also includes questions about the use of written materials in everyday life. Section B is centred on respondents' education, including training and enrolment in literacy programmes – it covers engagement in educational and cultural activities and exposure to literacy through other media. Section C generates information about everyday exposure to and production of written materials and calculations. This section also examines individuals' use of different communication and information devices, including mobile phones and computers. Section D is on household-level information. Section E focuses on employment and the use of written texts and numeracy skills at work.

In this annex, literacy practices are defined as the activities that expose individuals to written and numerical materials at home and in daily life, outside work. This may be in the form of printed texts (books, magazine or instruction manuals), through information and communication technologies (ICTs) (use of mobile phones or computers), through digital media such as watching television, and attendance of cultural activities (visiting a museum or a fair). For a detailed list of variables considered for the construction of the literacy practices index, refer to **Table A.20.6**.

Latent class analysis: A technique to identify indicators for the index of literacy practices

The data are based on individuals' own reporting of their literacy-related activities. Moreover, the questions, by design, yield information that is subjective and ordinal in nature. Latent class analysis (LCA) is a technique that results in the clustering of subjects based on categorical variables. When identifying indicators to retain, LCA requires an exploratory and iterative process. Initially, all indicators are considered, and during the process, indicators are included and then discarded, mainly for two reasons: (i) the indicator does not help discriminate, or (ii) the variation provided by the indicator is captured in a better way by another indicator that is strongly associated with the first. LCA assumes local independence, and thus implies that, within each class, the indicators should be independent of each other or, in other words, once the classes are identified, all (or almost all) covariance between indicators should occur between classes, not within each class.

The same variables and indicators were retained for all four countries' analyses. The variables can be summarised in six broad categories, each encompassing several indicators. Refer to **Table A.20.6** for the list of variables that were retained for the analysis. They include:

1. Use of computers for writing texts and preparing spreadsheets; reading and writing emails; using the internet to search for health or education-related purposes; reading the news; or being in touch with people through instant messaging and social networks.

[34] Other categorical response patterns may be: (i) "always", "sometimes", "never"; (ii) "none", "less than an hour", "between 1 and 2 hours", "more than two hours"; or (iii) dichotomous "yes", "no".

2. Use of mobile phones; reading and writing text messages.

3. Personal finances, such as reading bills or invoices; and using calculators.

4. Reading printed materials, such as newspapers, magazine or books.

5. Health awareness, such as reading instruction labels before taking medicine; or the labels printed on food packages (this may include prices, nutritional value and expiry dates).

An LCA was performed on the retained variables, where each individual was assigned to a class with a given probability based on his or her response pattern. Each class is defined based on a predominant response profile or, in other words, describes different levels and types of individuals' engagements in literacy practices. The following criteria were used to determine the number and constituents of classes for each country: (i) a good value of entropy, an indicator used in LCA; (ii) a good 'separation' (discrimination) between classes; and (iii) a result that yields classes that can be ranked on an ordinal scale.

Three classes were identified for each of the four countries. Even though the distribution of the population among the three classes varies by country, the description of the classes and the predominant response pattern were the same. Classes identified were:

Class 1 (broadcast media users): Most of the exposure of literacy for this group comes from listening to the radio and watching television. This group does not use computers and does not use text messages as a form of communication, even if a very large proportion declares using mobile phones. This group generally does not read instruction labels on food and medicine and, with low probability, reads books or magazines for pleasure.

Class 2 (mobile phone users): While individuals in this class with high probability use mobile phone texting as a means of communication, this group has very low engagement in computer-related activities, and is not likely to attend cultural activities. This group generally reads books and magazines for pleasure, and organizes their personal finances. This group always reads the instruction on the labels before taking any medicine and reads the labels on printed food packages.

Class 3 (computer users): With high probability, this class engages in computer-related activities, such as emailing, searching the internet for information, getting in touch using social media, reading the news; uses mobile phones, communicates using text messaging (reading and writing); and reads other printed materials, such as magazines, books and pamphlets. This group is also the most likely to attend cultural events, such as visiting museums, trade fairs, galleries or even attending lectures, workshops or seminars. Similar to Class 2, this group always reads the instructions before taking any medicine and reads the labels on printed food packages.

Table A.20.1 Percent of respondents in each leisure literacy use class by country

	Class 1	Class 2	Class 3
Jordan	13.3	51.7	35.0
Mongolia	30.5	34.4	35.1
Palestine	15.7	47.8	36.5
Paraguay	22.4	47.3	30.3

Construction of the index

Reliability of indicators

Coefficient alpha was used to determine if the indicators to the literacy practices index, which were determined by the LCA, are consistent and reliable. Coefficient alpha can have values between zero and one. Literature on reliability indicates that 0.7 is an acceptable value, although sometimes other thresholds are used.[35] The coefficient alpha for all countries exceeds 0.7.

Table A.20.2. Coefficient alpha reliability in each country data set for scores based on indicators

	Coefficient alpha	Number of indicators
Jordan	0.858	30
Mongolia	0.890	30
Palestine	0.878	30
Paraguay	0.923	30

Note: A15 and A16 were dichotomized for the reliability analysis: 1 Always, 0 Otherwise.

Recoding

Recoding of categorical variables (*see Table A.20.6*):

- All retained indicators in Sections B and C were recoded to dichotomous responses: 1 yes, 0 no.
- A15 and A16 were recoded to: 3 always, 2 sometimes (includes responses “often” and “seldom”), 1 never.
- If respondents report not being able to read (C1_0), then all indicators in C1 and C2 were assigned a value of zero.

[35] Nunnaly (1978) and Reynaldo et al. (1999) have indicated 0.7 to be an acceptable reliability coefficient, while Bland (2001) argues that for comparing groups, α values of 0.7 to 0.8 are regarded as satisfactory.

- If respondents report not having used a computer in the past month in C5, all indicators in C6 and C7 were assigned a value of zero, indicating that neither computer use nor access to the Internet through a computer were activities undertaken by respondents in the past month.

- If respondents did not access the Internet through a computer (their response to C6_11 is "never"), then all indicators in question C7 were assigned a value of zero, indicating that even though respondents may have used a computer, they did not use it to access the Internet.

The index of leisure literacy use

A 34-point scale of engagement in literacy activities was constructed from the recoded indicators. The distribution of the population among the three classes obtained with LCA was used to determine the cut-off points on distribution of scores. The cut-off points were selected as close as possible to the thresholds identified by the LCA, and therefore, the proportion of individuals in each of the three categories differs slightly.

Table A.20.3. Cut-off scores on the 34-point scale

	Class 1	Class 2	Class 3
Jordan	0-12	12.01-21.99	22-34
Mongolia	0-14.99	15-22.99	23-34
Palestine	0-9	9.01-19.99	20-34
Paraguay	0-13	13.01-22	22.01-34

Table A.20.4. Percent of respondents in each country falling into each class using the 34-point scale

	Class1	Class 2	Class 3
Jordan	14.5	49.9	35.6
Mongolia	29.7	35.1	35.2
Palestine	16.0	47.9	36.1
Paraguay	24.3	46.7	29.0

Given the high correspondence between the LCA classification and the ordinal index (highlighted by the high proportion of individuals falling in the diagonal of the cross-tabulation below), it is reasonable to assume the definitions stemming from the LCA are suitable to describe individuals belonging to the relative ordinal index.

Table A.20.5. Cross tabulation between Classes obtained using LCA classification and the 34-point scale classification for each country

Jordan		Class from Index		
		1	2	3
Class from LCA	1	0.89	0.11	0.00
	2	0.05	0.87	0.08
	3	0.00	0.10	0.90

Mongolia		Class from Index		
		1	2	3
Class from LCA	1	0.91	0.09	0.00
	2	0.08	0.86	0.06
	3	0.00	0.09	0.91

Palestine		Class from Index		
		1	2	3
Class from LCA	1	0.94	0.06	0.00
	2	0.03	0.88	0.09
	3	0.00	0.13	0.88

Paraguay		Class from Index		
		1	2	3
Class from LCA	1	0.93	0.07	0.00
	2	0.08	0.90	0.02
	3	0.00	0.07	0.93

Table A.20.6. List of variables considered for the construction of the literacy practices index

Variable	Description	Retained variables
A15	Reading instruction labels before taking any medicine	X
A16	Reading labels printed on food product packages	X
B22	Exposure to cultural activities in the past year	
B22_1	... visited a trade fair, professional conference or congress?	X
B22_2	... attended a lecture, workshop or seminar?	X
B22_3	... visited a museum, art gallery or similar?	X
B22_4	... used a computer?	X
B22_5	... accessed the Internet?	X
B22_6	... listened to a cultural/educational radio programme?	
B22_7	... watched a cultural/educational video recording or television programme?	
B22_8	... engaged in learning activities by yourself or supported by someone?	
B22_9	... visited an organization to learn new things?	
B24	Intensity of exposure to television, video and radio	
B24_1	... watching educational programmes or news on television?	X
B24_2	... watching other programmes on television?	X
B24_3	... watching video recordings?	
B24_4	... listening to educational programmes or news on the radio?	X
B24_5	... listening to other programmes on the radio?	X
B24_6	... listening to music (tapes, CDs, MP3)?	X
C1, C2	Reading and writing (outside work)	
C1_1	... directions such as road signs, or names of stores?	
C1_2	... posters, pamphlets, announcements and notice boards?	X
C1_3	... e-mail messages?	X
C1_4	... text messages sent using a cell/mobile phone?	X
C1_5	... personal letters or messages?	

C1_6	… newspapers or magazines?	X
C1_7	… all or parts of books for educational purposes?	X
C1_8	… all or parts of books for job/business-related reasons?	
C1_9	… all or parts of books for pleasure?	X
C1_10	… bills, invoices or budget tables?	X
C1_11	… maps, diagrams, or charts?	
C2_1	… written e-mail messages?	X
C2_2	… sent text messages using a cell/mobile phone?	X
C2_3	… written a personal letter or message?	
C2_4	… filled in forms?	
C2_5	… written an official letter to an authority or organization?	
C2_6	… written a report or article?	
C2_7	… produced a bill, invoice or budget table?	
C2_8	… produced a chart, diagram or map?	
C4	Exposure to ICT at home	
C4_1	… used a cell/mobile phone?	X
C4_2	… used a calculator at home?	X
C4_4	… used a fax machine at home?	
C4_7	… used an automated teller machine (ATM)?	
C4_8	… played with video games?	
C4_9	… listened to the radio?	
C4_10	… watched over-the-air television?	
C4_11	… watched cable television?	
C5-C7	Use of computers and internet outside work	
C5_1	… at home or a friend's or relative's place?	
C5_2	… at job/business?	
C5_3	… at a school?	
C5_4	… somewhere else (library/café)?	
C6_1	… write or edit texts?	X
C6_2	… work with spreadsheets?	X
C6_3	… create graphics and designs or edit pictures?	
C6_4	… work with presentations?	
C6_5	… programme?	
C6_6	… keep a schedule or calendar?	
C6_7	… play games?	
C6_9	… communicate using instant messages?	X
C6_10	… communicate using voice?	
C6_11	… access the Internet?	X
C7_1	… search for information for education-related purposes?	X
C7_2	… search for information for health-related purposes?	X
C7_3	… search for information for work-related purposes?	X
C7_4	… search for job opportunities?	
C7_5	… read news?	X
C7_6	… play games?	
C7_7	… do banking?	
C7_8	… buy goods or services?	
C7_9	… be in touch with other people through social networks?	X
C7_10	… watch/download movies, listen to/download music?	

Literacy Assessment and Monitoring Programme (LAMP): Implementation in Diverse Settings describes the development and application of a unique procedure for the cross-national assessment of literacy and numeracy. The worldwide pledge to achieve Sustainable Development Goal (SDG) 4 on education poses many challenges – among them how to monitor the move towards the provision of quality education for all and the promotion of lifelong learning by 2030. With the SDG 4 goal in mind, LAMP helps to provide a means to compare countries on a common metric. LAMP was developed with the assistance of 10 countries representing 13 languages, 7 language families and 4 language scripts. This report presents the findings of the assessment that was administered in four developing countries (Jordan, Mongolia, Palestine and Paraguay) and explores the challenges of implementing a household-based literacy assessment in very diverse settings. The report's findings aim to inform the policies needed to assess literacy and numeracy in low-skill populations as well as deliver the promise of SDG 4 to countries using direct assessment.

The report's main findings demonstrate why cross-country collaboration, consistent data collection, pragmatic statistical methodology and easy-to-understand reporting are fundamental when using assessment results to design effective interventions to improve literacy skills in adult populations. The report also presents the types of data and analyses countries need to address the compounding effects of disadvantages faced by adults with illiteracy or with low language proficiency – particularly women, people living in rural areas, those with lower socio-economic status and in low literate environments. Cross-sector collaboration, practical approaches to assessment and capacity building in affected countries are guideposts in a roadmap for using reliable and valid data to catalyse action to improve worldwide literacy and achieve SDG 4 in this critical moment of international development.