

UIS Survey on Statistics of Information and Communication Technology (ICT) in Education:

Building capacity to establish an international statistical framework

Moscow, Russian Federation, 25-27 November 2015

UNESCO



INSTITUTE *for* STATISTICS

COMMUNICATION *and* INFORMATION
STATISTICS

OUTLINE

- ❖ Why measure - ICT in education statistics
- ❖ Regional questionnaire on ICT in education
 - ❖ Policy and Curriculum
 - Indicator prioritization
 - ❖ **ICT infrastructure**
 - Indicator prioritization
 - ❖ Enrolment
 - Indicator prioritization
 - ❖ **Computers**
 - **Indicator prioritization**
 - ❖ Teachers
 - Indicator prioritization
- ❖ Sources of Information
- ❖ Data collection and Dissemination

THE QUESTIONNAIRE – Data sources

Section E5 (ISCED 1-3):

ICT Dept./ICT Plan/ National inventory

Computers

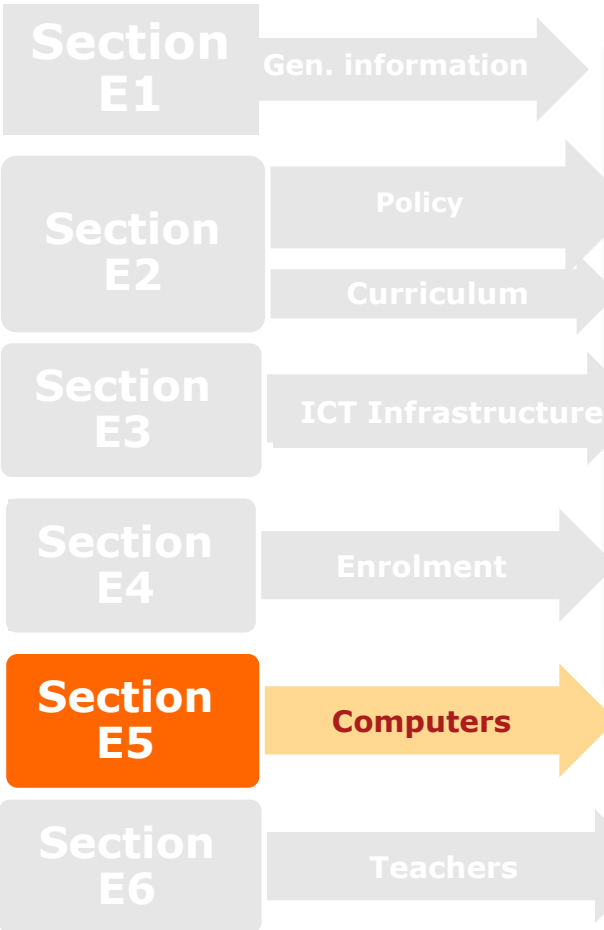


Table 3: Key ICT parameters for South Africa (APC Website, 2005)

Indicator	Value	Indicator	Value
TV sets per 1 000 people	192	Number of mobile networks*	3
Radios per 1 000 people	338	Mobile phones (millions) (2004)	20
Telephone mainlines (millions) (2002)	4.84	Mobile phones per 1 000 people	450
Telephone mainlines per 1 000 people	112	Third-generation (3G) networks*	2
		3G customers (thousands) (June 2005)	26.3
		Broadband (ADSL) users (thousands) (June 2005)	67
		Broadband (ADSL) users per 1 000 people	1.5

The characteristic elements of the digital revolution (e.g. digital broadband access) are significant innovations, bringing with them inherent opportunities and threats. The Digital Access Index and Networked Readiness Index (NRI)¹⁷ are composite indices used internationally to assess performance in this regard.

In 2004, South Africa had a Networked Readiness Index score of 0.33 and a world rank of 34 (out of 104 countries). This compares favourably with 70 countries that rank lower, including India at a score of 0.23 and a rank of 39. However, South Africa's rank is significantly below international benchmarks for countries within a similar economic category. See Canada (score 1.27, rank 10), Australia (score 1.23, rank 11) and Malaysia (score 0.69, rank 27).

The indicators behind the critical NRI components are:

Indicator	Approx. value for SA
Internet users/1 000 inhabitants	69
Broadband Internet subscribers/1 000 inhabitants	1.5
Personal computers/1 000 inhabitants	68.5
Government online services	not known

ES: COMPUTERS

All programmes (general and vocational)

All available computers should be allocated to a single level of education. Therefore the total number of computers allocated to primary and secondary programmes should not be double counted. When counting computers personal devices are excluded. Adult education programmes are excluded.

Computers allocated to educational programmes by level of education - public and private institutions

	Primary (ISCED 1)	Lower secondary (ISCED 2)	Upper secondary (ISCED 3)	Education level not specified	Primary and secondary (Total physical units) (ISCED 1, 2 and 3)
Total Computers					
Connected to the Internet					
<i>Of which allocated to:</i>					
Computers for teaching and learning					
Connected to the Internet					
Computers for administration					
Connected to the Internet					
<i>By type:</i>					
Desktop computers					
Laptop computers					
Tablet computers					

Computers allocated to educational programmes by level of education - public institutions only

	Primary (ISCED 1)	Lower secondary (ISCED 2)	Upper secondary (ISCED 3)	Education level not specified	Primary and secondary (Total physical units) (ISCED 1, 2 and 3)
Total Computers					
Connected to the Internet					
<i>Of which allocated to:</i>					
Computers for teaching and learning					
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Computers for administration					
Connected to the Internet					
<i>By type:</i>					
Desktop computers					
Laptop computers					
Tablet computers					

THE QUESTIONNAIRE - Coverage

❖ Includes the following:

- ❖ Primary programmes (ISCED 1)
- ❖ Secondary programmes (ISCED 2 and 3)
 - ❖ General and technical/ vocational education and training (TVET)
 - ❖ Public & private (Total)

❖ Excludes the following:

- ❖ Adult education programmes

2015 SURVEY OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN EDUCATION (ISCED 1-3)

Data for the academic year ending in 2015 or most recent

Deadline for returning the completed questionnaire: 18 December 2015

This questionnaire is designed to collect internationally comparable data on information and communication technology (ICT) in education at the primary and secondary levels necessary for the evaluation and monitoring of education systems worldwide. The data form a central part of the database of communication and information statistics maintained by the UNESCO Institute for Statistics (UIS). They are disseminated widely to the user community and help to inform policymakers at both national and international levels. The data are required for the calculation of many ICT in education indicators used in the monitoring of progress towards regional and global goals, including the World Summit on the Information Society, Education for All, and the Millennium Development Goals.

Instructions for completing the questionnaire

Please refer to the Instruction Manual: Survey of Information and Communication Technology (ICT) in Education for detailed concepts and definitions used in this survey.

All US questionnaires and manuals are available on the Questionnaire Website: <http://www.us.unesco.org/USQuesQuestionnaires/Pages/country.aspx>

Completed questionnaires should be sent by email attachment to: uis_survey@unesco.org

Data from previous surveys are available at: <http://www.us.unesco.org/datacentre>

Coverage

This questionnaire covers the entire formal primary and secondary education system in both public and private institutions within the borders of your country. The data provided should include formal adult education programmes. If data are not available for some part of the education system, please make estimates to ensure full data coverage.

Before completing this questionnaire, education programmes should first be classified by level according to the 2011 revision of the International Standard Classification of Education (ISCED 2011). The UIS will use the ISCED 2011 mapping of your country to validate your data submission. If your country does not have a recent ISCED mapping or if there have been subsequent changes to your national education system, please download and complete or update the questionnaire on National Education Systems (UIS/ED/ISC11) which is available on our Questionnaire Website.

Academic year/reference period for the data collected in this questionnaire

This questionnaire collects data on the academic year ending in 2015 or a more recent year. If data are not available for 2015, please report the latest year for which data are available.

Using the Excel questionnaire

This questionnaire has been designed for optimal functionality in Microsoft Excel 2010 but can also be used with other versions of Excel. The questionnaire has been locked to preserve the layout and the integrity of the automatically calculated totals (shaded in blue) and validations. To the extent possible, data should be entered in the white cells only. If data are not available for a given category please use the missing codes described below.

Validation checks

The questionnaire contains validation checks using conditional formatting to highlight errors or invalid data entries. If further input is required, for example when a comment is needed to explain a missing code or if an error is detected in the data, the cell will turn yellow and/or a pop-up message will appear.

Structure of data items

In order to ensure the provision of complete data and metadata, each data item is composed of three distinct cells which accept numeric data (including zeros to indicate nil or negligible data), missing data codes and comments, respectively. Countries are requested to make every effort to provide complete data in the numeric cell, if data are not available please use the appropriate codes described below. Please note that the Excel commenting feature has been disabled. Comments should be entered in the appropriate comment cell.

```
graph LR; A[Numeric data] --> B[Codes]; B --> C[Comment];
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Numeric data

These cells only accept numeric values, including zeros (to indicate nil or negligible data). Please note that an error message will appear if a non-numeric value is entered.

Codes

These cells only accept the letters Z, X, W or M and are located to the right of the numeric data cells. The correct use of codes is an essential condition to ensure cross-national comparability and completeness of data. The codes are used in statistical analyses and reports to indicate the coverage of the data and to explain why data are not available. Please explain any data coverage issues using the following codes:

Z - category not applicable (previously denoted as 'a')

If a data item or table refers to a category which does not apply or exist in your national education system, please leave the numeric data cell blank and enter 'Z' in the related codes cell. The use of this code indicates that data for these categories do not even hypothetically exist.

X - data included elsewhere

If a data item or category exists in your national education system but cannot be disaggregated from another category, please leave the numeric data cell blank and enter 'X' in related codes cell. Please also indicate in the comment cell, in which cell data are included, by using the Excel column and row identifiers or free text. Where appropriate, please also use the code 'W' described below.

W - includes data from another category (new code)

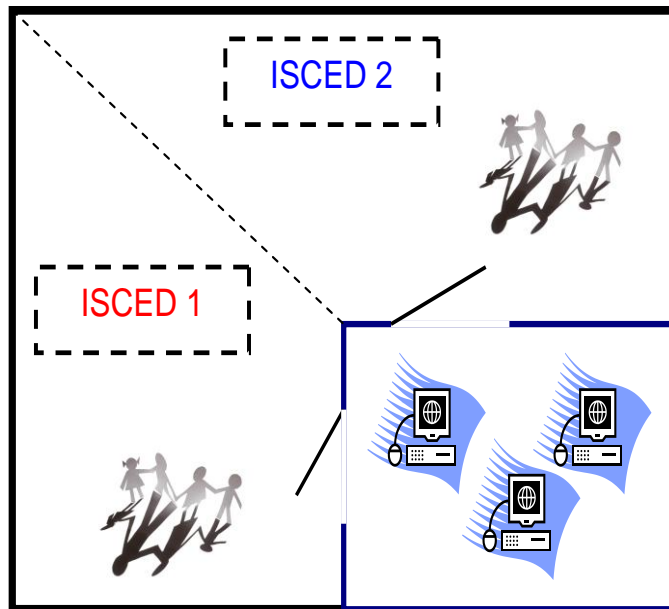
If data include other categories (e.g. primary data also include pre-primary data) and are therefore over-covered, please enter the value in the numeric data cell and 'W' in the related codes cell. Please also indicate in the comment cell which data are included by using the Excel column and row identifiers or free text. Where appropriate, please also use the 'X' code described above.

M - data not available or missing

If a category exists in your national education system but the related data are not available, cannot be estimated and are not included in any other cells of the questionnaire, please leave the numeric data cell blank and enter 'M' in the related codes cell. In such cases, please note that the total is considered to be missing or incomplete with respect to these categories. If possible, please provide a comment to indicate why data are not available.

SECTION E5: COMPUTERS

MULTIPLE education levels in schools and the implications for Pupil-computer ratios



	ISCED 1	ISCED 2
Number of educational institutions	1	
Number of pupils enrolled	150	100
Number of computer labs	1	1
Number of computers	10	10

	ISCED 1	ISCED 2
Pupil (Learner)-to-computer ratio	15	10

! *If possible, all available computers should be allocated to each level of education. Therefore the total number of computers allocated to primary and secondary programmes should NOT be double counted.*

TABLE 5: Computers

Measures computers and pupil-computer ratios according to the following:

- Public versus private
- Education level (i.e. ISCED)
- Pedagogy (teaching and learning) versus administration
- Internet connection versus not connected
- Device type (i.e. desktop, laptop, tablet)

PUPIL-COMPUTER RATIOS

Trend towards greater “mobility”



- ❑ New potential indicators measuring devices (computer) by type can shed light on mobile learning in schools
- ❑ Proprietorship: Bring your own device (BYOD) models increase device density facilitating mobile learning (m-learning); however the complexity in counting BYO devices in schools results in difficulty measuring density

SECTION E5: COMPUTERS

Table 5: Computers allocated to educational programmes by level of education - public and private institutions

Computers allocated to educational programmes by level of education - public and private institutions

	Primary (ISCED 1)	Lower secondary (ISCED 2)	Upper secondary (ISCED 3)	Education level not specified	Primary and secondary (Total physical units (ISCED 1, 2 and 3))
Total Computers	100	200	250	50	650
Connected to the Internet	50	150	250	10	470
<i>Of which:</i>					
Computers for teaching and learning	75	150	225	10	470
Connected to the Internet	50	125	225	10	420
Computers for administration	25	50	25	40	180
Connected to the Internet	25	50	25	40	180
<i>By type:</i>					
Desktop computers	100	150	150	50	500
Laptop computers	0	50	50	0	100
Tablet computers	0	0	50	0	50

If computers cannot be disaggregated by educational level, then estimate the allocation by level or please include in the 'Not specified' column.

Some or all computers may be used for both administrative and pedagogical purposes at the same ISCED level.



SECTION E: COMPUTERS



COMPUTER: Programmable electronic device that can store, retrieve and process data, as well as share information in a highly-structured manner. It performs high-speed mathematical or logical operations according to a set of instructions. Computers include desktops, laptops (portable) computers, and tablets (or similar handheld computers). Dumb terminals connected to mainframes should also be included.

COMPUTERS FOR ADMINISTRATION refer to computers used by non-teaching staff to assist with school management. Such usage may include record-keeping or data processing and analysis of registration and daily attendance in classes, teaching and non-teaching staff, physical school facilities, budget and expenditure data, and assessment results. It also includes planning of programmes and deployment of human, material and financial resources. It may involve secretarial usage through word processing, as well as communications with external bodies or parents through emails.

SECTION E: COMPUTERS



COMPUTERS FOR TEACHING AND LEARNING refers to the use of computers to support course delivery or independent teaching and learning needs. This may include activities using computers or the Internet to meet information needs for research purposes; develop presentations; perform hands-on exercises and experiments; share information; and participate in online discussion forums for educational purposes.

SECTION E: COMPUTERS



DESKTOP is a computer that usually remains fixed in one place; normally the user is placed in front of it, behind the keyboard. Dumb terminals connected to mainframes or mobile computer labs should also be included.

LAPTOP is a computer that is small enough to carry and usually enables the same tasks as a desktop computer; it includes notebooks and netbooks but does not include tablets and similar handheld devices.

TABLET (or similar handheld computer) is a computer that is integrated into a flat touch screen, operated by touching the screen rather than (or as well as) using a physical keyboard.

SECTION E: COMPUTERS

Table 6: Computers allocated to educational programmes by level of education - public institutions only

Computers allocated to educational programmes by level of education - public and private institutions

	Primary (ISCED 1)	Lower secondary (ISCED 2)	Upper secondary (ISCED 3)	Education level not specified	Primary and secondary (Total physical units (ISCED 1, 2 and 3))
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Connected to the Internet	50	125	225	10	420
Computers for administration	25	75	X	40	180
Connected to the Internet	25	75	X	40	180
<i>By type:</i>					
Desktop computers	100	150	150	50	500
Laptop computers	0	50	100	0	150
Tablet computers	0	0	0	0	0

Computers for administration in upper secondary are included in lower secondary

The country does not have any tablet computers

WHAT IS MEASURED ?

Indicator prioritization:

Pupil (learner)-computer ratio by income level, 2010 – LAC countries

World Bank Income Grouping	High income				Trinidad and Tobago Turks and Caicos Islands	Barbados Cayman Islands
	Upper middle income	Grenada		Argentina Costa Rica Cuba Dominica Panama	Chile Saint Lucia Venezuela (B. R.of)	Uruguay
	Lower middle income	Dominican Republic El Salvador Guyana Paraguay	Ecuador	Colombia		
	Very Low (40 or more)	Low (40-30)	Medium (30-20)	High (20-10)	Very high (10 or less)	

Students' access to ICT (ratio students per computer for pedagogical use)

WHAT IS MEASURED ?

❖ Indicator prioritization :

Conceptual domains	Indicator label	Indicator
Infrastructure	ED4	Learner (pupil)-to-computer ratio (in schools with CAI)
	ED4bis	Learner (pupil)-to-computer ratio
	ED25	Learner-to-computer connected to Internet ratio
	ED29	Proportion of all computers available for pedagogical purposes
	ED30	Proportion of all computers available for administrative purposes
	XX	Proportion of all computers that are desktops
	XX	Proportion of all computers that are laptops (portable computers)
	XX	Proportion of all computers that are tablets
	XX	Proportion of all computer connected to the Internet

- Core indicator
- WSIS target
- WSIS target and Core Indicator
- Additional Indicators

WHAT IS MEASURED ?

❖ Indicator prioritization :

ED4bis Learners-to-computer ratio (for ISCED levels 1-3)

Definition:

Average number of learners per computer enrolled in ALL schools for ISCED levels 1-3.

Purpose:

To explore the opportunities or limits for using computers in schools to promote or expand computer-assisted instruction.

Data requirement:

(L) Number of learners for ISCED levels 1- 3.

(refer to questionnaire item E.1)

(CP) Number of computers available for pedagogical use in all schools for ISCED levels 1-3.

(refer to questionnaire item C.2.1 + C.2.3)

Method of collection:

Administrative data collection through annual school census (or extract data from school records).

Data source(s):

Statistical unit of the Ministry of Education or, alternatively, the national statistical office.

WHAT IS MEASURED ?

❖ Indicator prioritization :

Formula:

$$\frac{\sum_{h=1}^3 L_h^t}{\sum_{h=1}^3 CP_h^t}$$

Where:

L_h^t = Number of learners enrolled at level of education **h** in school-year **t**

CP_h^t = Number of computers available for pedagogical use in all schools at level of education **h** in school-year **t**

WHAT IS MEASURED ?

❖ Indicator prioritization :

Analysis and interpretation:

A high value for this ratio indicates a situation where, on average, there are many learners for each available computer in the schools. This may signal either an overall low level of computer availability in schools in a country where there is, in theory full scale implementation of CAI, or the existence of digital gaps among schools, which can be identified when calculating and analysing this indicator by geographical regions and individual schools.

Methodological and definition issues or operational limitations:

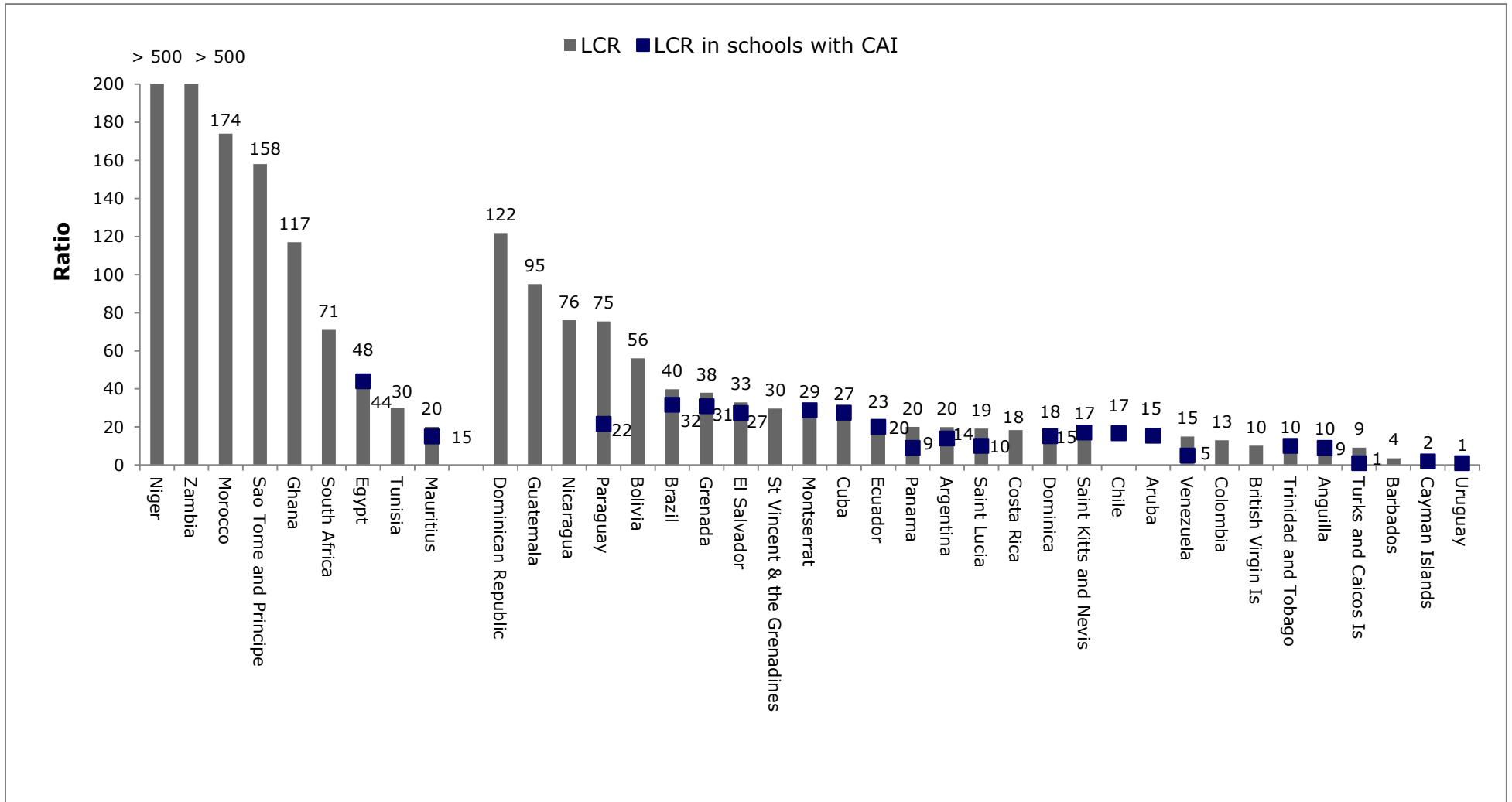
Further methodological work will be required to test more robust measures than a simple average (e.g. median, percentiles) in order to improve cross-country comparisons.

This ratio is neither a measure of actual use of computers in schools nor of time spent by learners to use computers.

Only computers in working condition for use in teaching and learning should be included. Other additional criteria may be applied, such as the age of the computer, its configuration and capacity, kinds of software available, etc.

The criteria for “working condition” of computers are left to the countries’ discretion, taking into consideration their own pedagogical requirements for schools, their technological environment and their financial capacities.

Pupil-computer ratios



SUMMARY

You have learned ...

- Completing the questionnaire**
- Computers and their different uses/ types**
- Concepts & definitions**
- What is measured?**

QUESTIONS ?



Thank you

<http://www.uis.unesco.org>