

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

Regional workshop for Latin America and the Hispanic Caribbean  
 Sao Paulo, Brazil, 17-18 November 2016

# Outline

## Module 4

- ❖ Global survey on ICT in education
  - ✓ Policy and Curriculum
  - ✓ Educational Institutions & ICT infrastructure
  - ✓ Enrolment
  - ✓ **Computers allocated to schools**
  - ✓ Teaching staff and ICT

# The questionnaire

## Structure

### ICT3: Computers allocated to schools by level of education - all programmes (general and vocational)

Section VAL → General information

Section VAL → Policy  
Section VAL → Curriculum

Section ICT1 → ICT infrastructure

Section ICT2 → Enrolment

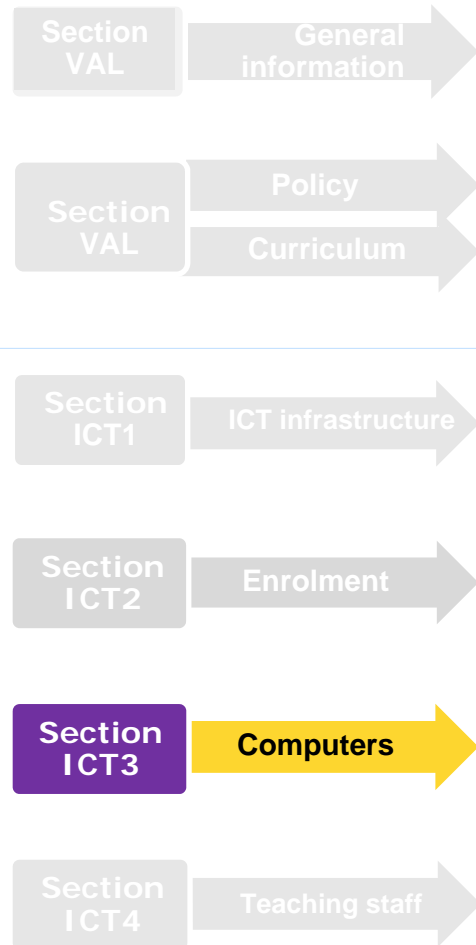
**Section ICT3 → Computers**

Section ICT4 → Teaching staff

|                     |                                     |                                     | Computers | Primary (ISCED 1) | Lower secondary (ISCED 2) | Upper secondary (ISCED 3) | Not specified | Total |
|---------------------|-------------------------------------|-------------------------------------|-----------|-------------------|---------------------------|---------------------------|---------------|-------|
| All schools         | Total number of computers           |                                     |           |                   |                           |                           |               |       |
|                     | Of which:                           | For teaching and learning           |           |                   |                           |                           |               |       |
|                     |                                     | Of which: Connected to the internet |           |                   |                           |                           |               |       |
|                     |                                     | For administration                  |           |                   |                           |                           |               |       |
|                     | Of which: Connected to the internet |                                     |           |                   |                           |                           |               |       |
|                     | Of which:                           | Desktop computers                   |           |                   |                           |                           |               |       |
|                     |                                     | Laptops                             |           |                   |                           |                           |               |       |
| Tablets             |                                     |                                     |           |                   |                           |                           |               |       |
| Public schools only | Total number of computers           |                                     |           |                   |                           |                           |               |       |
|                     | Of which:                           | For teaching and learning           |           |                   |                           |                           |               |       |
|                     |                                     | Of which: Connected to the internet |           |                   |                           |                           |               |       |
|                     |                                     | For administration                  |           |                   |                           |                           |               |       |
|                     | Of which: Connected to the internet |                                     |           |                   |                           |                           |               |       |
|                     | Of which:                           | Desktop computers                   |           |                   |                           |                           |               |       |
|                     |                                     | Laptops                             |           |                   |                           |                           |               |       |
| Tablets             |                                     |                                     |           |                   |                           |                           |               |       |

# The questionnaire – sources of information

## Structure



Estándar de dotación del Plan TEC

| Estándar de Dotación Digital al 2010 | Estándar de Dotación Digital al 2010 |  |  |  |
|--------------------------------------|--------------------------------------|--|--|--|
|                                      | Plúvulo                              | Básica Rural   | Básica Urbana  | Media  |
| Laboratorio de Computación           |                                      |  | Laboratorio de computación cada 16 cursos con:<br>• 2 alumnos por computador, para el curso de mayor tamaño.<br>• 1 computador para el profesor.<br>• 1 proyector fijo.<br>• 2 impresoras y 1 escáner. | Laboratorio de computación cada 16 cursos con:<br>• 2 alumnos por computador, para el curso de mayor tamaño.<br>• 1 computador para el profesor.<br>• 1 proyector fijo.<br>• 2 impresoras y 1 escáner. |
| Sala de Profesores                   |                                      |  | • 1 computador cada 4 cursos.<br>• 1 impresora y 1 escáner.  | • 1 computador cada 4 cursos.<br>• 1 impresora y 1 escáner.  |
| Biblioteca CRA                       |                                      |  | • 2 computadores.<br>• 1 impresora y 1 escáner.  | • 4 computadores.<br>• 1 impresora y 1 escáner.  |
| Sala de Clases                       | • 1 computador por cada curso.       | • 2 computador y 1 impresora por cada curso, con un mínimo de 2 computadores por escuela.<br>• 1 proyector, 1 portátil, 1 escáner por escuela. | • 1 portátil y 1 proyector cada 4 cursos   | • 1 portátil y 1 proyector cada 4 cursos   |
| Otros Dependencias de Uso Educativo  |                                      |  | • 1 computador cada 8 cursos.  | • 1 computador cada 8 cursos.  |

Estándar de Dotación Digital al 2010

| Especial         | Adultos   |
|------------------|---|
| 1 laboratorio de | 1 laboratorio de computación para 16 cursos (10 mayor tamaño. |

Plan de Acción de la Educación para Todos 2003-2015

ICT Dept./ICT Plan/ National inventory or other

ED/ICT - ICT3: Computers allocated to schools

**Presentación**

Costa Rica asume el reto de convertir la Educación en el principal e insustituible instrumento de movilidad social y reconoce en ella el impacto positivo que tiene en el mejoramiento de las condiciones de vida de sus habitantes, en particular de aquellos que forman parte de los segmentos de la población que aún viven en condiciones de pobreza y pobreza extrema.

El Plan Nacional de Desarrollo "Monseñor Víctor Manuel Sanabria", contempla como eje fundamental de desarrollo a "la educación", por lo que incorpora en una política social mayor de desarrollo nacional y de reducción de la pobreza: se logrará potenciar los efectos positivos que se derivan de ella y que se reflejan en la formación personal de las personas, en el desarrollo de sus capacidades y en la oportunidad de participar en forma plena en igualdad de condiciones, en el desarrollo.

Solo con un servicio educativo que se ofrezca en las mejores condiciones de equidad y calidad se puede avanzar hacia el logro integral de los objetivos de la Educación para Todos ratificados en el Foro Mundial de la Educación para Todos, celebrado en Dakar, Senegal, en el año 2000, que proclama por la satisfacción de las necesidades básicas de aprendizaje de toda la población.

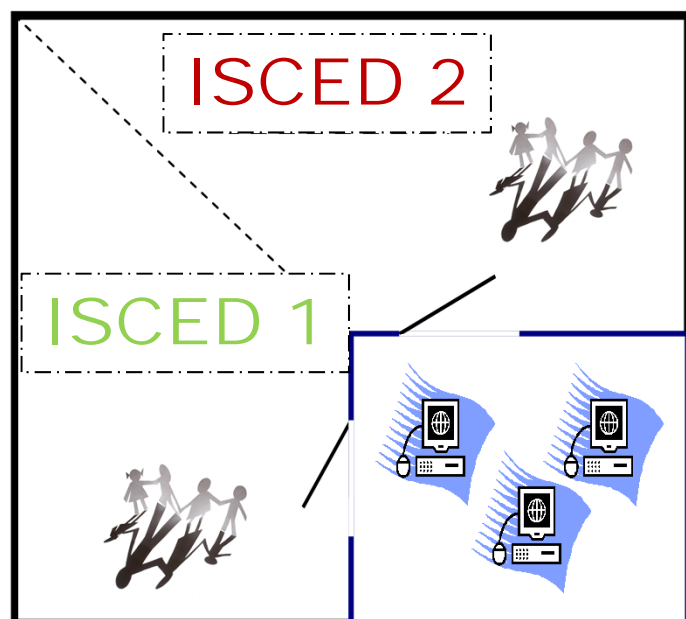
En un esfuerzo notable facilitado por el Foro Nacional de Educación para Todos, funcionarios y funcionarias del Ministerio de Educación y más de 1000 personas que participaron en los 20 foros regionales de Educación para Todos realizados a finales del año 2002, me complace hoy tener la oportunidad de presentar formalmente el **Plan de Acción de Educación para Todos de Costa Rica para el periodo 2003-2015**, cumpliendo de esta forma y satisfactoriamente con los compromisos adquiridos en el año 2000. Pero sobre todo, me honra reconocer y garantizar que es un plan en acción,

| Of which: | Desktop computers | Laptops | Tablets |
|-----------|-------------------|---------|---------|
|           |                   |         |         |

| Computers                           | Primary (ISCED 1) | Lower secondary (ISCED 2) | Upper secondary (ISCED 3) | Not specified | Total |
|-------------------------------------|-------------------|---------------------------|---------------------------|---------------|-------|
| of computers teaching and learning  |                   |                           |                           |               |       |
| Of which: Connected to the internet |                   |                           |                           |               |       |
| administration                      |                   |                           |                           |               |       |
| Of which: Connected to the internet |                   |                           |                           |               |       |
| ktop computers                      |                   |                           |                           |               |       |
| tops                                |                   |                           |                           |               |       |
| lets                                |                   |                           |                           |               |       |
| of computers teaching and learning  |                   |                           |                           |               |       |
| Of which: Connected to the internet |                   |                           |                           |               |       |
| administration                      |                   |                           |                           |               |       |
| Of which: Connected to the internet |                   |                           |                           |               |       |

# Computers allocated to school

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.*

# Section ICT3: Computers

## ICT3: Computers allocated to schools by level of education - all programmes (general and vocational)

| Computers   |                           | Primary (ISCED 1)                   | Lower secondary (ISCED 2) | Upper secondary (ISCED 3) | Not specified | Total   |         |
|-------------|---------------------------|-------------------------------------|---------------------------|---------------------------|---------------|---------|---------|
| All schools | Total number of computers | 100.000                             | 200.000                   | 250.000                   | 50.000        | 600.000 |         |
|             | Of which:                 | For teaching and learning           | 80.000                    | 180.000                   | 230.000       | 50.000  | 540.000 |
|             |                           | Of which: Connected to the internet | 50.000                    | 100.000                   | 200.000       | 50.000  | 400.000 |
|             | Of which:                 | For administration                  | 20.000                    | 20.000                    | 20.000        | 50.000  | 110.000 |
|             |                           | Of which: Connected to the internet | 20.000                    | 20.000                    | 20.000        | 50.000  | 110.000 |
|             | Of which:                 | Desktop computers                   | 20.000                    | 0.000                     | 0.000         | 50.000  | 70.000  |
|             |                           | Laptops                             | 60.000                    | 180.000                   | 230.000       | 0.000   | 470.000 |
|             |                           | Tablets                             |                           |                           |               |         |         |
|             |                           | M                                   | M                         | M                         | M             | M       |         |

If computers cannot be disaggregated by educational level, then estimate the allocation by level. Data should be pro-rated across each ISCED level according to the number of hours allocated to a single level of education. If this is not possible, 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.



# Concepts and Definitions



## **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.

# Concepts and Definitions



## **COMPUTERS FOR PEDAGOGICAL PURPOSES**

Refer 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 ICT3: Computers



Computers allocated to schools by level of education - all programmes (general and vocational)

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)

# Trends

## 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 ICT3: Computers

## ICT3: Computers allocated to schools by level of education - all programmes (general and vocational)

| Computers         |                           | Primary (ISCED 1) | Lower secondary (ISCED 2) | Upper secondary (ISCED 3) | Not specified | Total   |
|-------------------|---------------------------|-------------------|---------------------------|---------------------------|---------------|---------|
| All schools       | Total number of computers | 100.000           | 200.000                   | 250.000                   | 50.000        | 600.000 |
|                   | Of which:                 |                   |                           |                           |               |         |
|                   | For teaching and learning | 80.000            | 180.000                   | 230.000                   | 50.000        | 540.000 |
|                   | Of which:                 |                   |                           |                           |               |         |
|                   | Connected to the internet | 50.000            | 100.000                   | 200.000                   | 50.000        | 400.000 |
|                   | Of which:                 |                   |                           |                           |               |         |
|                   | For administration        | 20.000            | 40.000                    | ISCED X 2                 | 50.000        | 110.000 |
|                   | Of which:                 |                   |                           |                           |               |         |
|                   | Connected to the internet | 20.000            | 40.000                    | ISCED X 2                 | 50.000        | 110.000 |
|                   | Of which:                 |                   |                           |                           |               |         |
| Desktop computers | 20.000                    | 0.000             | 0.000                     | 50.000                    | 70.000        |         |
| Of which:         |                           |                   |                           |                           |               |         |
| Laptops           | 60.000                    | 180.000           | 230.000                   | 0.000                     | 470.000       |         |
| Tablets           | 0.000                     | 0.000             | 0.000                     | 0.000                     | 0.000         |         |


 Computers for administration in upper secondary are included in lower secondary  
 The country does not have any tablet computers

# Section ICT3: Computers

## ICT3: Computers allocated to schools by level of education - all programmes (general and vocational)

| Computers         |                           | Primary (ISCED 1) | Lower secondary (ISCED 2) | Upper secondary (ISCED 3) | Not specified | Total   |
|-------------------|---------------------------|-------------------|---------------------------|---------------------------|---------------|---------|
| All schools       | Total number of computers | 100.000           | 200.000                   | 250.000                   | 50.000        | 600.000 |
|                   | Of which:                 |                   |                           |                           |               |         |
|                   | For teaching and learning | 80.000            | 180.000                   | 230.000                   | 50.000        | 540.000 |
|                   | Of which:                 |                   |                           |                           |               |         |
|                   | Connected to the internet | 50.000            | 100.000                   | 200.000                   | 50.000        | 400.000 |
|                   | For administration        | 20.000            | 40.000 W 3                | ISCED X 2                 | 50.000        | 110.000 |
|                   | Of which:                 |                   |                           |                           |               |         |
|                   | Connected to the internet | 20.000            | 40.000 W 3                | ISCED X 2                 | 50.000        | 110.000 |
| Of which:         |                           |                   |                           |                           |               |         |
| Desktop computers | 20.000                    | 0.000             | 0.000                     | 50.000                    | 70.000        |         |
| Laptops           | 60.000                    | 180.000           | 230.000                   | 0.000                     | 470.000       |         |
| Tablets           | 0.000                     | 0.000             | 0.000                     | 0.000                     | 0.000         |         |

- The total number of computers corresponds to the data on schools provided in Table ICT1.
- Computers were counted only once.

# Section ICT3: Computers

## ICT3: Computers allocated to schools by level of education - all programmes (general and vocational)

| Computers           |                           | Primary (ISCED 1)                   | Lower secondary (ISCED 2) | Upper secondary (ISCED 3) | Not specified | Total |
|---------------------|---------------------------|-------------------------------------|---------------------------|---------------------------|---------------|-------|
| All schools         | Total number of computers |                                     |                           |                           |               |       |
|                     | Of which:                 | For teaching and learning           |                           |                           |               |       |
|                     |                           | Of which: Connected to the internet |                           |                           |               |       |
|                     |                           | For administration                  |                           |                           |               |       |
|                     | Of which:                 | Of which: Connected to the internet |                           |                           |               |       |
|                     |                           | Desktop computers                   |                           |                           |               |       |
|                     |                           | Laptops                             |                           |                           |               |       |
| Tablets             |                           |                                     |                           |                           |               |       |
| Public schools only | Total number of computers |                                     |                           |                           |               |       |
|                     | Of which:                 | For teaching and learning           |                           |                           |               |       |
|                     |                           | Of which: Connected to the internet |                           |                           |               |       |
|                     |                           | For administration                  |                           |                           |               |       |
|                     | Of which:                 | Of which: Connected to the internet |                           |                           |               |       |
|                     |                           | Desktop computers                   |                           |                           |               |       |
|                     |                           | Laptops                             |                           |                           |               |       |
| Tablets             |                           |                                     |                           |                           |               |       |



Number of computers for pedagogical purposes (All schools and public schools only) will be incorporated into the Questionnaire of formal education (Questionnaire A)

# What is measured ?

## Indicator prioritization



| Conceptual domains | Indicator label | Indicators   |
|--------------------|-----------------|--|
| Infrastructure     | ED4             | Learner (pupil)-to-computer ratio (in schools with computers for pedagogical purposes, for ISCED levels 1-3) |
|                    | ED4bis          | Learner (pupil)-to-computer ratio (for ISCED levels 1-3)   |
|                    | ED25            | Learner-to-computer connected to Internet ratio (for ISCED levels 1-3)                                       |
|                    | ED29            | Proportion of all computers available for pedagogical purposes (for ISCED levels 1-3)                        |
|                    | ED30            | Proportion of all computers available for administrative purposes (for ISCED levels 1-3)                     |
|                    | X               | Proportion of all computers that are desktops (for ISCED levels 1-3)   |
|                    | X               | Proportion of all computers that are laptops (portable computers, for ISCED levels 1-3)                      |
|                    | X               | Proportion of all computers that are tablets (for ISCED levels 1-3)  |
|                    | X               | Proportion of all computer connected to the Internet (for ISCED levels 1-3)                                  |



Core indicator



Additional indicator



WSIS indicator

# Indicator prioritization

## Learner to computer (for pedagogical purposes) ratio

### 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.

# Indicator prioritization

Learner to computer (for pedagogical purposes) ratio

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  $t$



# Indicator prioritization

## Learner to computer (for pedagogical purposes) ratio

### 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.

# What is measured ?

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

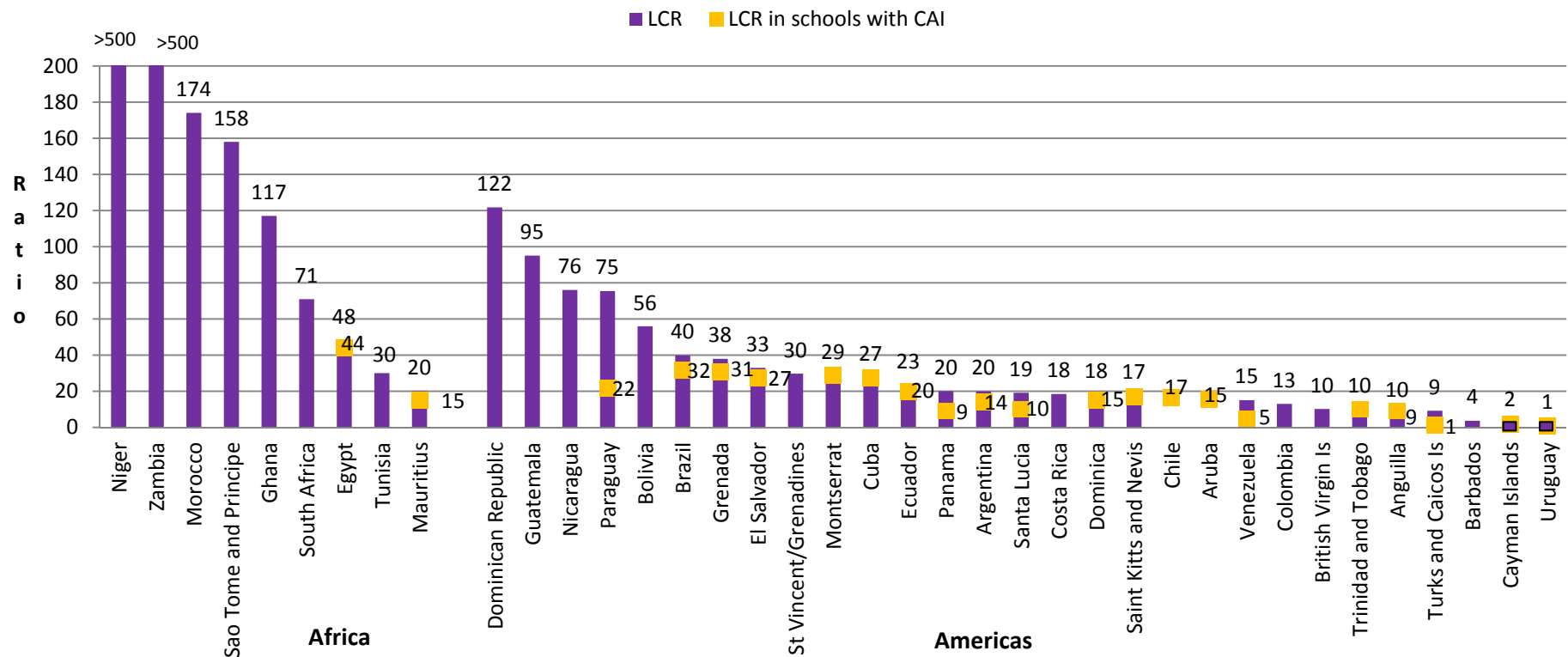
|                            |                     |   |                       |   |   |                                  |
|----------------------------|---------------------|---|-----------------------|---|---|----------------------------------|
| World Bank Income Grouping | High income         |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

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

# What is measured ?

## Indicator prioritization

Learner-to-computer ratios (National aggregate) versus schools with computer-assisted instruction (CAI, ISCED 1-3), 2009-2012



# Comments

**For more information on UIS statistics of ICT in education, please visit the UIS website:**

**[www.uis.unesco.org](http://www.uis.unesco.org)**

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