International Comparative Education
Data and Indicators
UNESCO’s Vision:
Quality Education Transforms Lives

- **When:**
  - Accessible to all
  - Relevant
  - Underpinned by core shared values

- **Influences:**
  - Poverty reduction
  - Improvements in health and livelihood
  - Prosperity increase
  - Inclusiveness
  - More sustainable and peaceful societies
UNESCO Institute for Statistics: Mission

- Mandated to produce, update, analyse and disseminate international databases for:
  - Education
  - Science, technology and innovation
  - Culture
  - Communication and information

- History of UIS
  - Established in 1999
  - Located in Montreal, Canada;
  - with staff also based in several UNESCO field offices
  - Staff: 100 people
UIS Core Work: Production of Internationally Comparable Official Statistics

Primary statistics provided by Member States

Validation process with national technical teams and political authorities

Methodological and conceptual frameworks:
- International Standard Classification of Education (ISCED) (just recently revised)
- Uniformity of concepts

UNESCO framework to produce statistics

Recognized secondary sources of information:
- Population (UNPD)
- Economic data (World Bank, Development Data Group; IMF)
UIS work flow and impact

Human Development Index
Gender Inequality Index
Education for All
Knowledge Index
Knowledge Economy Index
ICT Development Index
Global Competitiveness Index
Global Gender Gap
Global Innovation Index

National statistical offices
MoEs
OECD
Eurostat
World Bank
IMF
ILO
UNSD
UNPD
UNESCO permanent delegations and national commissions

United Nations Educational, Scientific and Cultural Organization

UNESCO Institute for Statistics

UIS work flow and impact
Products

UIS publications
- Thematic reports
- Factsheets
- Information notes
- Technical papers

UIS on-line data centre
Over 1,000 types of indicators and raw data on education, literacy, science and technology, culture and communication from more than 200 Member States from 1970-2013

Other international high-profile publications
THE INDICATOR

• An indicator is that which points out or directs attention to something
• Gives a broad indication of the state of the situation being investigated
• Relative state of development of different systems accomplished over a period of time in a specified field of human concern

Ex. Primary enrolment of two districts do not produce any information but the same, if linked to corresponding age-specific population can be used to compare the status of primary education
Education Indicators

• Enable management to monitor **effectiveness** and **efficiency** in the delivery of education services

• Enable judgments on key aspects of the functioning of the education system

• Useful tools to identify and measure **changes** in the education system **over time**, including the **effect of planned interventions**

• When indicators are produced on a **regular basis** they can reveal possible changes in response to policy actions
Please give me some examples of education Indicators
Identification of Indicators of Education

Framework: "Education as a Production Function"

The education system can be viewed as a form of "production" which has three components:

- Inputs
- Processes
- Output (and Outcome)

Then, basic education indicators can be identified and grouped under these categories.
Identification of Indicators of Education

Framework: "Education as a Basic Social Service"

If education is viewed as a “basic social service”, basic education indicators can be identified under three areas:

- Access and Participation
- Quality
- Equity and Management
Monitoring Education from Various Aspects

- Access
- Participation
- Management, Quality and Equity
- Next Level
- Labour Market
- Drop-out
Monitoring Education from Various Aspects

Education System

Access

Access to education
- Gross Intake Ratios
- Net Intake Ratios
- % of new entrants with ECCE

Participation
- Gross Enrolment Ratios
- Net Enrolment Ratios

Performance
- Promotion, Repetition and drop-out rates
- Internal efficiency

Quality
- Pupil-teacher ratio
- % of trained teachers

Equity
- Indicators by sex
- Gender parity Index

Output
- Survival rate to last grade
- Completion rate

Next Level

Labour Market

Drop-out
## Analytical Framework

<table>
<thead>
<tr>
<th>Issues</th>
<th>All Education Sub-sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Demand</td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
</tr>
<tr>
<td>Meeting Goals, targets</td>
<td></td>
</tr>
<tr>
<td>Trends, changes</td>
<td></td>
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<tr>
<td>Gaps, Differences</td>
<td></td>
</tr>
<tr>
<td>Finding reasons</td>
<td></td>
</tr>
</tbody>
</table>
Access indicators

• Three main indicators are used to measure access to education:
  – Gross (apparent) intake ratio to primary education
  – Net intake rate to primary education
  – Adjusted net intake rate to primary education
<table>
<thead>
<tr>
<th>Access Indicators</th>
<th>Definition</th>
<th>Data Required</th>
</tr>
</thead>
</table>
| **Gross Intake Ratio in Primary** | Total new entrance in Grade 1 (regardless of age) of pri as % of official pri school entrance age population                                                                                         | - Total new entrants to grade 1 of primary education  
- Population of the official primary school-entrance age                                           |
| **Net Intake Ratio in Primary**   | Total new entrance of official entrance age children in Grade 1 in primary as % of official pri school entrance age population                                                                           | - New entrants in first grade of primary education by single years of age;  
- Population of the official primary school-entrance age.                                                                                     |
| **Adjusted Net Intake Ratio in Primary** | Total Enrollment of of pri age children in primary level (regardless of grades) as % of official pri school entrance age population                                                                       | - Enrolment in primary education by single years of age;  
- Population of the official primary school-entrance age.                                                                                     |

Similar calculation can be done for lower secondary education
# GIR vs NIR vs ANIR

<table>
<thead>
<tr>
<th></th>
<th>GIR</th>
<th>NIR</th>
<th>ANIR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numerator</strong></td>
<td>Total number of new entrants to Grade 1 <strong>(All ages)</strong></td>
<td>Total number of Grade 1 pupil of the <strong>official school entrance age</strong></td>
<td>Total Enrollment of pri entrance age children in primary level <strong>(regardless of grades)</strong></td>
</tr>
<tr>
<td><strong>Denominator</strong></td>
<td>Total number of official primary school entrance age population</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Participation indicators

- Gross enrolment ratio (GER)
- Net enrolment rate (NER)
- Adjusted net enrolment rate (ANER)
- Age specific enrolment rate (ASER)
<table>
<thead>
<tr>
<th>Participation Indicators</th>
<th>Definition</th>
<th>Data Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Enrollment Ratio (GER)</td>
<td>Total enrollment in primary level (regardless of age) as % of official pri enrollment age population</td>
<td>Enrolment in primary education; Population of the official primary school age.</td>
</tr>
<tr>
<td>Net Enrollment Rate (NER)</td>
<td>Total enrollment of official primary age children in primary as % of official pri age population</td>
<td>Enrolment in primary education by single years of age; Population of the official primary school age.</td>
</tr>
<tr>
<td>Adjusted Net Enrollment Rate (ANER) in Primary</td>
<td>Total Enrollment of pri age children in primary or lower secondary level as % of official pri age population</td>
<td>Enrolment in primary and secondary education by single years of age; Population of the official primary school age.</td>
</tr>
</tbody>
</table>

Similar calculation can be done for lower secondary education
<table>
<thead>
<tr>
<th>Numerator</th>
<th>GER</th>
<th>NER</th>
<th>ANER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of Pupil enrolled in primary * (All ages)*</td>
<td>Total number of pupil of the official school entrance age enrolled in Primary</td>
<td>Total Enrollment of pri age children in primary and lower secondary level <em>(regardless of grades)</em></td>
<td></td>
</tr>
<tr>
<td>Denominator</td>
<td>Total number of official primary age population</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Participation indicators...

Age specific enrolment rate (ASER)

Enrolment of a specific single age enrolled, **irrespective of the level of education**, as a percentage of the population of the same age.

- **Required data:**
  - Enrolment of the population of age $a$
  - Population of age $a$

- $ASER_a = \frac{\text{Enrolment of the population of age } a}{\text{Population of age } a} \times 100$

- School life expectancy (SLE) = Sum of ASERs of all ages
## Calculation of ASER

<table>
<thead>
<tr>
<th>Age</th>
<th>Enrolment A</th>
<th>Population B</th>
<th>ASER</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1251946</td>
<td>25075533</td>
<td>(A/B) 0.050</td>
</tr>
<tr>
<td>5</td>
<td>12496696</td>
<td>24969336</td>
<td>(A/B) 0.500</td>
</tr>
<tr>
<td>6</td>
<td>27214848</td>
<td>24899828</td>
<td>(A/B) 1.093</td>
</tr>
<tr>
<td>7</td>
<td>24966380</td>
<td>24855370</td>
<td>(A/B) 1.004</td>
</tr>
<tr>
<td>8</td>
<td>23058672</td>
<td>24824318</td>
<td>(A/B) 0.929</td>
</tr>
<tr>
<td>9</td>
<td>21555461</td>
<td>24795033</td>
<td>(A/B) 0.869</td>
</tr>
<tr>
<td>10</td>
<td>14696847</td>
<td>24773268</td>
<td>(A/B) 0.593</td>
</tr>
<tr>
<td>11</td>
<td>5193247</td>
<td>24764767</td>
<td>(A/B) 0.210</td>
</tr>
<tr>
<td>12</td>
<td>2122674</td>
<td>24670941</td>
<td>(A/B) 0.086</td>
</tr>
<tr>
<td>13</td>
<td>653132</td>
<td>24445363</td>
<td>(A/B) 0.027</td>
</tr>
<tr>
<td>14</td>
<td>315828</td>
<td>24128566</td>
<td>(A/B) 0.013</td>
</tr>
</tbody>
</table>

**SLE**

**Sum of ASER: 5.375**
School Life Expectancy (SLE)

Definition: SLE is defined as 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.

- It describes the average number of years that a child is likely to spend in the educational system of his or her country.
- It indicates the average duration of schooling in years, not the number of grades reached.
- It is not necessarily a measure of actual or current attainment but rather of what the next cohort entering the schooling system may achieve.
System Performance Indicators
Key performance indicators

• **Promotion rate**: is the proportion of pupils who have successfully completed a grade and proceeded to the next grade the following year.

• **Repetition rate**: the proportion of pupils who repeat a grade once or twice. The repetition rate of grade $g$, year $y$ is obtained by dividing repeaters of grade $g$, year $y+1$, by enrolment in grade $g$, year $y$.

• **Drop-out rate**: the proportion of pupils who leave the system without completing a given grade in a given school year.

• **Percentage of repeaters**: Percentage of repeaters at a particular grade.
Survival Rate

• **Definition:** The percentage of a cohort of pupils enrolled in grade 1 of the primary level of education in a given school year who are expected to reach a specific grade (Survival rate to Grade 5).

• **Purpose:** To assess the “holding power” and internal efficiency of an education system. The survival rate to Grade 5 indicates the proportion of a pupil cohort that completes Grade 4 and reaches Grade 5. Conversely, it indicates the magnitude of drop-out before Grade 5.
Tertiary Gross Enrollment Ratio

With a typical education system at the age of 17, a child complete secondary education

Tertiary GER = \frac{\text{Total Enrollment in all levels of Tertiary}}{\text{Population of age 18-22 years}} \times 100\%
Measuring Quality

- Pupil Teacher Ratio (PTR)
- Pupil classroom Ratio (PCR)
- % Trained teachers (%TT)
- % of qualified Teachers (%QT)
- Student learning outcomes related indicators
  (UIS does not published the indicators)
Admission Rate

Gross Admission Rate =
Total Grade "I" Enrolment
——————————— X 100
Population of Age “6” Year

Apparent Admission Rate =
New Entrants in Grade “I” (=enrolment-repeater)
——————————— X 100
Population of Age “6” Year

Age-specific Admission Rate =
New Entrants of Age `6' in Grade "I"
——————————— X 100
Population of Age "6" Year
Enrolment Ratio

Over-All Enrolment Ratio =

\[
\text{Total enrolment in Grades I-XII} \div \text{Population in the age-group 6-17 years} \times 100
\]

if we take Enrolment in Grades I-V corresponding School-Age Population would be 6-11 Years

Age-Specific Enrolment Ratio and =

\[
\frac{\text{Enrolment in age-group `a' in all levels of education in any grade}}{\text{Population of a particular age `a'}} \times 100
\]
Level Enrolment Ratio

**Gross Enrolment Ratio (GER)** =

\[
\text{Total enrolment at school level } \text{`i'} \quad \frac{\text{—————}}{\times 100} \quad \text{X 100}
\]

Population in age-group `a' which officially correspond to that level `i'

**Net Enrolment Ratio (NER)** is an improved version of the GER. In NER, over-age and under-age children are excluded from enrolment and then ratios to the respective age-specific population are obtained.
TRANSITION RATE

It is based on Student Flow Analysis
starts at the point where students enter into an education cycle

• I : Population of Admission Rate (‘6' Year)
• II : Student Flow into the System : The Admission Rate
• III : Student Flow through the System : Promotion, Repetition and Drop-out Rates
• IV : Student Flow between Systems : The Transition Rate.
  3 possibilities –
  Students promoted to the next higher grade
  Students repeat their grades and
  Students dropped out from the system
TRANSITION RATE

• A student may complete the grade successfully and leave the school system

• A student may complete the grade successfully and then enrol in first grade of next higher cycle.

\[
\text{New Entrants into Grade VI in Year `t+1'} = \frac{\text{Enrolment in Grade V in Year `t'} \times 100}{\text{Enrolment in Grade V in Year `t'} \times 100}
\]
PROMOTION RATE

Number of Students Promoted to Grade `g+1' in Year `t+1'

\[ \frac{\text{Number of Students Promoted to Grade `g+1' in Year `t+1'}}{\text{Total Number of Students in Grade `g' in Year `t'}} \times 100 \]

Total Number of Students in Grade `g' in Year `t'
repeaters who are included in Grade `g+1' enrolment taken out

REPETITION RATE

Number of Repeaters in Grade `g' in Year `t+1'

\[ \frac{\text{Number of Repeaters in Grade `g' in Year `t+1'}}{\text{Total Number of Students in Grade `g' in Year `t'}} \times 100 \]
DROP-OUT RATE

Number of Students Dropping out from Grade `g' in Year t

\[ \text{Number of Students Dropping out from Grade `g' in Year t} = \frac{\text{Number of Students Dropping out}}{\text{Total Number of Students in Grade `g' in Year `t'}} \times 100 \]

Total Number of Students in Grade `g' in Year `t'

Promotion Rate + Repetition Rate + Drop-out Rate = 100
INPUT/OUTPUT RATIO

Number of Successful Completers $\times 5$

$= \frac{\text{Total Student Years Invested}}{\text{X 100}}$

Wastage Ratio $= 100 - \text{Input/Output Ratio}$

Wastage may be on Account of Repeaters or Drop-outs
ATTENDANCE RATE

Attendance rate can be calculated in relation to the number of school working days and children actually attending a class. For example, in a Class of 45 students in a school that functioned for 22 of 30 days in a month, attendance rate can be calculated in accordance to the actual number of days children attended schools. Some of them might have attended school for all the 22 days while others may not have. First, the maximum possible present days (attendance) is calculated by multiplying number of school days to number of students in a class. In this case it would come out (22 x 45) a total of 990 present days
PUPIL-TEACHER RATIO

Total Enrolment

= 

Total Teachers

Gender Parity Index (GPI)

• Ratio of the female to male values of GER
• A GPI of 1 indicates parity between sexes