Measuring and Monitoring the Quality of Education

Christopher Colclough
University of Cambridge
What are we trying to measure?

A good quality education encompasses:

- **Cognitive development**: reading, writing, numeracy
- **Creative and emotional** development and the promotion of attitudes and values necessary for effective life in the community

A good quality education carries personal and social benefits:

- better **health**, lower **fertility**, lower exposure to **HIV/AIDS**
- higher **personal income**
- stronger national **growth**
International learning assessments

PIRLS – reading literacy, 9-yr olds, 5 ldcs
TIMSS – maths/science, 9/13-yr olds, 9 ldcs
PISA – reading/math/sci, 15 yr-olds, OECD+
SACMEQ – reading/maths, grade 6, 14 SSA
UNESCO LLECE – lit/math, 16 LACs
PASEC – lit/maths, 6 Francophone SSA

110 countries in at least one study: 46 ldcs, but only at most 16 in any one assessment
Measuring Quantity is Insufficient

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Cohort</th>
<th>% that has ever enrolled (ages 6-14)</th>
<th>% that survived to grade 5</th>
<th>% that achieved minimum mastery</th>
<th>NER in primary for the period before the test</th>
</tr>
</thead>
<tbody>
<tr>
<td>SACMEQ (1995)</td>
<td>Malawi</td>
<td>100</td>
<td>91</td>
<td>31</td>
<td>7</td>
<td>69</td>
</tr>
<tr>
<td>Grade 6 Reading test</td>
<td>Mauritius</td>
<td>100</td>
<td>99</td>
<td>98</td>
<td>52</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>Namibia</td>
<td>100</td>
<td>97</td>
<td>74</td>
<td>19</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>U. R. Tanzania</td>
<td>100</td>
<td>87</td>
<td>70</td>
<td>18</td>
<td>54</td>
</tr>
<tr>
<td>PIRLS (2001)</td>
<td>Colombia</td>
<td>100</td>
<td>98</td>
<td>60</td>
<td>27</td>
<td>87</td>
</tr>
<tr>
<td>Grade 4 Reading test</td>
<td>Morocco</td>
<td>100</td>
<td>99</td>
<td>77</td>
<td>59</td>
<td>81</td>
</tr>
<tr>
<td>PASEC (mid 1990s)</td>
<td>Burkina Faso</td>
<td>100</td>
<td>35</td>
<td>25</td>
<td>21</td>
<td>28</td>
</tr>
<tr>
<td>Grade 5 French test</td>
<td>Cameroon</td>
<td>100</td>
<td>88</td>
<td>45</td>
<td>33</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>Côte d’Ivoire</td>
<td>100</td>
<td>65</td>
<td>45</td>
<td>38</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Guinea</td>
<td>100</td>
<td>48</td>
<td>32</td>
<td>21</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Madagascar</td>
<td>100</td>
<td>78</td>
<td>31</td>
<td>20</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Senegal</td>
<td>100</td>
<td>48</td>
<td>42</td>
<td>25</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Togo</td>
<td>100</td>
<td>82</td>
<td>49</td>
<td>40</td>
<td>66</td>
</tr>
</tbody>
</table>

Quantitative versus qualitative indicators of participation in primary schooling
Quality diagnosis: achievement tests

International assessments point to weak performance

- **Southern Africa**: in 4 countries less than 10% and in 3 others around one-third or less of tested grade 6 students reach a ‘desirable level’ in reading.

- **Francophone Africa**: in 6 countries, between 14% and 43% of grade 5 pupils have low achievement in French or mathematics.

- **OECD countries**: between 2% and 10% of 15-year-olds have serious deficiencies in literacy skills, whereas in middle and low-income countries, between 20% and 50% do so.
Literacy scores
Changes between Sacmeq 1 and 2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mauritius</td>
<td>420</td>
<td>450</td>
</tr>
<tr>
<td>Kenya</td>
<td>440</td>
<td>430</td>
</tr>
<tr>
<td>Zanzibar (U.R. Tanzania)</td>
<td>460</td>
<td>470</td>
</tr>
<tr>
<td>Zambia</td>
<td>480</td>
<td>490</td>
</tr>
<tr>
<td>Namibia</td>
<td>500</td>
<td>510</td>
</tr>
</tbody>
</table>

Mean scores in literacy
National Learning Assessments

- Subject oriented
- Assess achievement relative to intended curriculum
- Country studies doubled to 111, 1995-2006
- Over 90% focus on maths or language
- Results for 16 countries (mainly L.Am) mainly indicate improvement
Percentage of pupils meeting minimum reading mastery levels, by highest and lowest wealth asset score (1995/96)
National resources: finance and quality

In low income countries, increasing spending has a positive impact on learners’ cognitive achievement

- **6% of GNP** recommended on education spending not reached in majority of countries

- **Education spending** higher in rich countries (5.1% of GNP) than in systems where access and quality remain a top challenge (under 4% in Africa and East Asia/Pacific)

- **Spending increases** in East Asia and Pacific and Latin American and Caribbean in late 1990s, but -24% in Philippines; -8% in Indonesia
A Paradox:
Test scores and changes in per pupil expenditures in OECD

<table>
<thead>
<tr>
<th>Country</th>
<th>Change in mathematics and science score, 1970-94</th>
<th>Increase in real spending per pupil, 1970-94</th>
<th>Increase in real GDP per capita, 1970-94</th>
<th>Staff compensation as % of current expenditure on primary education, 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>-2.3</td>
<td>269.8</td>
<td>46.4</td>
<td>79</td>
</tr>
<tr>
<td>New Zealand</td>
<td>-9.7</td>
<td>222.5</td>
<td>24.3</td>
<td>n.a.</td>
</tr>
<tr>
<td>France</td>
<td>-6.6</td>
<td>211.6</td>
<td>60.7</td>
<td>79</td>
</tr>
<tr>
<td>Italy</td>
<td>1.3</td>
<td>125.7</td>
<td>74.6</td>
<td>89</td>
</tr>
<tr>
<td>Germany</td>
<td>-4.8</td>
<td>108.1</td>
<td>66.8</td>
<td>76</td>
</tr>
<tr>
<td>Japan</td>
<td>-1.9</td>
<td>103.3</td>
<td>100.7</td>
<td>87</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-8.2</td>
<td>76.7</td>
<td>58.3</td>
<td>70</td>
</tr>
<tr>
<td>Belgium</td>
<td>-4.7</td>
<td>64.7</td>
<td>68</td>
<td>86</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1.7</td>
<td>36.3</td>
<td>52.9</td>
<td>78</td>
</tr>
<tr>
<td>United States</td>
<td>0</td>
<td>33.1</td>
<td>70.5</td>
<td>80</td>
</tr>
<tr>
<td>Sweden</td>
<td>4.3</td>
<td>28.5</td>
<td>35.1</td>
<td>56</td>
</tr>
</tbody>
</table>
Students in countries that invest more in education tend to have better literacy skills. In high-income states, the impact of additional resources is less clear.
Proxies for quality

A wide range of evidence indicates that additional resources improve education quality, particularly where they are scarce.

Studies show that more resources for:

- low pupil-teacher ratios
- more and better textbooks
- time spent learning in school or at home
- teacher qualifications and experience

matter for quality
Other essentials that make the difference

- **Curriculum**: relevant, balanced with carefully defined aims

- **Instructional time**: few countries reach recommended 850-1,000 hours/year

- **Learning materials**: strong impact on learning but small percentage of education spending goes to textbooks

- **Language**: Successful models start in mother tongue and make gradual transition to second or foreign language

- **School environment**: safety, health, sanitation for girls and boys, access for disabled
Impact of school organization and pupil characteristics on achievement scores in five Francophone African countries (mid-1990s)
How resources are used is important for quality

Research on the characteristics of effective schools highlights the importance of the following factors:

- strong leadership
- emphasis on learning basic skills
- orderly and secure school environment
- high expectations of pupil attainment
- frequent assessment of progress
Quality proxies short-list

- P/T ratio – but skewness undermines mean value
- Repetition rate – but aut. prom policy
- % trained teachers – but definitions vary
- Expenditure variables – but incomplete data
- Learning outcomes – but cohort and curriculum problems and incomplete data
- Survival to grade 5 – best in short run?
Only one-third of students reach last grade of primary education where pupil/teacher ratios are high.
Survival rate and learning outcomes

Figure 1: Survival rate to grade 5 and learning outcomes at primary level, 2000

Countries participating in SACMEQ II, 2000

Sources: UIS calculation based on SACMEQ II database. UIS database for data on survival rate to grade 5.
Survival rate and learning outcomes at lower secondary level

Figure 2: Survival rate to grade 5 and learning outcomes at lower secondary level, 2003

Countries participating in TIMSS, 2003

\[ y = -0.1975x + 100.9 \]
\[ R^2 = 0.4135 \]

Sources: Mullis et al. (2004); UIS database for data on survival rate to grade 5.
End

Thank you