Education quality in Sub-Saharan Africa

Deon Filmer (World Bank)
on behalf of the SDI Team

RISE Conference
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What’s the problem? Extremely low performance

SACMEQ Math 2007: Proportions of Grade 6 students scoring at “Pre-, Emergent and Basic Numeracy”, “Beginning”, “Competent” and “Skilled” levels

- Mathematically skilled, Concrete and Abstract problem solving (Levels 6,7,8)
- Competent (Level 5)
- Beginning numeracy (Level 4)
- Pre, Emergent and Basic numeracy (Levels 1,2,3)
How much does money matter?

**Primary math test scores** vs. public education spending

**Malawi Primary School Leaving Exam (PSLE) pass rate** vs. per-student spending

Source: Bruns, Filmer and Patrinos 2011.
Service Delivery Indicators Surveys

- **School and health facility surveys** to understand what happens inside the service delivery units

- **Nationally representative sample**, also disaggregated by rural/urban and by public/private

- Consistent methodology for **comparable** data across countries and **repeated** every 2-3 yrs

- Implementation by **national research institutes**
Service Delivery Indicators Surveys

- Implemented in 7 countries -- representing the service delivery experience of roughly **350 million people**

- Pipeline for 2015/16

- Publicly launched in 4 countries (+2 pilots); 2 more currently being planned
What does SDI measure?

**Provider Effort**
- Teachers
  - Absence from school
  - Absence from classroom
  - Time spent teaching
- Health workers
  - Absence from facility
  - Caseload per provider

**Provider Ability**
- Teachers
  - Minimum knowledge to master the curriculum
  - Quality of instruction
- Health workers
  - Diagnostic accuracy
  - Adherence to clinical guidelines
  - Management of maternal/neonatal complications

**Availability of Key Inputs**
- Schools
  - Teaching equipment availability
  - Student-teacher ratio
  - Students per textbook
  - Infrastructure availability
- Health facilities
  - Equipment availability
  - Drug availability
  - Infrastructure availability
Results Chain and Data Sources

EMIS

SABER (Policy, Legal and Institutional Framework)

Inputs

Quality of Policies & Institutions + Quality of Policy Implementation

Quantity and Quality Services Delivered

Learning Outcomes

Service Delivery Indicators

SACMEC, PASEC, TIMSS, Uwezo, Beekunko
SDI Surveys

Some key features of the SDI school instrument

→ **Absenteeism** from school, and from class, during unannounced visit

→ **Classroom observation** module collects detailed time-on-task, as well as teacher practices data

→ **Direct assessment of teacher skills**
  - Math and language items drawn from 4th grade curriculum
  - Pedagogical skills test (lesson plan from newspaper article; assessment of strengths and weaknesses of written paragraphs; interpreting student test score patterns)
SDI Findings: Absenteeism

* Nigeria is 4 States
Contributors to low teaching:

Kenya: Average teacher absence and time spent teaching (in hours)

On average, remaining teaching time per day is approximately 2h 40mins, less than half of the schedule time. The main source of leakage is due to teachers in schools but absent from classrooms.
SDI Findings: Time spent teaching

* Nigeria is 4 States
Time spent learning in Mozambique

What are students doing when teachers are on task?

- Pupil learning time, 38%
- Pupil in class, not paying attention, 5%
- Pupil absence, 56%
## SDI Findings: Teacher skills in public schools

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum knowledge</strong></td>
<td>12.7</td>
<td>34.8</td>
<td>0.3</td>
<td>2.4</td>
<td>15.6</td>
<td>0.9</td>
<td>10.1</td>
</tr>
<tr>
<td>(At least 80% in language and mathematics)</td>
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</tr>
<tr>
<td><strong>Test score</strong></td>
<td>42.0</td>
<td>55.6</td>
<td>26.9</td>
<td>30.5</td>
<td>46.6</td>
<td>33.9</td>
<td>43.3</td>
</tr>
<tr>
<td>(language, mathematics, and pedagogy)</td>
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</tbody>
</table>

* Nigeria is 4 States
Heterogeneity in teacher test scores

Distribution of test scores in Mozambique

Sensitivity of “Minimum Knowledge” to cutoff score in Tanzania

<table>
<thead>
<tr>
<th>Score for Minimum Knowledge (%)</th>
<th>Proportion of teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>90</td>
<td>0.1</td>
</tr>
<tr>
<td>80</td>
<td>0.2</td>
</tr>
<tr>
<td>70</td>
<td>0.3</td>
</tr>
<tr>
<td>60</td>
<td>0.4</td>
</tr>
<tr>
<td>50</td>
<td>0.5</td>
</tr>
<tr>
<td>40</td>
<td>0.6</td>
</tr>
<tr>
<td>30</td>
<td>0.7</td>
</tr>
<tr>
<td>20</td>
<td>0.8</td>
</tr>
<tr>
<td>10</td>
<td>0.9</td>
</tr>
<tr>
<td>0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

English

Maths

Pedagogy
Private versus public schools

Absence from school (%)

Absence from Class (%)

Time teaching (hours:minutes)

Minimum knowledge (%)

* Nigeria is 4 States
Service Delivery Quality Matters:

Within country differences: learning outcomes between a country’s best and worst schools differ by as much as 60 points

- **Best Schools**
  
  In top deciles of teacher presence, and subject knowledge, and in bottom decile of pupil/teacher ratio

- **Average schools**
  
  In 45th-55th percentile of teacher presence, and subject knowledge, and pupil/teacher ratio

- **Worst Schools**
  
  In bottom deciles of teacher presence, and subject knowledge, and in top ventile of pupil/teacher ratio.
Service Delivery Quality Matters:

Between country differences: learning outcomes in Nigeria’s best are worse than the outcomes in Kenya's worst schools

- **Best Schools**
  In top deciles of teacher presence, and subject knowledge, and in bottom decile of pupil/teacher ratio

- **Average schools**
  In 45th-55th percentile of teacher presence, and subject knowledge, and pupil/teacher ratio

- **Worst Schools**
  In bottom deciles of teacher presence, and subject knowledge, and in top ventile of pupil/teacher ratio.
Service Delivery Quality can change

Improvements in Tanzania

• In teachers’ effort…

- SDI 2010
- SDI 2014

<table>
<thead>
<tr>
<th></th>
<th>Tanzania</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>School absence</td>
<td>23%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Classroom absence</td>
<td>53%</td>
<td>47%</td>
<td>45%</td>
</tr>
<tr>
<td>School absence</td>
<td>36%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Classroom absence</td>
<td>68%</td>
<td>45%</td>
<td>50%</td>
</tr>
<tr>
<td>School absence</td>
<td>20%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Classroom absence</td>
<td>50%</td>
<td>47%</td>
<td>47%</td>
</tr>
</tbody>
</table>

• … which led to more teaching time

- SDI 2010
- SDI 2014
→ Trying to get more out of the data ...

How are teacher performance measures linked to learning outcomes?

(But recognizing the cross-sectional nature of the data)
What happens in the classroom matters

- Teacher/Classroom effects explain about 15% of variation in achievement
- Scope for changing what takes place in classroom to have impact
- Teacher skills matter
  - Teacher subject knowledge and pedagogical skill, instruction time, and practices each matter
  - Impacts on the order of 0.15 standard deviations of achievement
- But...
  - Considerable differences between classrooms remain after accounting for these characteristics
Classroom observation: Teachers’ practices

- Interacts with children as group 23%
- Reads or lectures to the pupils 10%
- Writes on blackboard 19%
- Listens to pupils answer/recite 8%
- Waits for pupil to answer 14%
- Testing 6%
- Other 11%
- Pupils write on board +0.6sd
- +0.6sd
- +0.3sd
- +0.7sd

Note: Average across Kenya, Mozambique, Nigeria, Tanzania and Uganda; Preliminary analysis
Using SDI Data: Not just a research/technical exercise

Moving students up in within the existing distribution of test scores is only one part of the challenge (only 15% of the variation explained by classroom/teacher factors)

An important part of SDI is injecting data into national debate—to help foster change that could move the entire distribution up
Teacher absenteeism: pupils best placed to fight vice

By Caroline Arinda

“Class, what is this?” a teacher asks out to his pupils in Kitibu Junior School in Kiruando town during a lesson. “Cut it as usual” the seemingly attentive pupils choruses.

Outside, however, a few teachers can be seen running off to the next class.

For a rural school, this is almost unheard of as typical school day for them entails a handful of teachers lounging under the school trees, while the pupils devour the fruits in the compound.

Only last year, it was a different story. “You would have found the teachers under the trees” the headmaster, Eunice Muga, explained.


Education in Kenya

Classroom divisions

The goal of wider enrolment, he argues, was “poorly conceived”, as it had up standards. A World Bank report in 2013 found that Kenyan teachers spend almost half the time. And pupils in Kenya’s state schools received on average two hours of instruction a day. Another study found that only one-third of teachers scored at least 80% when tested on the curriculum they teach.


http://www.ippmedia.com/frontend/?l=65875
Tanzania

• 2011: SDI results were presented at a closed Cabinet meeting: Minister of Education starts doing unannounced visits to schools and confirms SDI’s findings
• Feeds into environment with poor showing in UWEZO results, and disappointment with pass rates from primary school levers exam
• April 2013: Presidential initiatives use SDI data as diagnostics during planning for major reforms: Reform Compact and Big Results Now!
• April 2013: SDI data cited in blogs (see screenshots below; https://dfid.blog.gov.uk/2013/03/19/big-fast-accountable-results-now-mr-president/)
• June 2014: SDI indicators feed into and use to track performance of Government of Tanzania and World Bank/ project valued $122 million.
Thank you
### Sample sizes

Nationally representative; 1 sub-national level
Rural/urban; public/private

<table>
<thead>
<tr>
<th></th>
<th>Number of Observations</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Schools</td>
<td>Teachers Absenteeism</td>
<td>Teachers Assessment</td>
<td>Classroom Observations</td>
<td>Pupil Assessment</td>
</tr>
<tr>
<td>Tanzania</td>
<td>180</td>
<td>1750</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senegal</td>
<td>151</td>
<td>1252</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td>400</td>
<td>3670</td>
<td>1466</td>
<td>400</td>
<td>3831</td>
</tr>
<tr>
<td>Togo</td>
<td>195</td>
<td>865</td>
<td>631</td>
<td>200</td>
<td>1518</td>
</tr>
<tr>
<td>Nigeria</td>
<td>760</td>
<td>5371</td>
<td>1904</td>
<td>760</td>
<td>6644</td>
</tr>
<tr>
<td>Kenya</td>
<td>306</td>
<td>2950</td>
<td>1228</td>
<td>306</td>
<td>2953</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1992</strong></td>
<td><strong>15858</strong></td>
<td><strong>5229</strong></td>
<td><strong>1666</strong></td>
<td><strong>14946</strong></td>
</tr>
</tbody>
</table>

Notes: In the case of Tanzania and Senegal, since we use a different survey instrument for teacher assessment, classroom observation and pupil assessment.

* Nigeria is 4 States
## SDI Findings: Absenteeism and Time on Task in Public Schools

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</tr>
</thead>
<tbody>
<tr>
<td><strong>School absence rate</strong></td>
<td>20.1</td>
<td>15.2</td>
<td>44.8</td>
<td>16.9</td>
<td>18.0</td>
<td>15.3</td>
<td>23.0</td>
<td>22.6</td>
<td>29.9</td>
</tr>
<tr>
<td><strong>Classroom absence rate</strong></td>
<td>42.1</td>
<td>47.3</td>
<td>56.2</td>
<td>22.8</td>
<td>29.0</td>
<td>46.7</td>
<td>53.0</td>
<td>39.3</td>
<td>56.9</td>
</tr>
<tr>
<td><strong>Scheduled teaching time</strong></td>
<td>5h 31min</td>
<td>5h 31min</td>
<td>4h 17min</td>
<td>4h 44min</td>
<td>4h 36min</td>
<td>5h 54min</td>
<td>5h 12min</td>
<td>5h 28min</td>
<td>7h 13min</td>
</tr>
<tr>
<td><strong>Time spent teaching per day</strong></td>
<td>2h 53min</td>
<td>2h 30min</td>
<td>1h 41min</td>
<td>3h 10min</td>
<td>3h 15min</td>
<td>2h 57min</td>
<td>2h 04min</td>
<td>3h 15min</td>
<td>2h 56min</td>
</tr>
</tbody>
</table>

* Nigeria is 4 States
### Reasons for Absence

<table>
<thead>
<tr>
<th>Reason</th>
<th>Kenya</th>
<th>Mozambique</th>
<th>Nigeria</th>
<th>Togo</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sick</td>
<td>15</td>
<td>31</td>
<td>22</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>Maternity</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>In training</td>
<td>5</td>
<td>4</td>
<td>14</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Other approved absence</td>
<td>59</td>
<td>29</td>
<td>27</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Pick up salary</td>
<td>2</td>
<td>12</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>On strike</td>
<td>2</td>
<td>0</td>
<td>6</td>
<td>34</td>
<td>1</td>
</tr>
<tr>
<td>Not approved</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>18</td>
<td>26</td>
</tr>
<tr>
<td>Other /DK</td>
<td>9</td>
<td>10</td>
<td>5</td>
<td>18</td>
<td>16</td>
</tr>
</tbody>
</table>
What teacher activities correlate with test scores?

<table>
<thead>
<tr>
<th>Teaching from the front:</th>
<th>Students participating:</th>
<th>Assessment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interacts with children as a group</td>
<td>Pupils write on board</td>
<td>Testing</td>
</tr>
<tr>
<td></td>
<td>0.095</td>
<td>0.598</td>
</tr>
<tr>
<td></td>
<td>(0.113)</td>
<td>(.187)***</td>
</tr>
<tr>
<td>Reads or lectures</td>
<td>Kinesthetic group activity</td>
<td>Other:</td>
</tr>
<tr>
<td>-0.652</td>
<td>0.297</td>
<td>Discipline</td>
</tr>
<tr>
<td>(.166)***</td>
<td>(0.466)</td>
<td>-0.961</td>
</tr>
<tr>
<td>Writes on blackboard</td>
<td>Pupils answer/recite</td>
<td>Paperwork</td>
</tr>
<tr>
<td>0.236</td>
<td>0.706</td>
<td>0.18</td>
</tr>
<tr>
<td>(0.159)</td>
<td>(.197)***</td>
<td>(0.375)**</td>
</tr>
<tr>
<td>Interacting with individual children:</td>
<td>Wait for pupil to answer</td>
<td>Lesson length</td>
</tr>
<tr>
<td>Interacts with small group</td>
<td>0.257</td>
<td>0.018</td>
</tr>
<tr>
<td>0.296</td>
<td>(.136)*</td>
<td>(.003)***</td>
</tr>
<tr>
<td>(0.328)</td>
<td>Number off task</td>
<td></td>
</tr>
<tr>
<td>Interacts one on one</td>
<td>-0.012</td>
<td></td>
</tr>
<tr>
<td>0.07</td>
<td>(.006)**</td>
<td></td>
</tr>
<tr>
<td>(0.188)</td>
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</tr>
</tbody>
</table>

Note: Pooled data for Kenya, Mozambique, Nigeria, Tanzania and Uganda; Preliminary analysis