EGRA & EGMA: Overview & Experience

Presented at UNESCO Bangkok
Introduction to Large Scale Assessments of Learning
September 23-26, 2014
Sequence of Presentation

1. Overview & rationale
2. Assessment procedures
3. EGRA described
4. EGMA described
5. Uses of EGRA & EGMA
6. Influence on policy and instructional quality
Compare Two Readers

- Beginning reader
- Fluent Reader
Overview

- **EGRA** = Early Grade Reading Assessment
- **EGMA** = Early Grade Math Assessment

- Orally administered assessments that measure the **foundational** math & literacy skills that are predictive for success in those domains

- To evaluate; monitor progress; inform instruction, teacher education, & materials development

- Provide data to address reading & math failure & success from a systematic perspective

- Not a high stakes assessment
Shift from Access to Quality

■ Until recently big international goals = access, gender, completion

■ How do low income countries compare to high income countries?

- Gross primary enrollment: 95%
- Net primary enrollment: 80%
- Gender parity: 94%
- Completion: 58%
- Learning achievement: Approx 30%
Rationale

• Many national & international assessments are paper-and-pencil tests administered in grades four and higher. The assumption is that children can read and write.

• These assessment results often reveal what students do not know, but cannot identify what they do know.

• Lack of valid & reliable information about performance in the early grades to intervene early.

• Strong theoretical foundation supports quick adaption to meet demand for early assessments.
Development

- Created in 2007 & 2009 via USAID’s EdData IQC
- Formalized methodology, scientific panel, serious pilot tests, analysis of results.
- Collaboration with a range of stakeholders [www.eddataglobal.org](http://www.eddataglobal.org)
- EGRA used by governments & NGOs in 60 countries in over 100 languages to inform & guide instruction.
- All versions locally developed & adapted; Not translations (field test – pilot – refine – validity tests)
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EGRA Video

- Switch to EGRA video from flash (5 minutes)
Characteristic: Child-centered

1. Assessor & child interact one-on-one
2. Oral assessment ~20 minutes
3. Rapport & assent
4. Timing begins when child speaks
5. Early stop rule
6. Administered in a language the child understands
Characteristic: Technically adequate

- Consistent procedures & scoring
  - Administration time (60 seconds)
  - Prompt
  - Discontinuation rule
- Paper or tablet (Tangerine)
- Consistency between assessors (IRR)
- Face validity allows for parallel forms
- Concurrent validity
Characteristic: Electronic data collection

- Tangerine = Open-source data collection software
- Minimizes assessor error
- Removes data entry time & error
- Increases confidence in data

http://www.tangerinecentral.org/
Characteristics: Timing

1. Consistency between administrations
2. Skills becomes more accurate & automatic
3. Same items can show individual differences
4. Avoid ceiling effects
5. Avoid the need to create multiple levels
6. Informs instructional needs
Timing: Differentiates with same content

The diagram shows the percentage of students who read a certain number of correct words per minute, differentiated by their language proficiency: L1 (local language) and L2 or L3 (international language).

- The x-axis represents the number of correct words read per minute, ranging from 0 to 170.
- The y-axis represents the percentage of students, ranging from 0% to 15%.

The distribution indicates that students who read in their local language tend to have a higher percentage of students within the range of 50-69 correct words read per minute, compared to those who read in an international language.
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<table>
<thead>
<tr>
<th>EGRA Subtask</th>
<th>Reading Skill</th>
<th>Demonstrated via:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts about print</td>
<td>Knowledge of print</td>
<td>Indicate text direction, concept of word, more</td>
</tr>
<tr>
<td>Phonemic awareness: identification of onset/rime sounds; phoneme segmentation</td>
<td>Phonemic awareness</td>
<td>Identify initial or final sounds; or segment words into phonemes or syllables</td>
</tr>
<tr>
<td>Oral vocabulary</td>
<td>Knowledge of vocabulary</td>
<td>Receptive language task, point to body parts &amp; objects in the room, spatial</td>
</tr>
<tr>
<td>EGRA Subtask</td>
<td>Reading Skill</td>
<td>Demonstrated via:</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Listening comprehension</td>
<td>Comprehension</td>
<td>Respond correctly to literal &amp; inferential q’s about a text read to the child</td>
</tr>
<tr>
<td>Letter Identification: Names or Sounds</td>
<td>Alphabetic principle</td>
<td>Provide name or sound of upper &amp; lowercase letters in random order</td>
</tr>
<tr>
<td>Syllable reading</td>
<td>Alphabetic principle</td>
<td>Identify legal syllables in random order</td>
</tr>
<tr>
<td>EGRA Subtask</td>
<td>Reading Skill</td>
<td>Demonstrated via:</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Nonword reading</td>
<td>Alphabetic principle</td>
<td>Use knowledge of letter sound correspondence to decode</td>
</tr>
<tr>
<td>Familiar word reading</td>
<td>Automatic word reading</td>
<td>Read simple and common words</td>
</tr>
<tr>
<td>Oral reading fluency with comprehension</td>
<td>Oral reading fluency &amp; comprehension</td>
<td>Read a text w/ accuracy &amp; rate to respond to literal &amp; inferential question</td>
</tr>
<tr>
<td>Dictation</td>
<td>Alphabetic principle</td>
<td>Use letter sound knowledge to write a sentence</td>
</tr>
</tbody>
</table>
2. EGRA: Why these areas?

- They are predictive of future reading success/difficulty.
- They are easily measured.
- Instruction in these areas has an impact on child outcomes.
- If these areas are addressed reading trajectories can change.
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EGMA Video

- EGMA video from Vimeo start at 2.22

- http://vimeo.com/79483307
Criteria for Subtasks
- Represent a progression of foundational skills that support proficiency in mathematics
- Research indicates predictive power
- Include measures of both conceptual understanding and procedural fluency
- Common in many curricula for early grades
- Instructionally transparent
<table>
<thead>
<tr>
<th>EGMA Subtask</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Counting Fluency</td>
<td>Child asked to count as high as they can.</td>
<td></td>
</tr>
<tr>
<td>One-to-One Correspondence</td>
<td>Child asked to count circles on a page &amp; then asked how many there are.</td>
<td>● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>Number Naming Fluency</td>
<td>Child presented with a series of numbers &amp; asked to identify the them.</td>
<td>12 6 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 16 25</td>
</tr>
<tr>
<td>Quantity Discrimination</td>
<td>Child presented with two numbers &amp; asked to choose the one that is bigger.</td>
<td>10 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 12</td>
</tr>
<tr>
<td>EGMA Subtask</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Number Line</td>
<td>Child presented with an ungraded number-line &amp; asked to place a given number on it.</td>
<td></td>
</tr>
<tr>
<td>Estimation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing Number</td>
<td>Child presented with a series of numbers, with one number missing, &amp; asked what number should be there.</td>
<td>16, 17, ___, 19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30, ___, 40, 50</td>
</tr>
<tr>
<td>Word Problems</td>
<td>Child listens to a simple addition and/or subtraction story problem &amp; asked to solve it.</td>
<td></td>
</tr>
<tr>
<td>Addition &amp;</td>
<td>Child presented with a series of simple addition &amp; subtraction problems &amp; asked to solve them.</td>
<td>4 + 5 =</td>
</tr>
<tr>
<td>Subtraction</td>
<td></td>
<td>8 - 3 =</td>
</tr>
</tbody>
</table>
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Use: Locations across the globe
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Surveys increased awareness (Gove & Cvelich, 2010)

### Percentage of Students Who Could not Read a Single Word, 2008-2009

- Mali: French: 94%
- Mali: Bomu: 93%
- Mali: Fulfulde: 91%
- Uganda, Lango Subregion: English: 88%
- Mali: Songhoi: 84%
- Mali: Bamanakan: 83%
- Uganda, Lango Subregion: Lango: 82%
- Gambia: English: 54%
- Uganda, Central Region: English: 53%
- Uganda, Central Region: Luganda: 51%
- Nicaragua Atlantic Coast: Miskito: 35%
- Liberia: English: 35%
- Honduras, Rural Schools: Spanish: 29%
On average, letter recognition was not automatic.

This helped the stakeholders realize that children were not learning a key literacy skill. A subsequent intervention included explicit letter instruction.
Use: Compare intervention design

Gains over baseline in oral reading fluency by intervention type

<table>
<thead>
<tr>
<th>Intervention Type</th>
<th>National lang</th>
<th>Lingua franca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coach tablet</td>
<td>27</td>
<td>15.6</td>
</tr>
<tr>
<td>Teacher tablet</td>
<td>25.4</td>
<td>14.6</td>
</tr>
<tr>
<td>Child e-reader</td>
<td>23.2</td>
<td>14.3</td>
</tr>
<tr>
<td>Control</td>
<td>17</td>
<td>8.8</td>
</tr>
</tbody>
</table>
Oral reading fluency gains over baseline per dollar spent

- **Coach tablet**: 11.6
- **Teacher tablet**: 6.7
- **Child e-reader**: 1
- **Control**: 6.4

Legend:
- National lang
- Lingua franca
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Indicator</th>
<th>Words Faster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>Home Language=School</td>
<td>5.22*</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>6.54*</td>
</tr>
<tr>
<td>Pre-School</td>
<td>Attended</td>
<td>15.18*</td>
</tr>
<tr>
<td>Age</td>
<td>Of-Age (7-8yr)</td>
<td>9.31*</td>
</tr>
<tr>
<td>School Location</td>
<td>Remote</td>
<td>-7.32*</td>
</tr>
<tr>
<td>SES</td>
<td>Low</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Medium Low</td>
<td>4.46</td>
</tr>
<tr>
<td></td>
<td>Medium High</td>
<td>9.61**</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>13.81***</td>
</tr>
</tbody>
</table>
## Use: Inform teacher training

<table>
<thead>
<tr>
<th>Category</th>
<th>Referent</th>
<th>Words Faster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise book all completed &amp; marked</td>
<td>No pages</td>
<td>17.3*</td>
</tr>
<tr>
<td>Exercise book most completed &amp; marked</td>
<td>No pages</td>
<td>8.4*</td>
</tr>
<tr>
<td>Pupil work on the wall</td>
<td>None</td>
<td>6.2*</td>
</tr>
<tr>
<td>Has library pupils do not use it</td>
<td>No library</td>
<td>6.4*</td>
</tr>
<tr>
<td>Has library pupils use it</td>
<td>No library</td>
<td>14*</td>
</tr>
<tr>
<td>Majority of class time reading aloud</td>
<td>No time spent</td>
<td>-1.22</td>
</tr>
<tr>
<td>Corrects pupil, does not scold</td>
<td>Does nothing</td>
<td>8.1*</td>
</tr>
<tr>
<td>Repeat / clarify</td>
<td>Does nothing</td>
<td>7.9**</td>
</tr>
<tr>
<td>Checks for pupil understanding with assistance</td>
<td>No questions</td>
<td>13*</td>
</tr>
</tbody>
</table>
Use: Inform instruction

- Inference: 33.3%
- Comprehension 51+: 12.4%
- Fluency 26-50 wpm: 18.5%
- Word recognition 1-25 wpm: 24.2%
- Letter recognition 0 wpm: 11.7%
Use: Intervention monitor

Oral Reading Fluency (Words per Minute)

- Control = 0.6 wp month
- Light = 0.6 wp month
- Full = 2.3 wp month
Use: Explore relationships seen in the literature

Oral Reading Fluency by Identification of Familiar Words

- Average Oral Reading Fluency (WPM) vs. Number of Familiar Words Identified

- Data points show a trend where higher numbers of familiar words identified correlate with higher oral reading fluency.

- The graph displays a positive correlation, indicating that as the number of familiar words identified increases, oral reading fluency also increases.
Use: Explore prosody & comprehension
Summary EGRA & EGMA

- Assess foundational literacy & math skills that are predicative of later success

- EGRA: Measures oral & written language

- EGMA: Measures conceptual understanding & procedural fluency

- Technically adequate; Locally adapted; Flexible

- System level evaluation; Inform design; Evaluations
Resources

- https://www.eddataglobal.org/
- http://www.tangerinecentral.org/
- http://earlygradereadingbarometer.org
Thank you

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