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Research Design and Sampling Frameworks

Prepared for the USAID workshop
"Designing and Implementing Early Grade Reading Assessments: Understanding the Basics"

March 2015

Recap of Where We Are

- **Identification of Research Design and Sampling Framework**
- **Development/Adaptation of EGRA Instrument**
- **Procedures for EGRA Administration, Scoring and Data Capture**
- **Establishment of Electronic Data Capture System**
- **Enumerator Training, Assessment, and Selection**
- **Pilot and Full Data Collection**
- **Use and Dissemination of EGRA Results**
- **Planning and Managing EGRA Implementation**

Session Objectives

- Understand best practices of research design for pilot and full data collection, including:
  - common types of research design,
  - considerations for common EGRA designs, and
  - implications for sampling.

Why Assess Early Grade Reading in Your Context?

What is the purpose of EGRA?

What do you want to know

- by grade?
- by region?
- by language?
- by school type?
- by student sex?

Brainstorming Activity:
What is research? Research vs. assessment?

What are Common Types of Research Designs?

- Cross-Sectional Design
- Successive Independent Sample Design
- Longitudinal Design

Terms to Know

- Random Sample
- Representative Sample

Cross-Sectional Design

- Consists of one or more samples drawn from the population(s) at one point in time.
- Allows researchers to describe characteristics of the population(s) and to identify correlations between characteristics at that point in time.

Example:

EGRA administered once to a random sample of students in a nationally representative sample of schools in order to get a snapshot of student performance at that time.

Successive Independent Sample Design

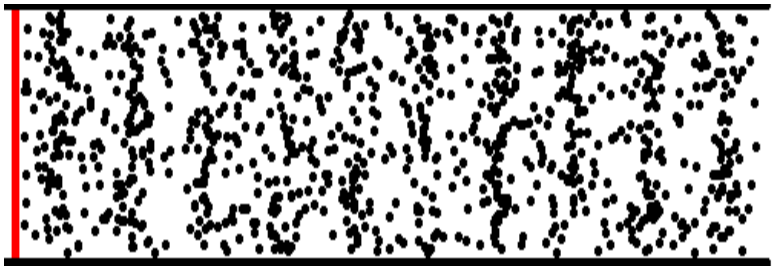
- A series of cross-sectional studies conducted over a period of time.
- Each study uses an independent sample.
- Allows researchers to study changes in the population(s) (but not specific individuals) over time.

Example:

EGRA administered to a random sample of students in a representative sample of schools at baseline and to another random sample of students at endline in order to monitor change in overall performance over time as the result of an intervention.

Longitudinal Design

- A series of cross-sectional studies conducted over a period of time.
- The same respondents are surveyed each time.
- Allows researchers to study changes in specific individuals over time.



Example:

EGRA administered to a random sample of students in a representative sample of schools at baseline, and again to the same students at endline, in order to measure change in their performance over time due to influence of a particular input.

What Are Common Purposes of EGRA?

- National Snapshot (*cross-sectional research design*)
- Regional Snapshot (*cross-sectional research design*)
- Program Evaluation (*successive independent sample or longitudinal, depending on design*)

- Who will participate in the intervention? Teachers? Parents? Students?
- At what scale will the intervention take place? Small-scale/pilot? Mid-scale/full-survey intervention? Full-scale implementation?

How Do Your Research Design, Population, and Budget Determine Your Sampling Frame?

Let's Discuss Sampling…

- What do you want to know?
  - Have there been changes in reading skills over time?
  - Do reading skills differ by grade?
  - Do reading skills differ between school types?
  - Do reading skills differ by region or district?

- The number and type of research questions will determine your sampling framework.

- Since your sample size will have a huge effect on your budget, you will need to identify a realistic number of research questions.

If life is like eating a box of chocolates….
sampling is like ladling from a pot of soup.

You don’t have to drink the whole pot of soup to know what it tastes like, but you do have to stir it well to make sure you get a good taste. In other words, you need to sample properly to ensure you get an accurate picture.

For example, if you want to know children's reading abilities in Grade 2 and Grade 3, you need to "ladle from two pots of soup"—i.e., sample children from each class.

Grade 2 **Grade 3**

Considerations

- What is your unit of sampling?
  - Typically, it's the school for an EGRA administration.

- How and where are your schools selected?
  - Schools are typically selected randomly.
  - Students are always selected randomly.

- When would you use replacement schools, and how many should you have available?
  - Replacement schools should be identified for every sampled school. They should be visited based on specified criteria (i.e., originally sampled school not functioning, etc.)

Best Practice: Consult with a statistician early in the planning process to make sure the research questions are feasible given sampling considerations. The statistician will also advise on a methodologically sound sampling framework given budgetary and other considerations.

Additional Considerations

- Amount of time available to collect data
- Distance to cover to reach schools (may need to cluster sample)
- Number of assessors you can hire
- Amount of equipment you can purchase

Best Practice: Engage with the Ministry of Education to obtain necessary information about schools (e.g., location, number of teachers per grade, number of students per grade, and schedule).

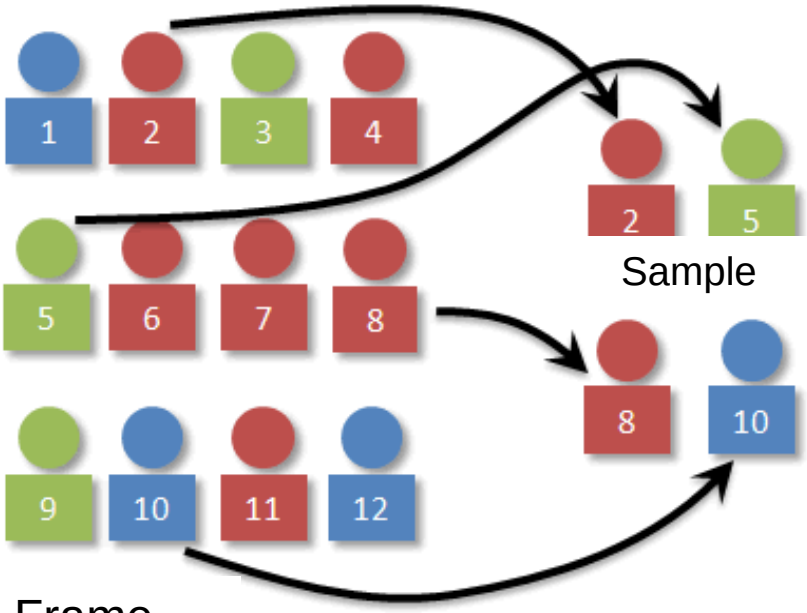
How Does Your Research Design, Population, and Budget Determine Your Sampling Frame?

- Your sampling frame is a list of all individuals in the population of interest.
  - *For example, if you want to know the reading performance of Primary 2 students in Region X, all P2 students in Region X make up your sampling frame*.

- Generally, however, you will not have the resources to test all individuals in your sampling frame. This is where sampling comes into play.

How Does Your Research Design and Your Budget Determine Your Sampling Method?

- Your sampling method is the procedure you use to select individuals from your sampling frame.
  - *For example, if your sampling frame is P2 students in Region X, you would sample a certain number of P2 students in Region X to make up your sample*.



Select a Sampling Method Based on Your Research Design

Census Sample

- *Sample all individuals in a population*
  - Provides the most comprehensive information
  - Most studies do not have the resources to use this method

Convenience Sample

- *Sample a subset of individuals based on a factor that is convenient (e.g., location or prior relationship)*
  - By definition, method is convenient
  - Risks introducing bias into the sample

Random Sample

- *Sample is selected by a random method*
  - Is the most rigorous method since it minimizes sampling bias
  - Size of sample is determined based on various factors

EGRA: Typical Sampling Approach

- EGRA is a sample-based assessment because it is *not* administered to ALL students. Rather, it is administered to a sample of students. Data collected from this sample are used to determine how the overall population (e.g., all Grade 2 students in a region) performs.

- We typically rely on a sample of schools and a sample of students within a school to tell us how a target population is performing. Otherwise, it would be too expensive and take too much time to test ALL students.

EGRA: Typical Sampling Approach, continued

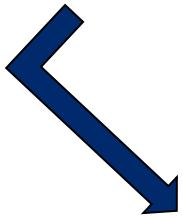
- Statistical analyses tell us how many schools we need to visit and how many students we need to test in order to gather data that are accurate and representative of the target population.

- When researchers are determining how many analysis groups should be evaluated, it is important to take into account the overall number of students who will be tested and whether the budget can accommodate this number.

- When sampling, consider whether stratification is relevant in a given context and when random selection and assignment are possible. Refer to the *EGRA Toolkit* for sampling guidance.

EGRA: Typical Sampling Approach, continued

- Based on previous EGRA surveys, one typically needs approximately 400 participants per analysis group in order to achieve a data precision level of +/- 7 correct words per minute (CWPM) on the oral reading fluency subtask.
  - For example: 400 Grade 1 students in Region X and 400 Grade 2 students in Region X).



In general, the appropriate sample size is calculated using the variance of historical data from the given country.

Best Practice: Work with the Ministry to get an accurate school list prior to sampling that includes enrollment data by grade and region. This will substantially simplify sampling.

Example: Sample of Students from Different School Types

	Grade 2	Grade 3	Total
Public schools	400	400	800
Private schools	400	400	800
Nonformal schools	400	400	800
Total	1,200	1,200	**2,400 pupils**

General EGRA Sampling Guidance

- Generally, we assess 10-12 children per grade to obtain a representative sample size for a given population.
- For the previous example, we would need to sample 100-120 schools (2,400 pupils ÷ 2 grades = 10-12 pupils/grade = 100-120 schools).
- If the number of schools is too many (given budget and time constraints), reduce the pupil sample size. (Of note: Pupils tend to vary more between schools than within, so sampling more schools is usually preferable to sampling more students within the same school to obtain a target sample size.)
- Conduct EGRA in two grades whenever possible, in order to identify any grade-level gains.
- *Don't forget!* Adjustments to the sample will in turn require changes to your research questions.

Refer to EGRA Toolkit annex for more detailed sampling guidance.

Exercise A:

Research Design and Sampling Frame Activity