

# NRS Myth Busters: The Truth About Adult Education

American Institutes for Research

# Day 2

# Reviewing Day 1

- ▶ State Presentation of Topics and Plans
- ▶ Research Planning Model
- ▶ Introduction to Planning Tool
- ▶ Procedures: Your Method for Research
- ▶ Data Quality Issues and Threats to Validity
- ▶ Questions and Discussion

See Agenda

# Agenda – Day 2

- ▶ Presentations and Discussion With ELC Participants
- ▶ Refining Your Research Question
- ▶ Research Design
- ▶ Analysis, Reporting, and Sample Size
- ▶ State Planning Time: Research Design

# STATE ELC PRESENTATIONS



# Break



National Reporting System  
for Adult Education

Adult Education Data System  
National Reporting System for Adult Education

# Refining Your Research Questions

# Identify Topics

- ▶ **Research Topics**
  - **Recruitment:** Who are my students? What are their needs?
  - **Long-term outcomes:** How quickly do adult education students transition into postsecondary?
  - **Learning:** What do they learn? What are effective ways to teach them?
- ▶ **Management and Performance**
  - Meeting targets
  - Managing better
  - Effectiveness of state initiatives
- ▶ **Curiosity**
  - I wonder...? Why...?

# Develop Questions

An ineffective question is:

- Too general
- Has several questions imbedded
- Cannot be answered with available time and resources



# Develop Questions

A good research question is...

- Clearly stated
- Simple
- Focused and specific
- Possible to address with the time and data available



# Importance of a Well-Formed Question

- ▶ Defines what the research will address
- ▶ Focuses the topic
- ▶ Identifies the data you need
- ▶ Suggests appropriate designs
- ▶ Helps determine conclusions you can draw

# Developing Good Questions

| Poor Question                                                | Good Question                                                                          | Better Question                                                                                                           |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Is my program effective for all students?                    | Do different types of students in my program have better program outcomes than others? | How does attaining a GED, entry into employment, and education gain differ by student age and ethnicity?                  |
| How long do students have to be in our program to be helped? | Does longer retention in our classes help our students learn?                          | What is the average and range of instructional hours attended among students who gained an educational functioning level? |
| What is a good teacher?                                      | Does student learning differ by teacher?                                               | Do students in classes taught by teachers who have more education and experience have higher test scores?                 |

# Defining Inputs and Outputs

- ▶ Inputs are the intervention or student/teacher factors you want to study
- ▶ Outputs are the “outcomes” you are interested in
- ▶ These need to be specified, made measurable

Q: How would we make the following input and output measurable?

“Is attendance [input] related to learning [output]? ”



# Help Out a State – Private Eyeland

- ▶ Myth – Teachers don't need training. Good teachers are just good teachers naturally.
- ▶ Beginning Question:

*Is our new PD program making a difference?*

- ▶ Is this a good question?
- ▶ How would you improve this question?

# Private Eyeland – Data

- ▶ *Do teachers who participate in the new intensive PD program being piloted by the state have a higher percentage of students making an EFL gain than similar teachers who do not participate in the pilot PD?*
- ▶ What are the inputs/outputs?
- ▶ What data will they need to bust this myth?

# Private Eyeland – Data

- ▶ *Do teachers who participate in the new intensive PD program being piloted by the state have a higher percentage of students making an EFL gain than similar teachers who do not participate in the pilot PD?*
- ▶ What existing data are available to address this question?
- ▶ Is additional data collection needed to answer this question?

# Now Help Out Curiosityville

- ▶ Look at Handout 8a.
- ▶ Review the state's research question.
- ▶ As a team, determine whether or not it is a good question, and help the team develop a revised question.

See Handout 8a: Curiosityville  
Research Question

# Curiosityville: Data

- ▶ Look at Handout 8b
- ▶ Determine the following for Curiosityville:
  - Inputs
  - Outputs
  - Data needed
  - Data available

See Handout 8b: Curiosityville  
Data

# Activity: Refine Your Research Question

- ▶ Adjust sections A & B of your planner accordingly
- ▶ 5-minute presentation for each state with 5-minute Q&A among state teams

See Handout 4: Evaluation/Research Planner Sections A&B

# Working Lunch

## Continued Refinement of Research Questions

# Thinking About Data

# Identify Data Sources

- ▶ After the question is clear and deconstructed, you can identify data sources
- ▶ Existing data: available from your NRS data base
- ▶ Other extant data sources
- ▶ Additional data collection may be needed, such as:
  - Questionnaires, surveys
  - Interviews
  - Classroom observations

# Questions and Sources

| Topic                                                            | NRS Data in Database                                                            | Other Data Possibly in Program Database            | Data May Not Be in Database                                                  |
|------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------|
| <i>Do teacher characteristics affect student learning gains?</i> |                                                                                 |                                                    |                                                                              |
| Teachers and Instruction                                         | Attendance; teacher certification and years of experience beginning with PY2012 | full – or part-time status, age, gender, ethnicity | Teacher education, credential, professional development, years of experience |
| Learning Gains                                                   | Educational functioning level, level advancement                                | Test scores                                        | None                                                                         |

# Extant Data Sources

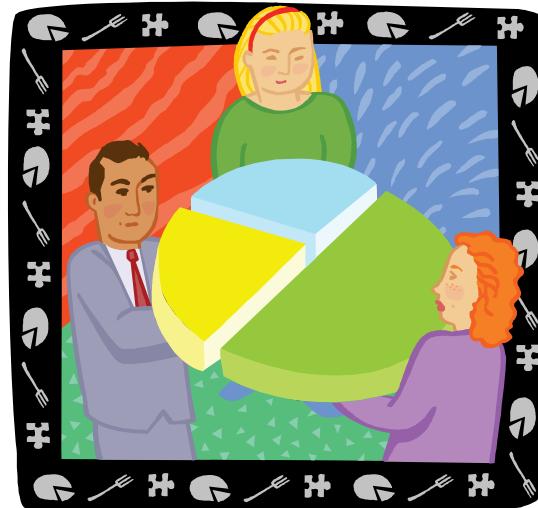


National Reporting System  
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See Handout 9: Extant Data Sources

# Revisiting Data Collection

Now that you have refined your research question, revisit Section C: Data Sources in your planner.



See Handout 4: Research/Evaluation  
Planner Section C

# Research Design

# Research Design

- ▶ Organizes how you will collect, analyze, interpret, and report the data
- ▶ Determined by research question and resources available
- ▶ Helps control for alternative explanations
- ▶ Designs for main types:
  - Exploratory study
  - Formative evaluation
  - Summative evaluation

# Additional Data: Alternative Explanations

- ▶ Other factors affect the “input–output” relationship
- ▶ Need to “control” or understand them as much as possible
- ▶ Example: attendance and test gains—what else can affect gains?
- ▶ Identify and get the most important measures

# Research Methods

- ▶ Exploratory studies – “I want to learn more.”
  - Descriptive/correlational
  - Qualitative
- ▶ Formative evaluation – “How well is it working?”
  - Implementation
  - Progress evaluation
- ▶ Summative evaluation – “How well did it work?”
  - Experimental
  - Quasi-experimental

# Which Research Methods Do I Use?

| Example Goals                                            | Type of Data | Possible Methods                                               |
|----------------------------------------------------------|--------------|----------------------------------------------------------------|
| Explore whether outcomes vary by different student types | Quantitative | Descriptive study                                              |
| Explore relationships                                    | Quantitative | Correlational study                                            |
| Study how well a new intervention is being implemented   | Qualitative  | Implementation study using expert observation and focus groups |

# Which Research Methods Do I Use?

| Example Goals                                     | Type of Data | Possible Methods                          |
|---------------------------------------------------|--------------|-------------------------------------------|
| Study how well a new intervention is working      | Quantitative | Correlational or quasi-experimental study |
| Study whether an established intervention “works” | Quantitative | Quasi-experimental or experimental study  |



# Break



National Reporting System  
for Adult Education

Adult Education Data  
Tool  
Version 2.0

# Sample Size

# Why Does Sample Size Matter?

- ▶ You want to collect enough data to answer your research questions.
- ▶ The type and number of participants you include in a study determine what you can conclude from the results.
  - Representativeness
  - Statistical power

# Sample Selection Factors for Each Study Type

- *Representativeness* matters for all study types
- *Statistical power* matters only when you want to do formal tests of hypotheses (statistical tests using quantitative data)
- Note: These sample selection factors matter only when you do not use data for all students

# Sample Size: How Much Do I Need?

- ▶ Type of study
- ▶ What conclusions you want to draw



*A subset of the population.*

# Sample Size: Other Considerations

- ▶ Resources
- ▶ Time
- ▶ Data quality
- ▶ Availability
  
- ▶ Point of diminishing returns: More is not always better

# Sampling

- ▶ Universe
- ▶ Random
- ▶ Convenience



# Sample Type Options: Universe

## *Universe Sample*

- Uses data on all students, teachers, or programs, or all students, teachers, or programs of a specific type
- Also called the “population” of interest
- Use a universe sample if you are using NRS data to do a secondary analysis

# Sample Type Options: Random

## *Random sample*

- Uses data from a representative subset of universe
- You may use random sampling if you are collecting completely new data



The screenshot shows a Microsoft Internet Explorer window displaying the Stat Trek website at <http://www.statstrek.com/statistics/random-number-generator.aspx>. The page title is "Random Number Generator". On the left, there's a sidebar with links for "Tools for Statistics" (Probability Calculators, Mathematical Analysis), "Tutorials" (AP Statistics, AP Statistics), and "Stat Tables" (Binomial, Chi-Square, F Distribution, etc.). The main content area contains instructions for using the generator, input fields for number count (10), minimum value (1), maximum value (80), and options for allowing duplicates and setting a seed. Below this is a "Random Number Table" section showing 10 random numbers: 56, 11, 09, 52, 23, 56, 28, 35, 75, 43. A note below the table specifies the range was 1 to 80, and numbers were randomly selected without replacement. At the bottom, there's a "Frequently Asked Questions" section and a sidebar for "ShareFile".

# Sample Type Options: Convenience

*Convenience (or “purposive”) sample*

- Uses data from a handpicked subset of universe
- Good approach for qualitative studies



# Sampling Tables – Review From NRS Guidelines

- ▶ Sample size tables are provided in the appendix of the Planning Guide
- ▶ To find your sample size, decide...
  - If you want to report at the state or program level
    - Use either the state or program sample table
  - If you want to be able to make any group comparisons
    - If yes, do you expect a small, medium, or large difference? Use the corresponding column
    - If no, use the numbers in the “large” difference column

## Appendix

### State Sample Sizes for NRS Reporting

- Reporting at the state level,
- Don't want to make group comparisons, and
- Want to study a sample of a total population of 4500

| Number of Eligible Learners in Cohort | Minimum Sample Size Required to Detect Difference of: |                    |                   |
|---------------------------------------|-------------------------------------------------------|--------------------|-------------------|
|                                       | 10 Percent (Large)                                    | 5 Percent (Medium) | 3 Percent (Small) |
| 1 to 200                              | All                                                   | All                | All               |
| 201 to 400                            | 200                                                   | All                | All               |
| 401 to 600                            | 200                                                   | 400                | All               |
| 601 to 800                            | 210                                                   | 500                | 600               |
| 801 to 1000                           | 225                                                   | 500                | 710               |
| 1001 to 1200                          | 225                                                   | 550                | 865               |
| 1201 to 1400                          | 225                                                   | 630                | 990               |
| 1401 to 1600                          | 230                                                   | 660                | 1075              |
| 1601 to 1800                          | 240                                                   | 715                | 1170              |
| 1801 to 2000                          | 245                                                   | 715                | 1220              |
| 2001 to 2200                          | 250                                                   | 740                | 1300              |
| 2201 to 2400                          | 250                                                   | 755                | 1350              |
| 2401 to 2600                          | 250                                                   | 780                | 1425              |
| 2601 to 2800                          | 250                                                   | 795                | 1480              |
| 2801 to 3000                          | 250                                                   | 805                | 1515              |
| 3001 to 3200                          | 255                                                   | 835                | 1600              |
| 3201 to 3400                          | 255                                                   | 835                | 1630              |
| 3401 to 3600                          | 260                                                   | 850                | 1690              |
| 3601 to 3800                          | 260                                                   | 855                | 1700              |
| 3801 to 4000                          | 260                                                   | 885                | 1830              |
| 4001 to 4200                          | 260                                                   | 885                | 1830              |
| 4201 to 4400                          | 260                                                   | 885                | 1830              |
| 4401 to 4600                          | 260                                                   | 890                | 1840              |
| 4601 to 4800                          | 265                                                   | 910                | 1900              |
| 4801 to 5000                          | 265                                                   | 910                | 1940              |
| 5001 to 5500                          | 265                                                   | 945                | 2100              |
| 5501 to 6000                          | 265                                                   | 945                | 2100              |
| 6001 to 6500                          | 265                                                   | 945                | 2100              |
| 6501 to 7000                          | 265                                                   | 950                | 2120              |
| 7001 to 7500                          | 270                                                   | 965                | 2200              |
| 7501 to 8000                          | 270                                                   | 965                | 2210              |

## Program Sample Sizes for Optional Program-Level Estimates

- Reporting at the program level,
- Want to make group comparisons, and
- Expect to find small differences within a cohort of 7500

| Number of Eligible Learners in Cohort | Minimum Sample Size Required to Detect Difference of: |                    |                   |
|---------------------------------------|-------------------------------------------------------|--------------------|-------------------|
|                                       | 10 Percent (Large)                                    | 5 Percent (Medium) | 3 Percent (Small) |
| 5                                     | 5                                                     | 5                  | 5                 |
| 10                                    | 10                                                    | 10                 | 10                |
| 20                                    | 19                                                    | 20                 | 20                |
| 50                                    | 43                                                    | 48                 | 50                |
| 100                                   | 74                                                    | 92                 | 97                |
| 200                                   | 116                                                   | 170                | 188               |
| 300                                   | 144                                                   | 236                | 274               |
| 400                                   | 163                                                   | 294                | 354               |
| 500                                   | 178                                                   | 344                | 430               |
| 600                                   | 189                                                   | 389                | 502               |
| 700                                   | 198                                                   | 428                | 570               |
| 800                                   | 205                                                   | 463                | 634               |
| 900                                   | 211                                                   | 495                | 696               |
| 1000                                  | 216                                                   | 524                | 754               |
| 1250                                  | 226                                                   | 585                | 887               |
| 1500                                  | 233                                                   | 635                | 1006              |
| 1750                                  | 238                                                   | 675                | 1113              |
| 2000                                  | 242                                                   | 709                | 1208              |
| 3000                                  | 252                                                   | 804                | 1513              |
| 5000                                  | 261                                                   | 901                | 1895              |
| 7500                                  | 265                                                   | 958                | 2168              |
| 10000                                 | 268                                                   | 990                | 2337              |
| 12500                                 | 269                                                   | 1010               | 2452              |
| 15000                                 | 270                                                   | 1023               | 2534              |
| 17500                                 | 271                                                   | 1033               | 2597              |
| 20000                                 | 271                                                   | 1041               | 2646              |

# Exercise

- ▶ Using the appendix of the guide, find the required sample size when:
  1. You do not need to report out at the program level
  2. You do not need to be able to make comparisons
  3. The overall adult education population you want to study is 12,000

# Private Eyeland – What We Know

- ▶ *Do teachers who participate in the new intensive PD program being piloted by the state have a higher percentage of students making an EFL gain than similar teachers who do not participate in the pilot PD?*
  
- ▶ Inputs: Teacher pilot PD participation, lack of participation
- ▶ Outputs: Student EFL gain
  
- ▶ Student pre- and posttest scores data
- ▶ Professional development participation data for all teachers involved

# Help Private Eyeland With Research Design

- ▶ What kind of study are they conducting?
- ▶ Are there any external factors to consider that could affect the results?
- ▶ What type of research design will be used?
- ▶ Why?

# Help Curiosityville With Research Design

- ▶ What kind of study are they conducting?
- ▶ Are there any external factors to consider that could affect the results?
- ▶ What type of research design will be used?
- ▶ Why?

See Handout 8c: Curiosityville Research Design

# State Planning Time: Research Design



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See Handout 4:  
Evaluation/Research Planner

# Questions and Discussion

# $+/\Delta$ for Day Two