Evaluation Learning Community (ELC) 2019

AMERICAN INSTITUTES FOR RESEARCH
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Welcome, Introductions, and Training Overview

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Objectives

The Evaluation Learning Community (ELC) is intended to serve as a primer and a framework for state teams to conduct evaluation activities (i.e., research)

Through participation in the ELC (2019–20), state teams will …

- Understand the main approaches to research and evaluation
- Develop and refine a logic model and research questions
- Create feasible evaluation and continuous improvement plans
- Implement the evaluation plan
- Begin to implement the continuous improvement plan

Agenda

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Planning Guide

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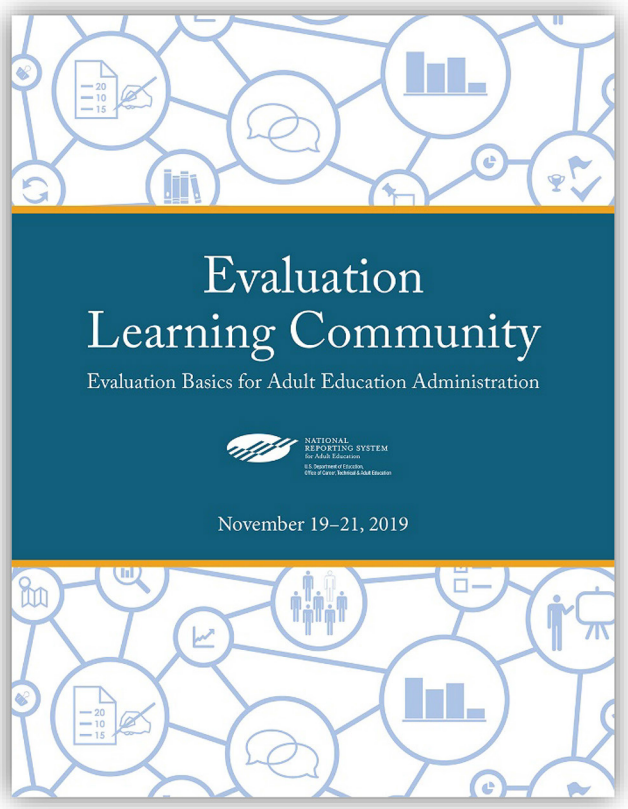
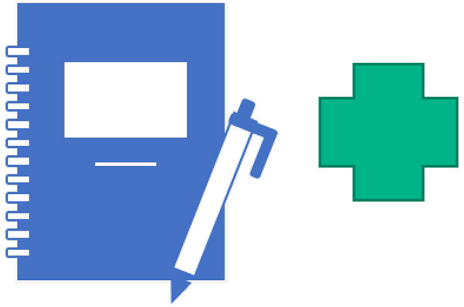
Planning Guide



Workbook icon



e-plan

Both at: https://courses.nrsweb.org/course/view.php?id=53

Opening Activity

Icebreaker

Monitoring and Evaluation in Everyday Life

- Review the icebreaker handout and identify whether the activities listed are monitoring or evaluation
  - Find a participant you do not know and discuss your responses
  - Identify other monitoring and evaluation activities from everyday life, unrelated to your work
- Introduce your partner and present your responses to the whole group

Handout

See Planning Guide, p. 29

Evaluation Planning Model

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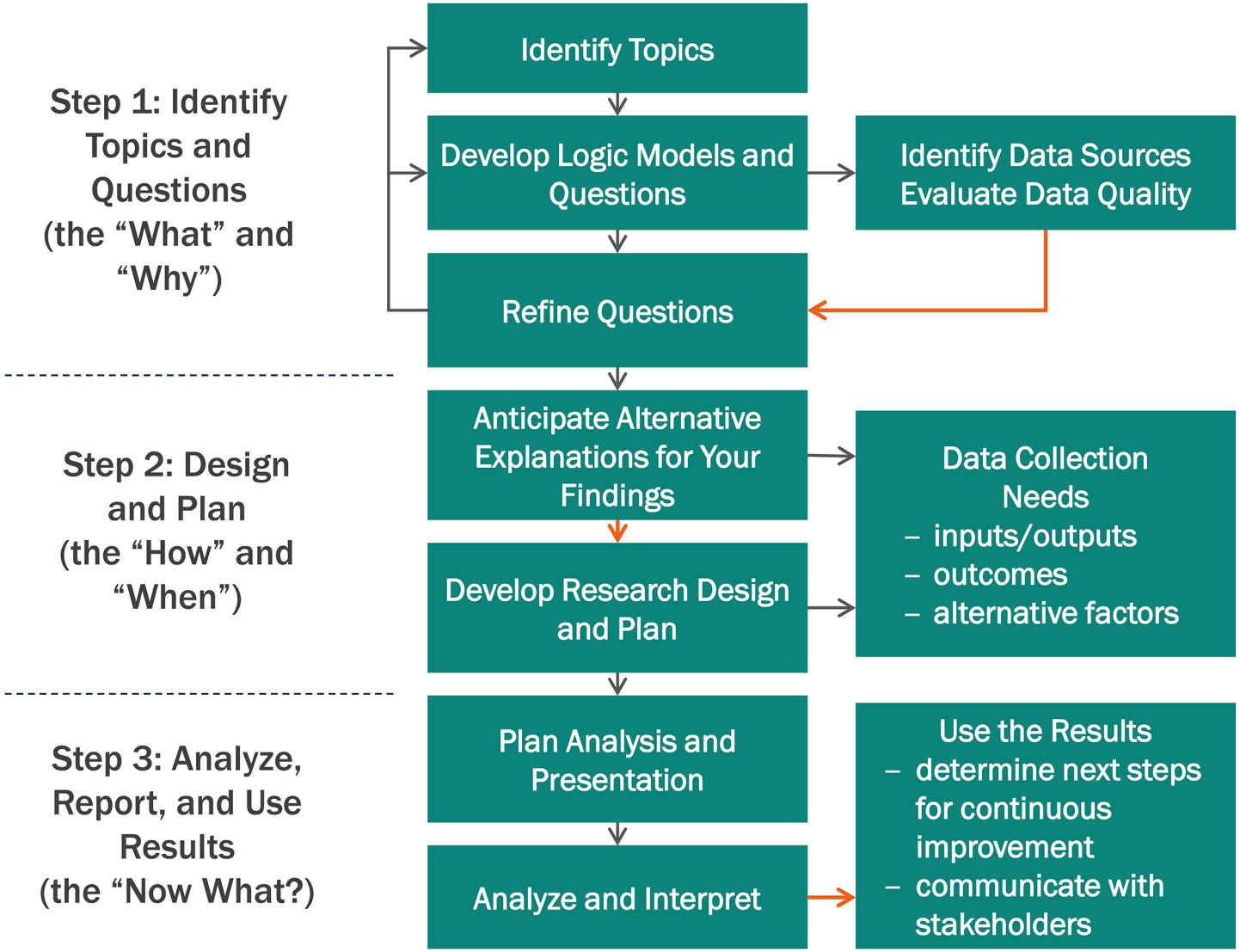
Evaluation Planning Model Overview

- Basic step-by-step model from idea state to using findings:
  1. Identify evaluation topics and questions
  2. Design and plan study
  3. Analyze, report, and use results
- Includes basic research design concepts using nontechnical language and approach
- Will guide your research plans

Evaluation Planning Model



Step 1: Identify Topics and Questions

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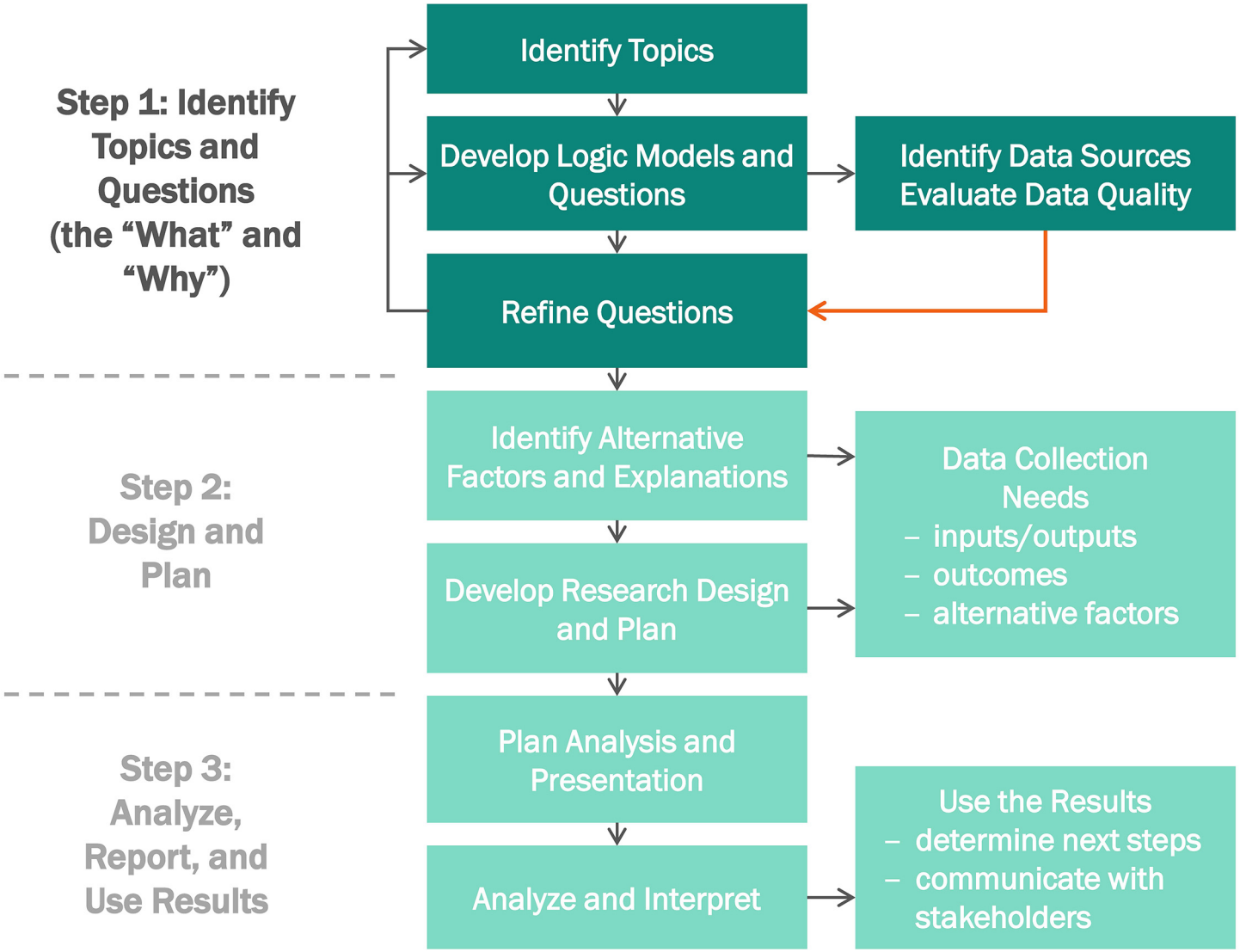
Evaluation Planning Model—Step 1



Identify Topics: What Are Your Goals?

- Why do research and evaluation?
  - What information do you or stakeholders hope to gain?
  - Are there requirements for evaluation that you need to fulfill (e.g., WIOA)?
  - Which services or activities in your state would be timely to study (e.g., to make decisions before a statewide rollout)?

Identify Topics: What Do You Want To Know?

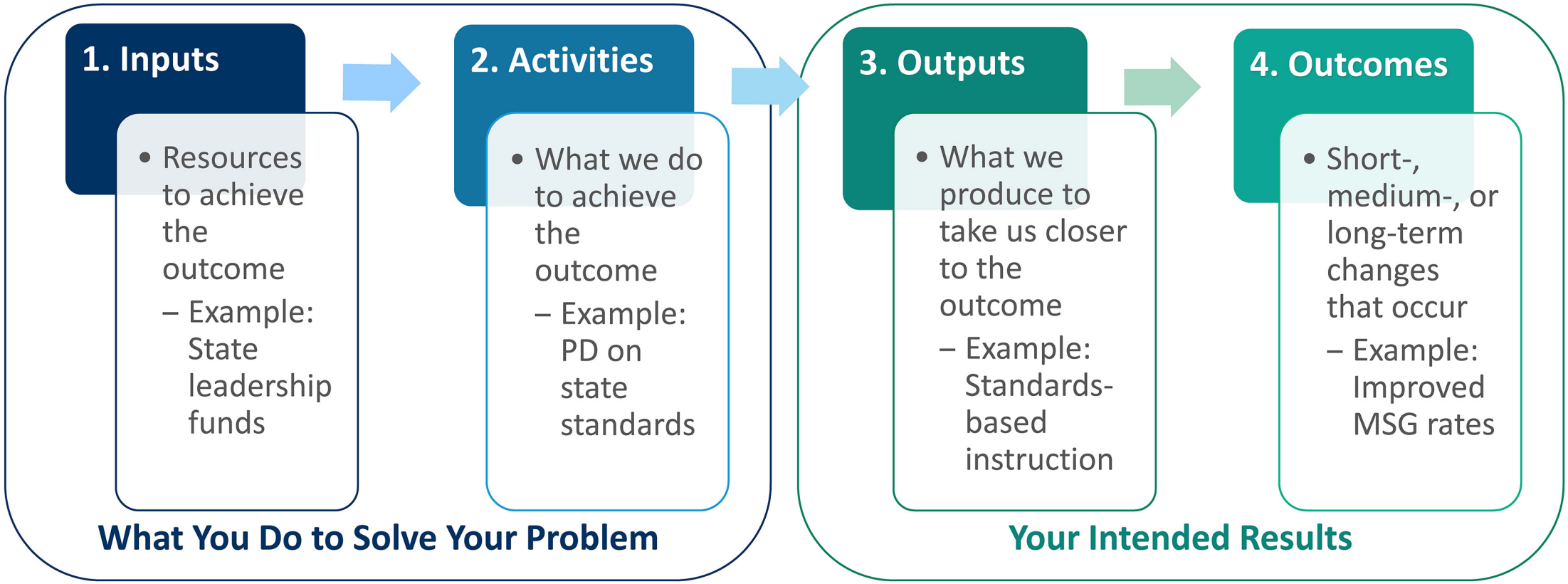
- Focus the evaluation on areas of concern such as these:
  - Participants—characteristics and coverage of target population
  - Services—providing the right services to appropriate participants
  - Outcomes—achieving targets

A Logical Progression—Getting Started

It can help to start defining your topic by stating it in terms of a *problem* you're trying to solve, the *strategy* you're using to solve it, and the desired *outcome*.

A Logical Progression—Outline of a Logic Model

Next, add more structure and detail to your topic. Typically, evaluations are guided by some type of logic model.



Evaluation Logic Models

- Provides specificity about the topic(s) to be studied—helps in planning
- Depicts in a chart how activities affect outcomes in a logical sequence
- Logic models consist of
  - Topic and goals: what you are evaluating and what you want to accomplish
  - Inputs (program resources)
    - » Examples: teachers, staff, funding
  - Activities & Outputs: what the program does with its resources and for whom
    - » Examples: training, webinars, written resources for administrators or teachers, curriculum, instruction

Evaluation Logic Models (continued)

- Outcomes: results of activities
  - Examples:
    - » Short term—skills and learning gains
    - » Intermediate—obtain secondary diploma, enter postsecondary education
    - » Long term—obtain employment, credentials
- Alternative explanations or external factors that could affect the outcomes
  - External events or conditions that might affect or explain your outcomes

Logic Model Example 1: Improving IET Program Outcomes

- Topic question: How can we improve IET program outcomes?
- Inputs (resources):
  - Funding for IET programs
  - Teachers trained in IET instruction
  - Providers of IET instruction
  - Relationships with employers

Logic Model Example: Improving IET Program Outcomes: Outputs and Outcomes

Outputs (activities) for participants

- Number of classes taken
- Contact hours received
- Other training services received

Outputs (activities) for teachers and staff

- Professional development on IET instruction, materials use, program design

Outcomes

- Short term
  - Skill gains
  - Job placement
- Intermediate
  - Job advancement, higher wages
  - Employer satisfaction (e.g., repeat business)
- Long term
  - Reduced unemployment, higher skilled workforce

Break—Please Return in 15 Minutes

Simple Logic Model Tool

As a team, use your topic and the outcomes you are trying to achieve to flesh out your logic model using the template.

See Planning Guide, p. 10

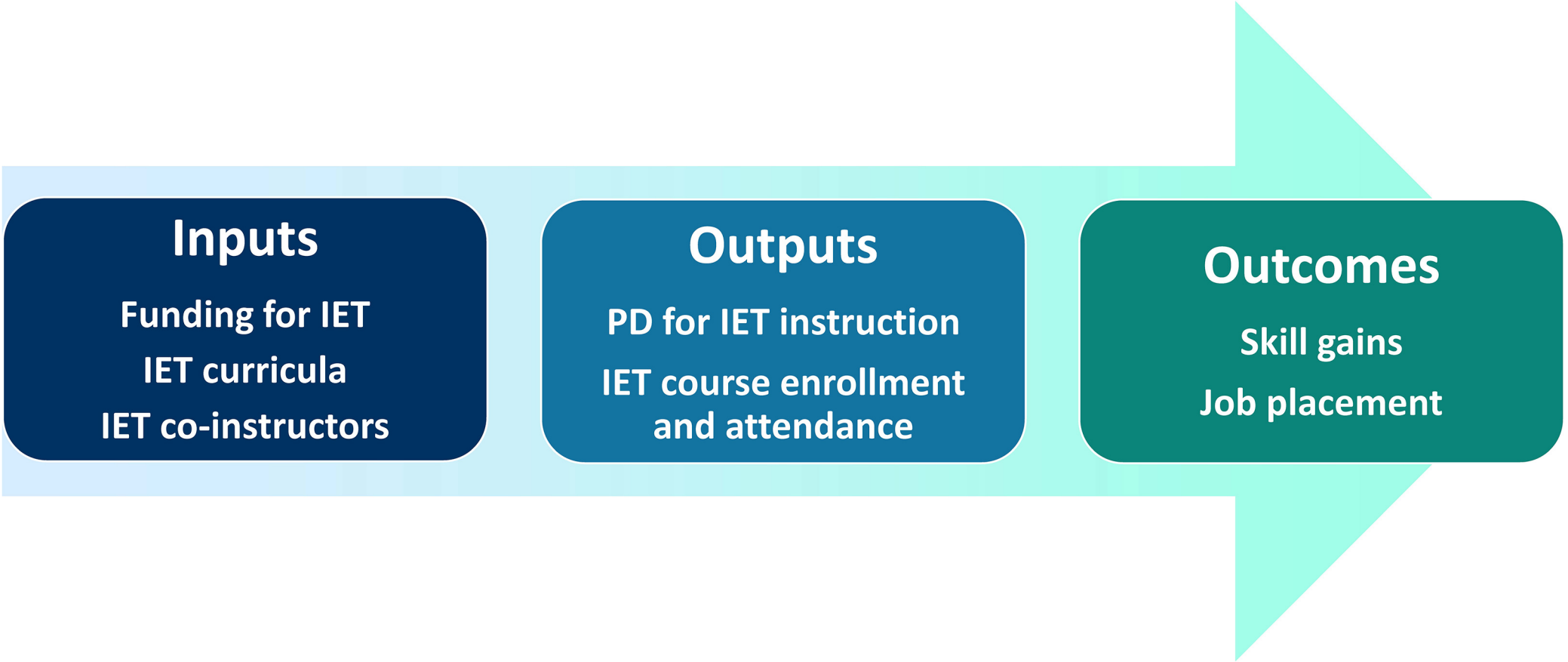
A Logical Progression: Develop Research Questions

Research questions …

- Help you translate the logic model into something actionable
- Guide you in identifying the data you need
- Suggest appropriate research designs
- Reflect what conclusions can be drawn

Logic Model → Research Questions

In the IET logic model example here, what do we really want to know?



Tips for Developing Good Research Questions

An ineffective question …

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

A good research question is …

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

Poor-Good-Better Research Question Activity

In your team, improve the research questions in the workbook. We will discuss the improvements as a whole group.

See Planning Guide, p. 11

Poor-Good-Better Research Questions

Poor question	Good question	Better question
Is my program effective for all students?	Do some 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 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?

Identify Data Sources for Answering Your Questions

After the question is clear and deconstructed, you can identify data sources

- Sources from monitoring
  - Desk monitoring
  - Onsite monitoring
  - Program visits
- Reports
  - Dashboard data
  - Reports from data system
  - State reports

Map Data Elements to Research Questions

Input, output, or outcome	NRS data	Other data possibly in program database
Are teacher characteristics related to student learning gains in IET?		
Teachers	• Licensure • Years of experience • Full- or part-time status	• Degrees • Participation in IET PD
PD in IET instruction	• N/A	• Provision of IET PD
Learning gains in IET	• MSGs	• Test scores

Assess Data Coverage: Do You Have What You Need?

- Coverage—whether you have enough data, data of sufficient depth, or data from enough of your subjects
- Possible coverage issues:
  - No data available
  - Too much missing data
  - Different tests or other measures used
  - Data availability varies across local programs
  - Poor data quality

Some Ways to Resolve Data Quality Problems

General

- Review error checks in data system
- Look at tables of all data to gauge missing data and identify errors

Definitions and coding issues

- Recode by combining or creating categories (e.g., age, race/ethnicity)
- Separate analyses for incompatible variables (e.g., look separately at different tests)

Some Ways to Resolve Data Quality Problems (cont.)

Missing data

- Obtain data from another source
- Use classes, programs that have the data
- Statistical correction (complicated!)

Coverage

- Use proxy measures (e.g., student years of education for literacy level)

If all else fails

- Collect new data or revise your research question

Look at Your Data and Refine Research Questions and Logic Model

Map out the data you will need for the inputs, outputs, and outcomes you outlined in your logic model.

Think about the NRS data you have, other data you have, or data you may need to access and gather to supplement those data. Enter the information in the chart in the workbook.

Post your revised research questions and logic model on a flip chart

See Planning Guide, p. 13-17

Logic Model Gallery Walk

- Walk through the Logic Model Gallery
- Briefly reconvene with your team
- Assign one person from your state team to briefly report out the following:
  - Your research questions, input and outputs and outcomes
  - One takeaway from another state's logic model

Lunch

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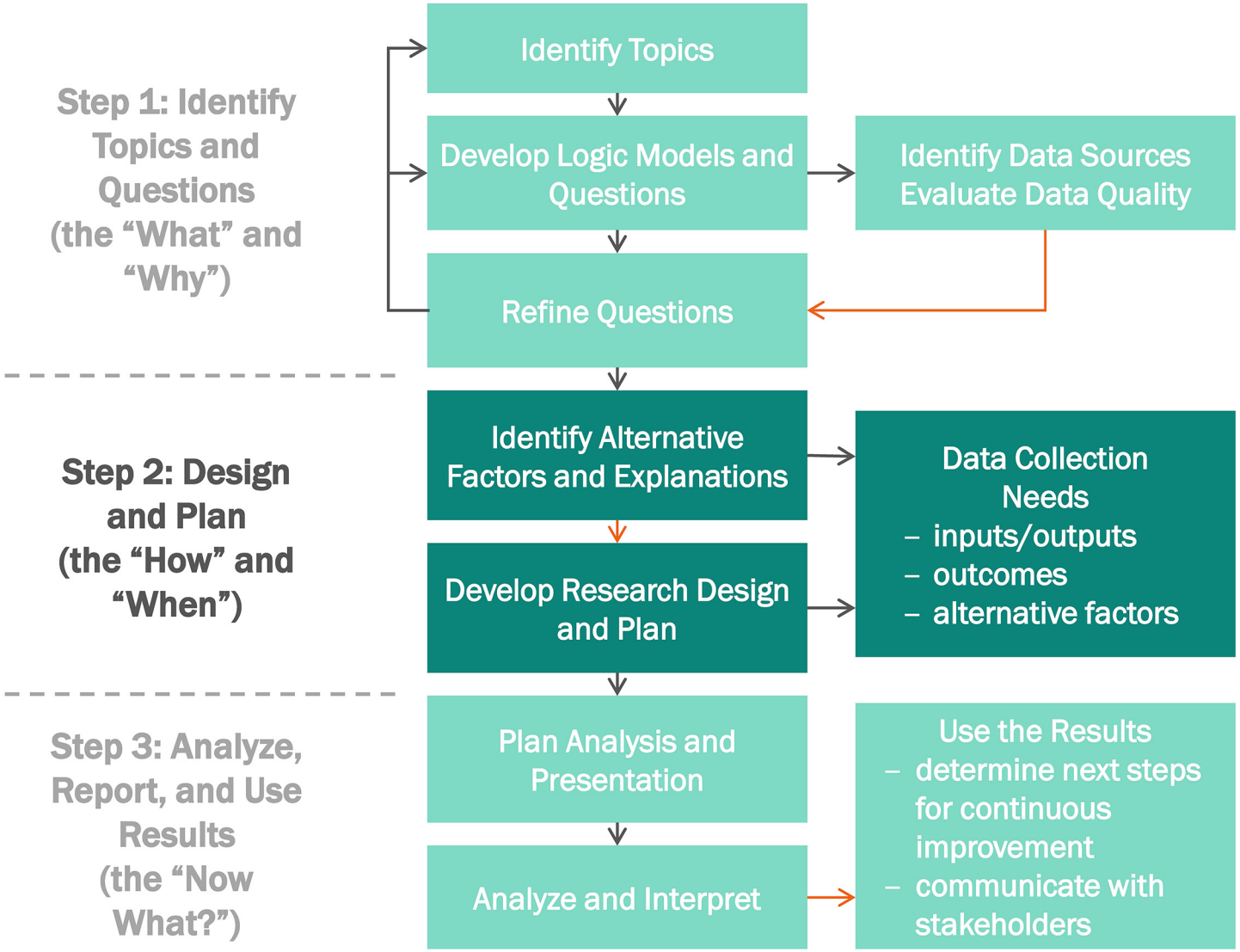
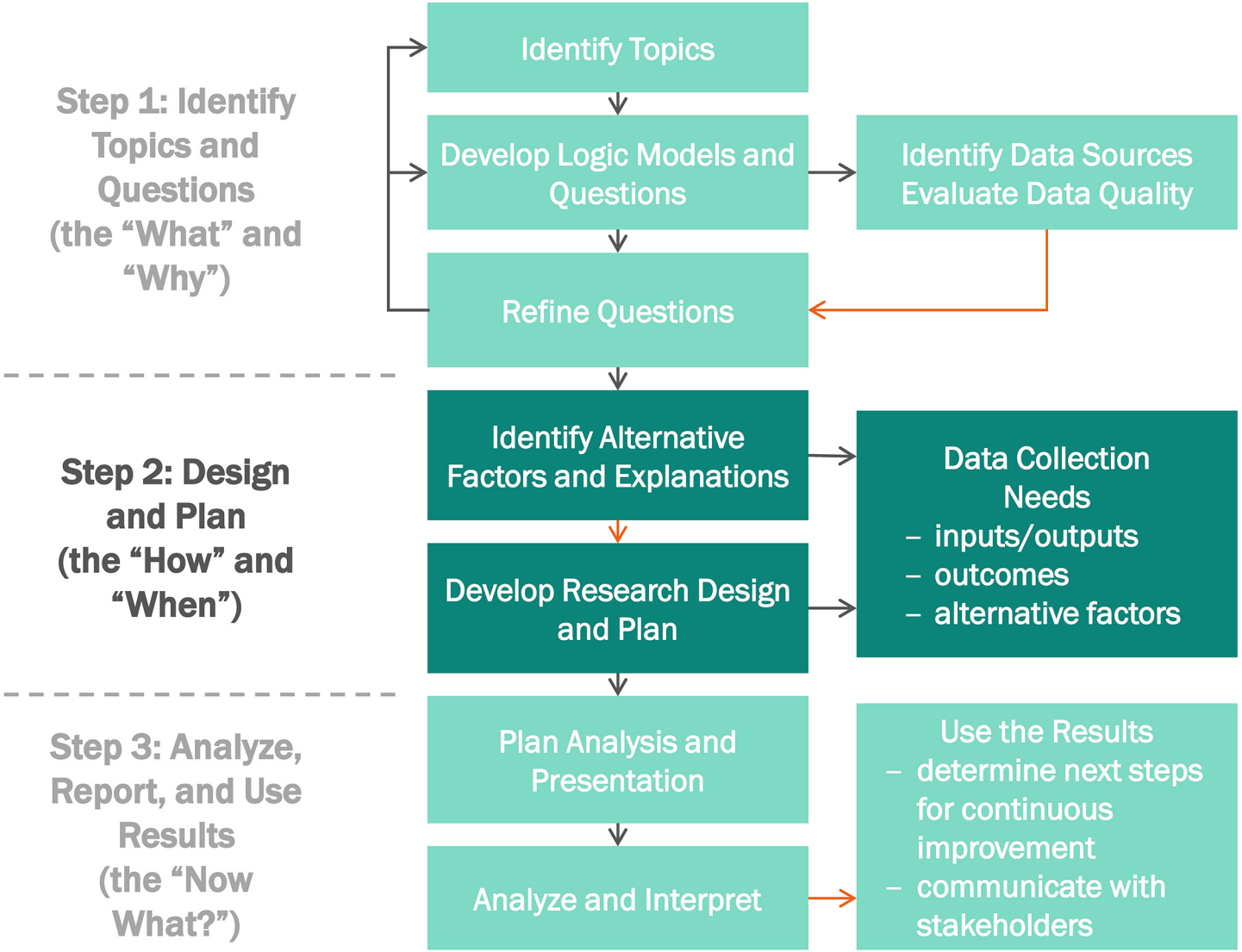
Step 2: Design and Plan

Evaluation Planning Model—Step 2



Evaluation Planning Model—Step 2

Evaluation Planning Model—Step 2



How to Anticipate and Prevent Alternative Explanations for Your Study Findings

The Often-Overlooked Issue of Threats to Validity

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What Are "Threats to Validity"?

- Factors that affect what you can and can't conclude from your study
- Why are they important?
  - Can make your findings inaccurate and untrustworthy; conclusions are not valid

You think you found something, but not really because …

What Are the Greatest Threats?

Confounding factors

Nonrepresentativeness

Hawthorne effect

History effect

Selection effect

Maturation effect

Regression to the mean

Participant mortality

Testing effect

Confounding Factors

- Are there other variables that could explain your results?
- Example: Are the students doing better on the assessments because the intervention is working, or are their gains due to other program initiatives not being studied?

Nonrepresentativeness

- Are you drawing broad conclusions based on very limited observations?
- Example: You conclude that the intervention is successful and should be implemented statewide because it shows promise at one site. The one site serves mostly Spanish-speaking ESL learners.

Hawthorne (Observer) Effect

- Did participants change their behavior because they know they're being observed?
- Example: Did the intervention really work, or did student test scores improve because, once students heard that you were doing research on them and their test scores, they started coming to class more often because they wanted to do well?

History Effect

- Did things external to the study change over time that affected the outcomes? (see also Confounding)
- Example: Under WIOA, we have new indicators for outcomes like employment. If you compare employment rates before and after you implement an intervention statewide in the early years of WIOA, it would be hard to separate the effects of the intervention from the change in employment that occurred based on who you included in the employment indicator.

Selection Effect

- How were participants chosen?
- Example: A new student counseling service was offered. Students who volunteered for counseling made greater gains than other students, but is the effect due to counseling or student factors?
- This is why random-assignment studies are considered the “gold standard”

Maturation

- Have participants matured significantly over the period of the study?
- Example: Are students showing gains because of instruction or due to natural literacy development from interacting with print outside the classroom?

Regression to the Mean

- Do the high scores seem to be dropping while the low scores seem to be increasing?
- Example: A teacher was given the highest possible scores on the end-of-semester evaluation one semester and the next semester received scores that were still very good but not nearly as high.

Participant "Mortality"

- Who dropped out of the study?
- Example: Were the only students who stayed in the class to receive the intervention the ones who could benefit most from the it (i.e., the intervention group got "creamed")? Or did the opposite happen?

Testing Effect

- Did you use the same questions to test students as you did previously?
- Example: Students pretested with TABE Form A should not be posttested with the same form, so that the results reflect what they've learned rather than their ability to learn how to take that particular test.

Controlling for Threats to Validity

- Controlling for alternative factors *statistically* when you do your data analysis
  - Not ideal for "effectiveness" type research questions, but more realistic and common practice when randomly assignment is not feasible or desirable
    - E.g., teachers were allowed to volunteer for PD [selection threat], but the outcomes of their students are only compared to those of *similar* teachers
- "Gold standard" experimental impact study
  - Ideal for studying the effect of something (e.g., PD) on student outcomes
    - E.g., teachers volunteered to be randomly assigned to either receive the PD or be in the comparison group

Identify the Threats to Validity

Refer to the Threats to Validity handout in the Planning Guide appendix. At your table, review the assigned scenario and determine:

- What are the possible threats to validity for the study?
- How can the threats be addressed?
- What other factors should be considered?

Be prepared to share your responses with the whole group.

Handout

See Planning Guide, p. 31

Your Threats to Validity

Apply your learning about threats to validity to your own study.

Use your **e-plan** (Excel file). In your state teams, identify your anticipated (or hoped-for) results, any possible alternative factors that may influence these results, and strategies for controlling for these factors.

Share-Out

Break

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Designing Your Studies

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The Right Type of Study Is Determined by Your Goals

- Want to learn more about AE in your state? Just curious.
  - "Exploratory" study
- Want to find out how well or how a particular activity, program, or practice—an "intervention"—is being implemented in your state?
  - Implementation study/process evaluation
- Want to find out how well a particular intervention is working in your state?
  - Progress evaluation
  - Outcomes or impact evaluation

Research Methods

- Exploratory studies: "I want to learn more about a new program or practice. What are the patterns and relationships I see in my data?"
  - Descriptive/correlational
- Formative evaluation
  - Implementation/process: "How well is the program or practice being implemented?" or "How is it being implemented?"
  - Progress: "Is it showing early signs of promise?"
- Summative evaluation: "How well did it work?" "Is it effective?"
  - Outcome or impact study
    - » Experimental or quasi-experimental

Exploratory Studies

- Can be based on experience or theory
  - A priori hypotheses
- Can be used to uncover “emergent” patterns and themes in the data
  - A “fishing expedition” is a legitimate first step
  - What you learn helps advance AE theory and improves the research base
  - Based on a method that is typically descriptive
    - » Numbers
    - » Percentages
    - » Correlations

Descriptive/Correlational

- Relies on quantitative data
  - Extant (existing) data from program records
  - Survey data
- Can be used simply to describe and compare
  - "Students read an average of 20 hours outside of class."
  - "More female students (40 percent) read outside of class than male students (27 percent) last semester."
- Also typically used to look at relationships
  - "As hours of attendance go up, so do posttest scores."
  - The most common statistic to explore relationships is called a correlation coefficient, or more simply, correlation.

Qualitative

- Good for obtaining a deep understanding of something: what, how, when, and where
- Methods vary. Some common examples include:
  - Case studies
  - Focus groups
  - Observations
  - Interviews
  - Document review
- Qualitative research complements other types of (quantitative) research
- Labor intensive; not an option on a large scale

Formative Evaluation

- Will be based on a priori hypotheses
- Used to informally evaluate how well or how an intervention …
  - Is being implemented
  - Seems to be working at an early stage (is showing promise)
- Results used to refine the intervention or how it's implemented
- Can be done multiple times during intervention development
- Types of formative evaluation:
  - Implementation study/process evaluation
  - Progress evaluation

Implementation Study/Process Evaluation

- Usually takes place within a larger evaluation study
- A major component of a formative evaluation
  - Is the intervention being implemented as planned?
  - Do changes need to be made to the process or intervention to improve implementation?
- Also increasingly recognized as a vital component of a summative evaluation
  - Helps explain why an intervention did or didn't work (good vs. poor implementation)
- Methods can be qualitative or more structured

Progress Evaluation

- A major component of a formative evaluation
- Provides an indication that the intervention had the intended effect
- Purpose is to feed information back into intervention development: Are changes needed?
- Methods are more likely to be quantitative but can include qualitative components
  - Descriptive/correlational
  - Quasi-experimental—more on this in a minute
  - Qualitative

Summative Evaluation

- Will be based on a priori hypotheses
- Used as a more formal test of an intervention
  - Implementation data may also be collected to help explain findings, not for refinement purposes
- Generally larger than a formative evaluation to support advanced statistical analyses
- Findings suggest whether the intervention is effective or not
- Based on method that is
  - Experimental or
  - Quasi-experimental

Experimental

- The main component of a summative evaluation, if feasible
- The “gold standard” for establishing causation
- Often referred to as an “impact” or experimental study
- Uses random assignment to rule out alternative explanations for an intervention’s effect
- Compares outcomes of students in intervention group to those in the “control” group
- If the differences are statistically significant, the intervention had an impact

Quasi-Experimental

- Can be used with either formative or summative evaluations
- Second best for establishing causation
- Typical study uses a matched control group to attempt to rule out alternative explanations
- Compares outcomes of students in intervention group to those in the matched group
- If the differences are statistically significant, the intervention had an impact

Which Research Methods Do I Use?

Example goals	Type of data	Possible methods
Explore whether outcomes vary by different student types	Quantitative (NRS data)	Descriptive study—e.g., crosstabulations of MSGs by EFL and student characteristics
Explore relationships	Quantitative	Correlational study—e.g., predicting posttest scores based on pretest scores, attendance hours, and student characteristics
Study how well a new intervention is being implemented	Qualitative or quantitative	Implementation study—e.g., developing and applying a rubric to assess the extent to which local curricula reflect state-approved standards
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

Considering Your Options: Research Methods

Review the questions in the Planning Guide.

What are your research goals?

What are your research questions?

What data are available to you?

Considering your answers, what types of studies are feasible to do that will answer your questions?

See Planning Guide, p. 21

Share-Out

Wrap-Up, Day 1

Welcome Back and Review of Day 1

Planning to Conduct Your Studies

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Planning & Procedures Activity

What's your fantasy trip or trip of a lifetime?

What goes into making this trip happen?

- Planning, tasks, communication, resources

Where do you see similarities?

- Identify Topics and Questions
- Design and Plan
- Analyze, Report, and Use Results

Planning Your Procedures for Data Collection and Analysis

- Your recipe or road map for conducting the study
- Critical to guide you and others for interpretation and replication
- Varies by type of study but guided by research questions
- General commonalities by type of design, but many procedures are specific to project
- Includes ways to develop operational definitions
  - Make components of research questions concrete and measurable

Operationalize Your Measures

- Translates concepts into practical definitions
- Identify key variables from research question
  - inputs, outputs, or outcomes
- Conceptually represents the measures
- Defined in terms of procedures and data
- Clear descriptions permit interpretation and replication of findings
- Will help clarify procedures

Operationalize Measures: Examples

Online and classroom-based instruction

- Online: Moodle classroom, nonfacilitated, 6 hours per week
- Classroom based: Face-to-face classroom, 6 hours per week

Professional development

- Teacher attends 8 hours of training on specific topics related to teaching

Student learning gains

- Scaled pre-/post-test scores on TABE total battery

General Guidelines for Planning Procedures

- Work with staff to identify all steps
- Consult prior studies for guidance
  - There may be standards or commonly accepted practices
- Include
  - Staffing and resources
  - Schedule and timeline—then double it (at least)
  - Anticipate problems
- Be flexible—change according to needs

Exploratory Studies: Secondary Data Analyses

- Identify the data elements (variables) you need
  - Don’t forget control variables
- Determine who/what to include
- Make sure that the data definitions and codes will allow you to answer the research question
- Obtain data-use permission, meet confidentiality needs

Secondary Data Analyses (continued)

Evaluate technical issues and needs

- Data formats and download needs
- Software needs

Clean data

- Run frequencies
- Check missing data and other data quality problems

Recode, eliminate data, programs, or classes as needed

Plan analytic approach

- Statistical tests
- Controls needed for statistical and other validity threats
- Software needed
- Reporting needs

Reconsider, finalize approach

Summative Evaluation: Special Design Issues

More complicated procedures for summative designs due to need for controls

Define intervention and comparison group

- What is the intervention (e.g., classroom-based, computer-based instruction, curriculum)?
- Who/what will you compare to—who is in the control group (e.g., business as usual, another intervention)?

Determine control variables such as

- Education and background variables
- Test scores
- Type of class, program

Break—Please Return in 15 Minutes

Step 3: Analyze, Report, and Use Results

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Data Analysis

Preparing and Planning

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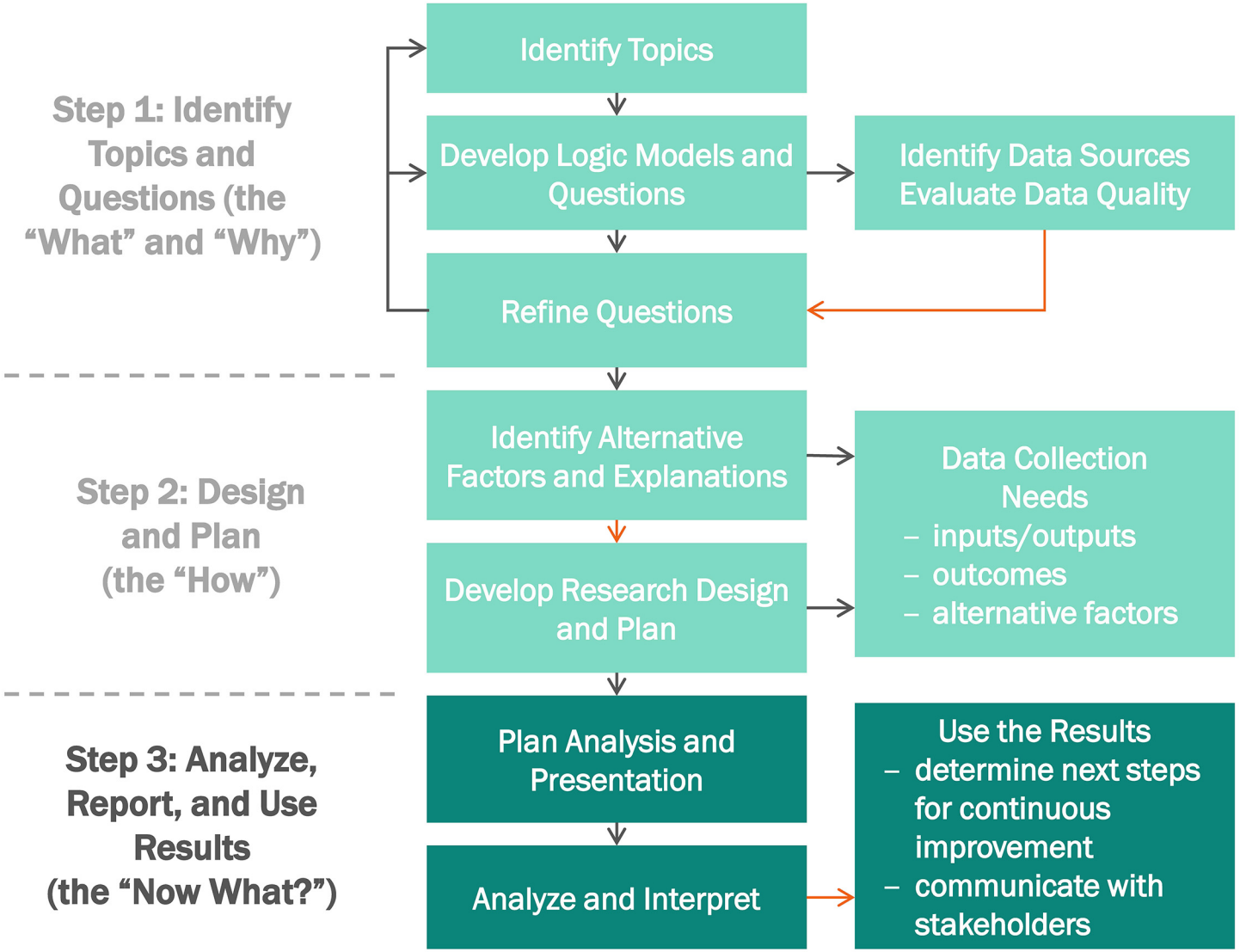
Evaluation Planning Model—Step 3



Where We Are

- You know the questions you want to answer.
- You have the design of your study.
- You have an evaluation and data collection plan.

Now, what are you going to do with the data?

Analysis and Reporting

Method for interpreting the data and answering the research questions

- Are descriptive
  - Frequency tables, charts
  - Means, standard deviations
- May include results of statistical tests
  - Correlations
  - Regression results, comparison test
- Methods depend on design

Types of Data

Scale	Description	Examples	Statistics
Nominal	Categories	Gender	Mode, percentage, chi-square
Ordinal	Rank or ordered categories	Grades, satisfaction (Likert scales)	Median, percentile
Interval	Distance between values meaningful	Temperature	Mean, standard deviation, correlation/regression coefficient
Ratio	Absolute zero	Counts (usually)	All

Don't worry about the details; just be aware that there are different types of analyses that are appropriate for different types of data.

Best Practice: Preanalyses Data Quality Check

Why?

- Errors or missing data can change your findings

Who should do this?

- Everyone

What do you do?

- Review descriptive statistics/frequencies on all variables
- Review missing data

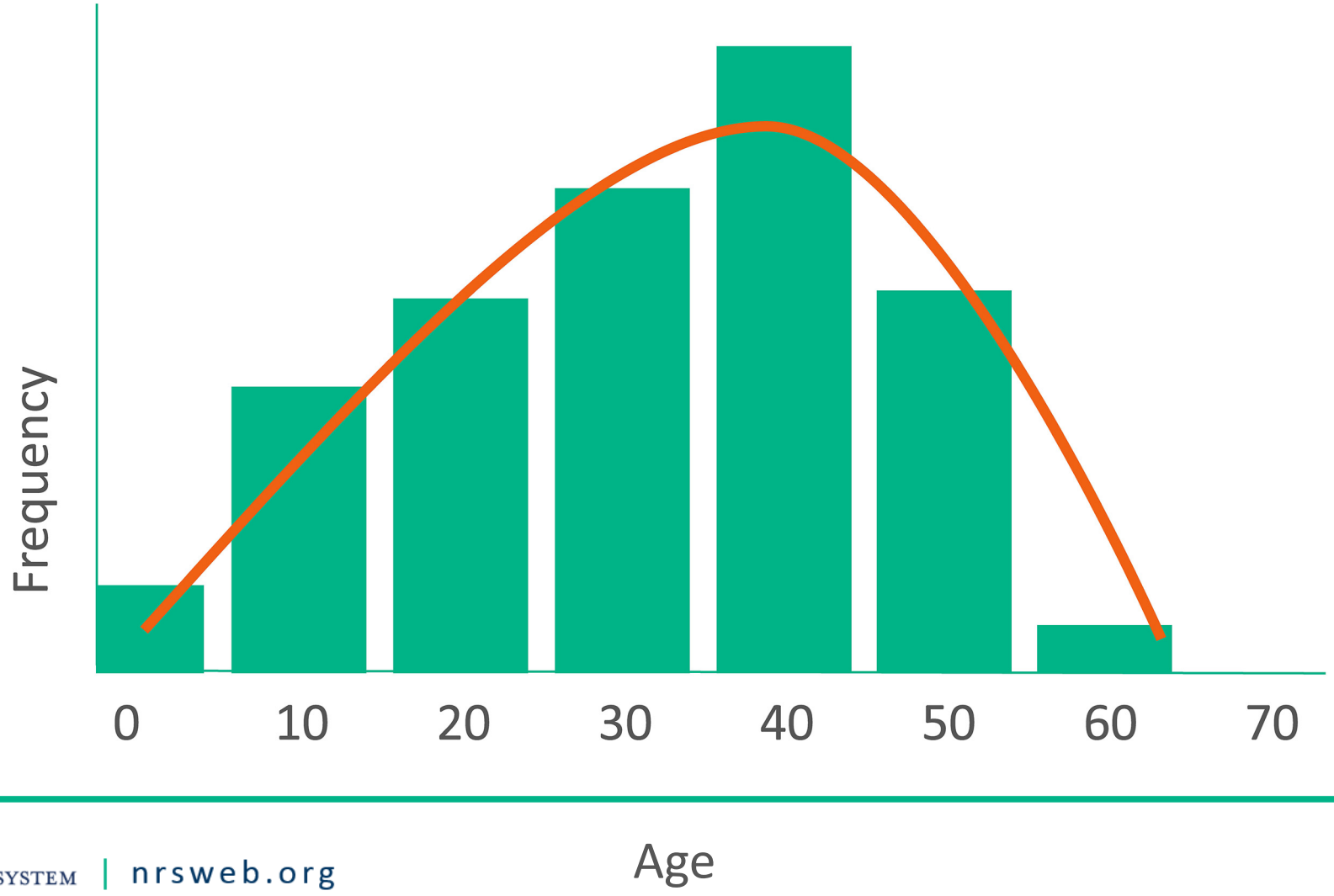
Descriptive Statistics

If you run descriptive statistics, you will likely get:

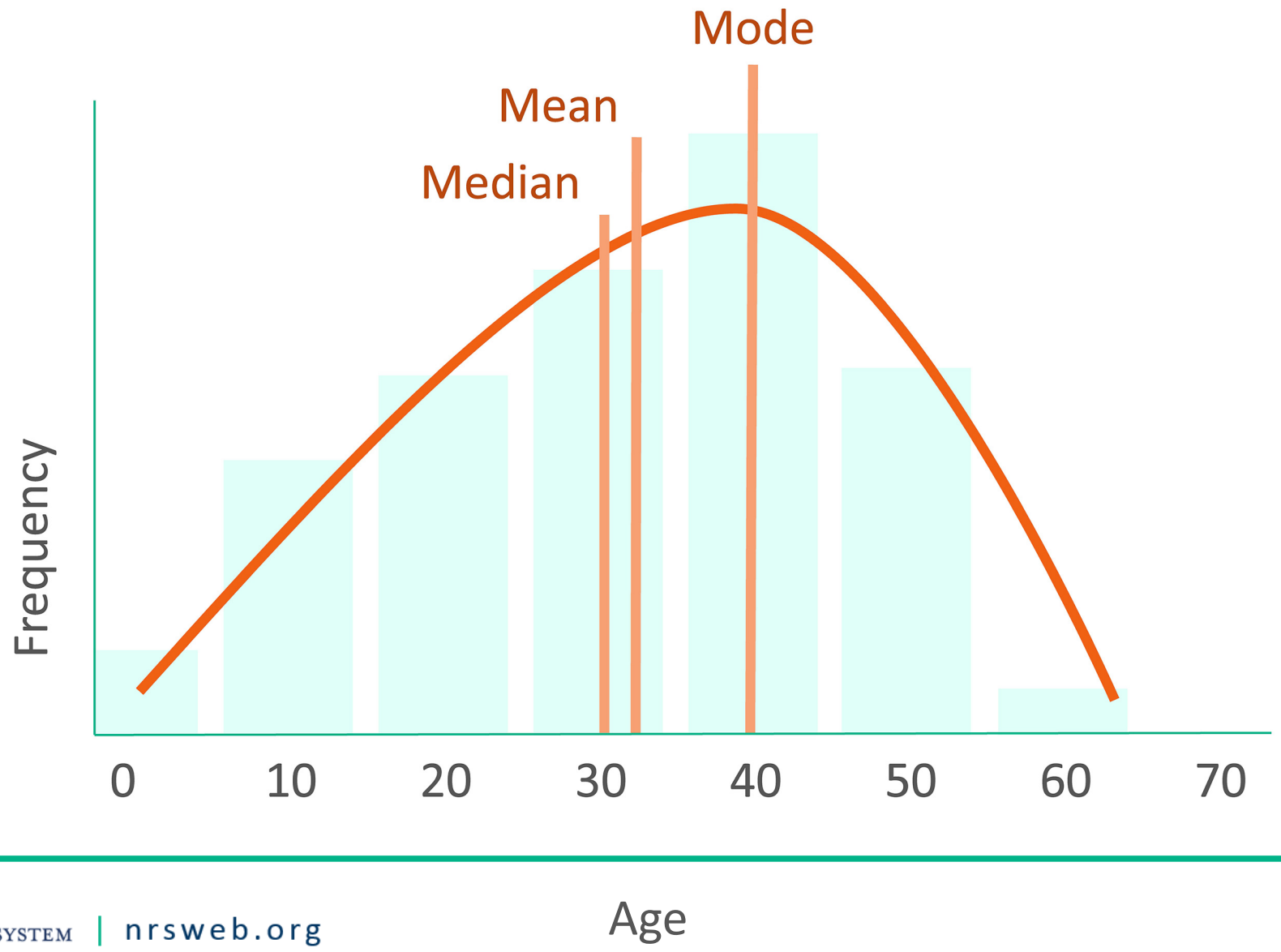
- Mean = Average
- Mode = Most frequent
- Median = Middle
- Range = Lowest and highest values
- Standard deviation = Average distance from mean
- Frequency distribution (usually run separately from above)

Descriptive Statistics (continued)

Frequency Distribution = How many at each level?



Descriptive Statistics (continued)



Data Quality Check

Before doing analyses, look at the descriptive data or a frequency graph and ask:

- Does the range look right? Are there numbers that are too high or too low to be possible?
- Does each average (mean) make sense and fit with what you know?
- Are the “counts” right? How many missing data points? How was missing data coded?

Sample output for “descriptive statistics”

Student ESL Level	
Mean	8.1
Standard Error	5.2
Median	3
Mode	2
Standard Deviation	16.5
Range	54
Minimum	1
Maximum	55
Sum	81
Count	10

When things don't look right, scan the raw data.

Raw Data
2
2
5
5
4
3
1
55
1
3

Student ESL Level	
Mean	8.1
Standard Error	5.2
Median	3
Mode	2
Standard Deviation	16.5
Range	54
Minimum	1
Maximum	55
Sum	81
Count	10

Software and Missing Data

- In Excel, blanks are excluded (nonzero)
  - Issue: Make sure blanks are not meant to be zeros
- SPSS/STATA/SAS
  - Will generally leave blanks out of analyses
  - Can be programmed to exclude coded missing data
  - Can be programmed to provide estimates for missing data
- Missing data means less power

Lunch

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Your turn.
Run descriptive statistics.

See Sample Analyses in Excel

Example 1 Instructions

Go to the Excel file, Example 1

Go to the “Data” tab → “Data Analysis”

Click “Descriptive Statistics” and OK

For “input” box, select the shaded data & headers

Click grouped by “columns”

Click “labels in first row”

Click “new worksheet ply” and fill in “Ex1”

Click “summary statistics” and OK

Go to the tab labeled “Ex1”

Example 1

What do you see?

Which data look clean and which do not?

What are some of the issues?

Exploratory Analyses

Why?

- Goal = Explore the data
- Broad, more open-ended questions
- No narrow question or hypothesis to test

What do you do?

- Look at trends over time
- Look for relationships in the data
- Disaggregate the data

Exploratory Analyses (continued)

Graphing

Exploratory correlational analyses

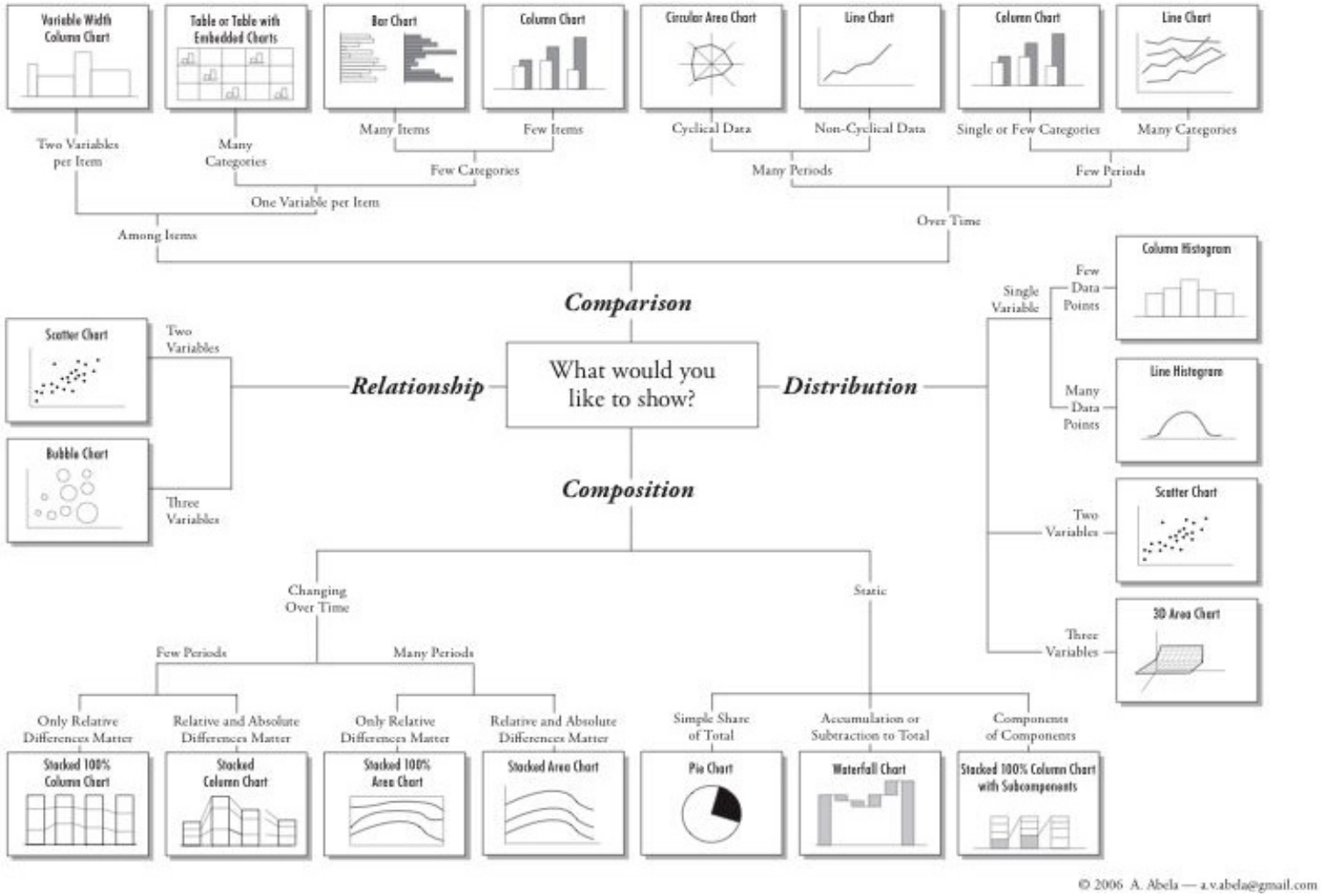
Exploratory regression analyses

Graphing

You all know this already!

Some quick resource reminders …

Chart Suggestions—A Thought-Starter



http://extremepresentation.typepad.com/blog/2006/09/choosing_a_good.html

A PERIODIC TABLE OF VISUALIZATION METHODS

Data Visualization
Visual representations of quantitative data in schematic form (either with or without axes)

Information Visualization
The use of interactive visual representations of data to amplify cognition. This means that the data is transformed into an image, it is mapped to screen space. The image can be changed by users as they proceed working with It

Concept Visualization
Methods to elaborate (mostly) qualitative concepts, ideas, plans, and analyses.

Strategy Visualization
The systematic use of complementary visual representations in the analysis, development, formulation, communication, and implementation of strategies in organizations.

Metaphor Visualization
Visual Metaphors position information graphically to organize and structure information. They also convey an insight about the represented information through the key characteristics of the metaphor that is employed

Compound Visualization
The complementary use of different graphic representation formats in one single schema or frame

C continuum																	G graphic facilitation
Tb table	Ca cartesian coordinates											Me meeting trace	Mm metro map	Tm temple	St story template	Tr tree	Ct cartoon
Pi pie chart	L line chart											Co communication diagram	Fp flight plan	Cs concept sceleton	Br bridge	Fu funnel	Ri rich picture
B bar chart	Ac area chart	R radar chart cobweb	Pa parallel coordinates	Hy hyperbolic tree	Cy cycle diagram	T timeline	Ve venn diagram	Mi mindmap	Sq square of oppositions	Cc concentric circles	Ar argument slide	Sw swim lane diagram	Gc gantt chart	Pm perspectives diagram	D dilemma diagram	Pr parameter ruler	Kn knowledge map
Hi histogram	Sc scatterplot	Sa sankey diagram	In information lense	E entity relationship diagram	Pt petri net	Fl flow chart	Cl clustering	Lc layer chart	Py minto pyramid technique	Ce cause-effect chains	Tl toulmin map	Dt decision tree	Cp cpm critical path method	Cf concept fan	Co concept map	Ic iceberg	Lm learning map
Tk tukey box plot	Sp spectogram	Da data map	Tp treemap	Cn cone tree	Sy system dyn./ simulation	Df data flow diagram	Se semantic network	So soft system modeling	Sn synergy map	Fo force field diagram	Ib ibis argumentation map	Pr process event chains	Pe pert chart	Ev evocative knowledge map	V Yee diagram	Hh heaven 'n' hell chart	I infomural

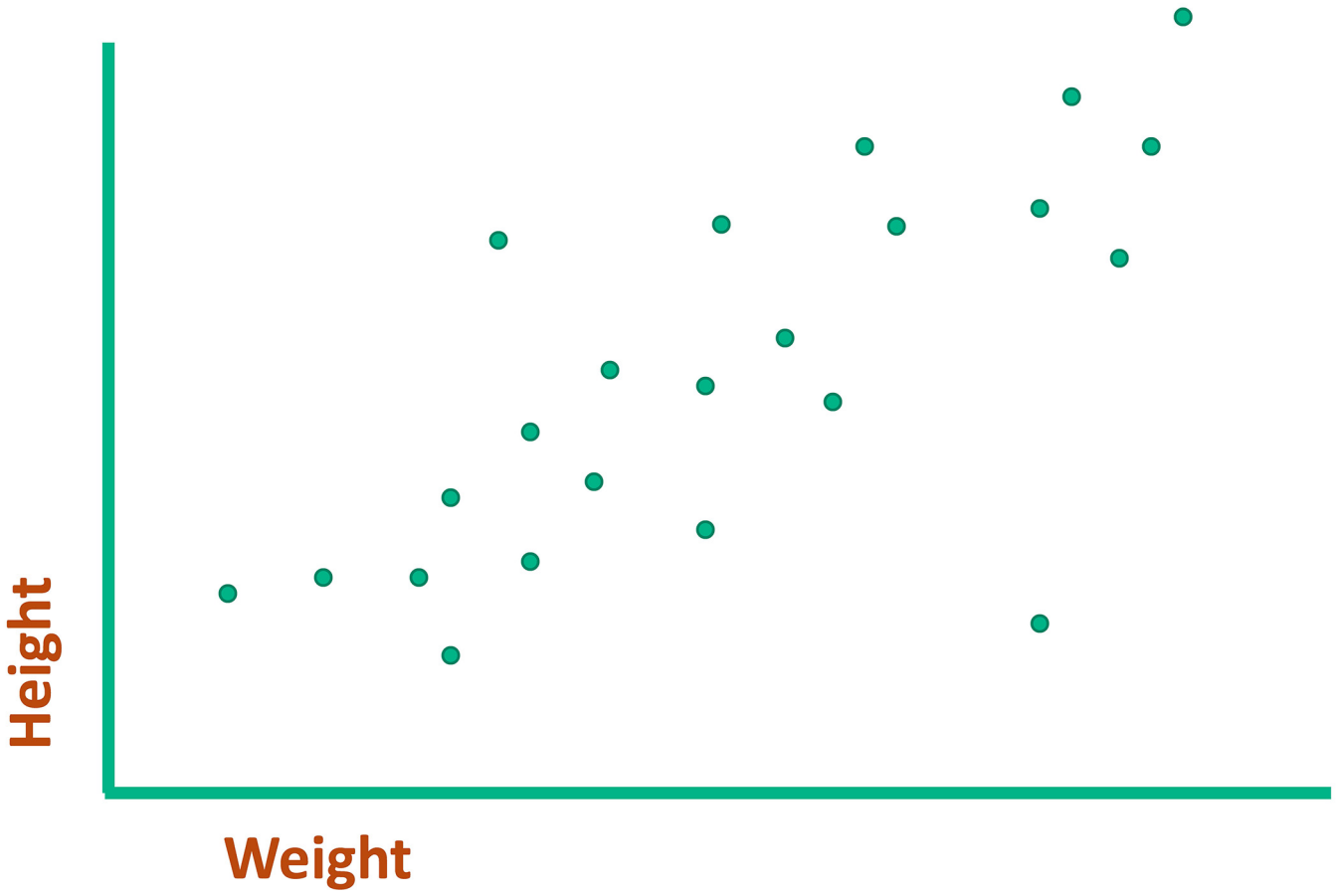
Click on each cell on website to see examples of graphs: http://www.visual-literacy.org/periodic_table/periodic_table.html#

Correlational Analysis

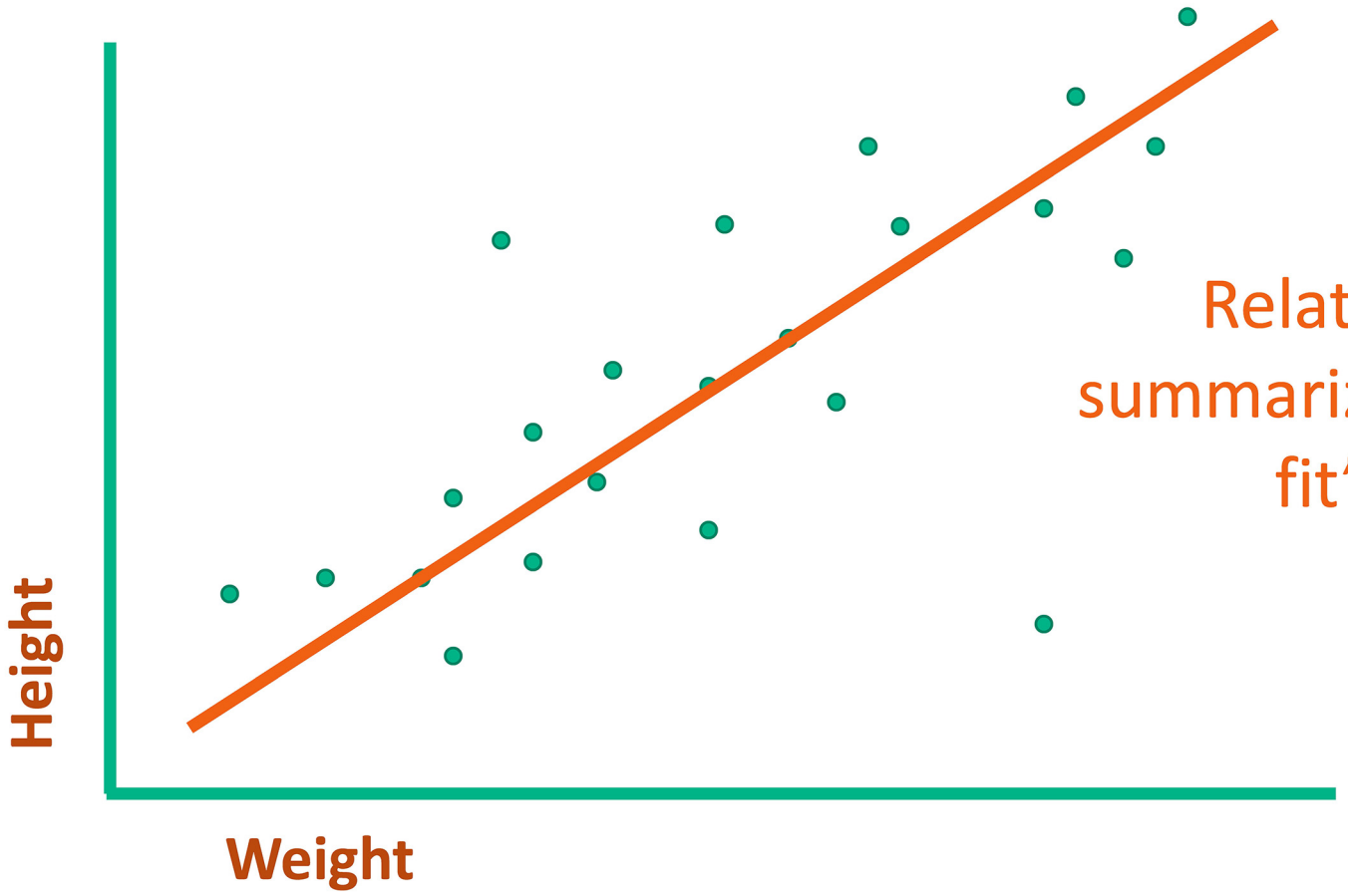
A correlation is a single number that describes the degree of relationship between two variables

One of the most common and useful statistics

Correlation Example Graph 1

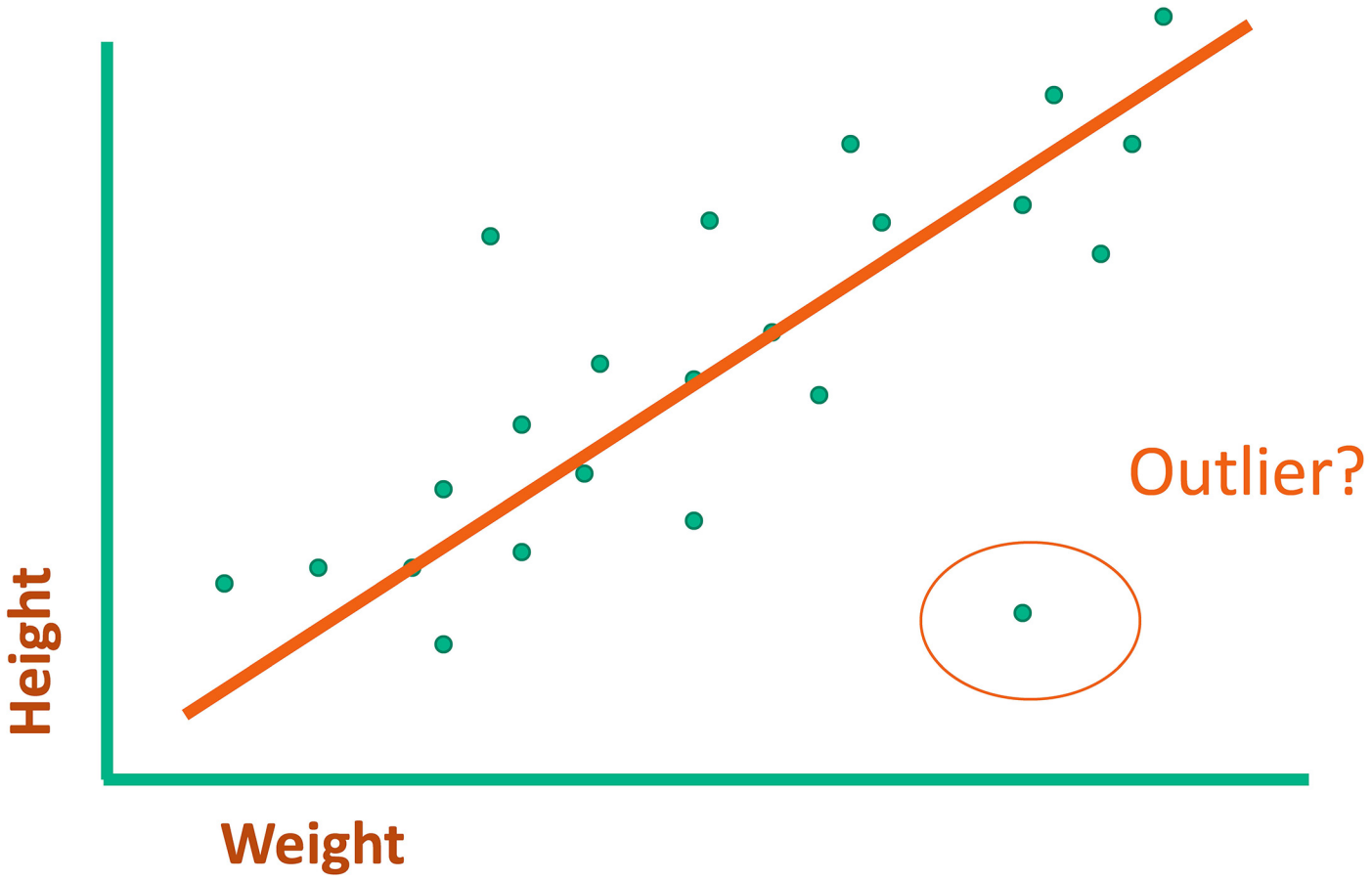


Correlation Example Graph 2

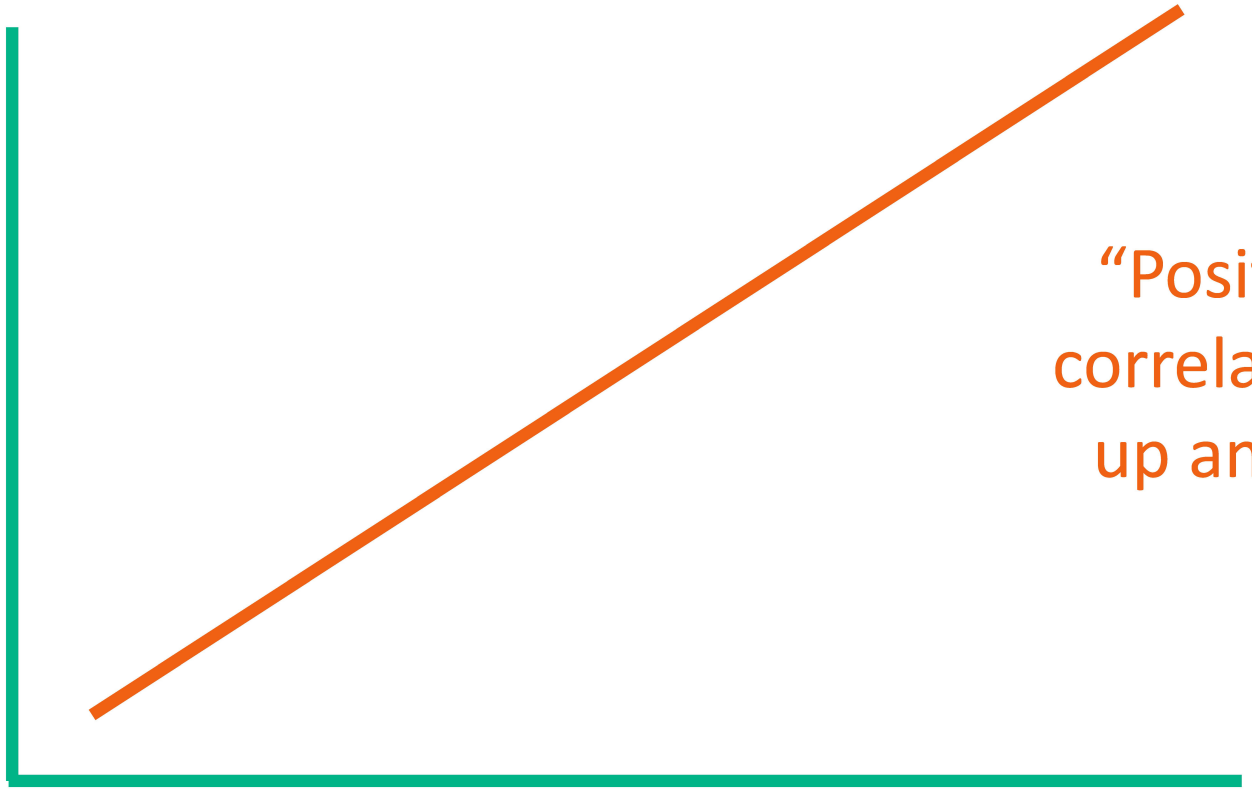


Relationship summarized in “best fit” line

Correlation Example Graph 3

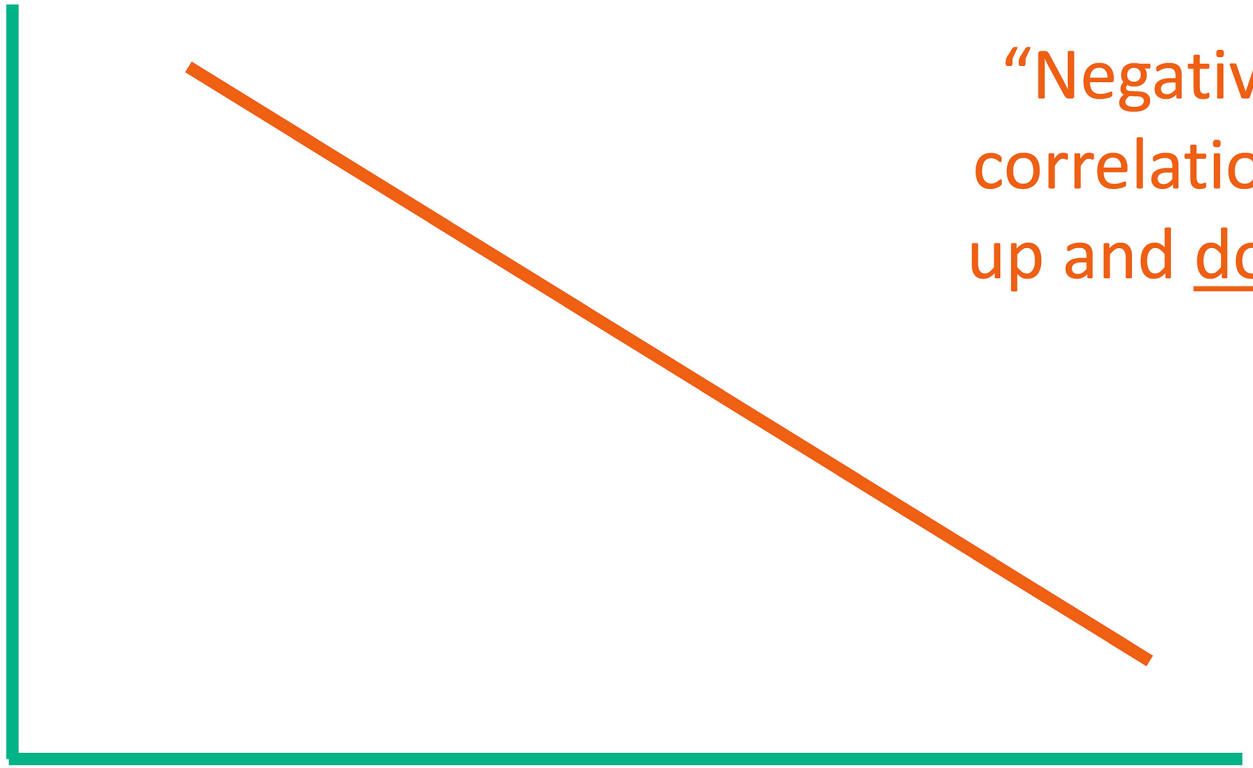


Correlation Example Graph 4



"Positive" correlation = up and up

Correlation Example Graph 5

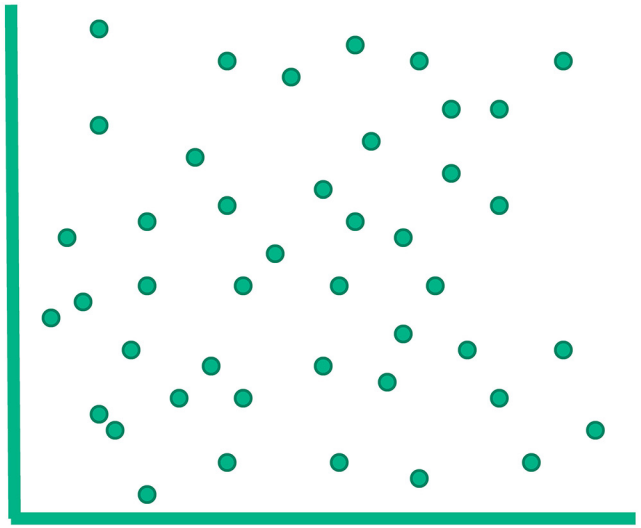


"Negative" correlation = up and down

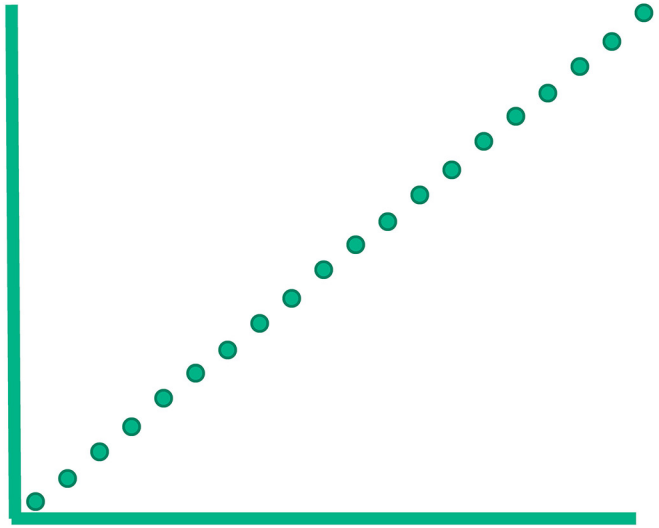
More Correlations

Score ranges from 0 to 1 (or –1)

0 = no correlation



1 = perfect (positive) correlation



–0.8 > r > +0.8 = strong correlation

Your turn.
Run a correlational analysis.

See Sample Analyses in Excel

Example 2 Instructions

Go to the Excel file, Example 2

Go to the “Data” tab → “Data Analysis”

Click “Correlation” and OK

For “input” box, select (1) age, (2) pretest score, (3) posttest score & their headers

Click grouped by “columns”

Click “labels in first row”

Click “new worksheet ply” and fill in “Ex2” and click OK

Go to the tab labeled “Ex2”

Example 2

What do you see?

How high are the correlations?

How are you interpreting them?

Break

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Summative (Outcomes) Analyses

Why?

- Goal = Usually to test a whether or not an intervention seems to make a difference, or whether there is a relationship between an intervention and outcomes

What do you do?

- State a hypothesis (e.g., students of teachers who participated in PD will score better than others)
- Test to see if the data show the expected difference or relationship and whether it is statistically significant (i.e., unlikely due to chance alone)

Types of Summative Analysis

T test: Comparison of means

Correlational analysis

Regression analysis

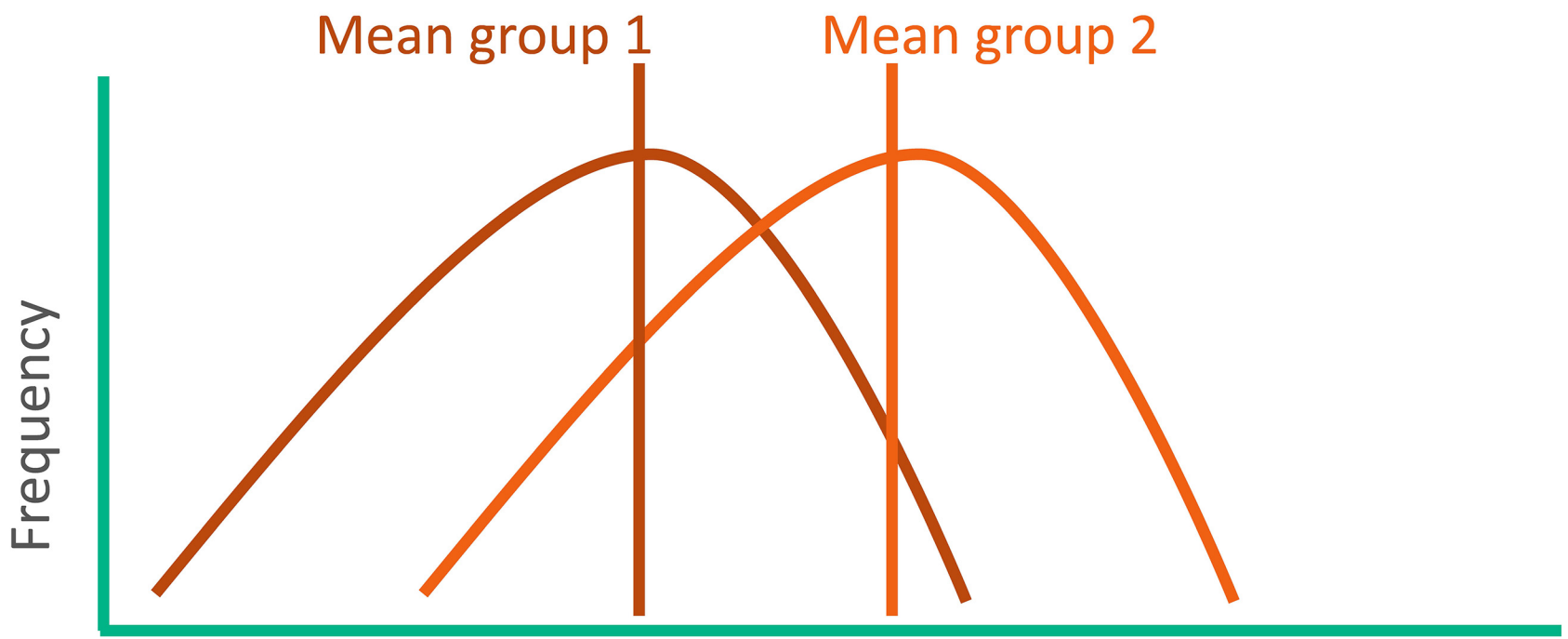
T Tests 1

Test means of two groups to see if they are different

Perfect for testing means from two groups in a randomized experiment when you only have posttest scores

T Tests 2

Is the average of one group significantly different than the average of another group?



Types of *T* Tests

- **Paired** = We have reason to believe that the groups are similar—e.g., same people have scores in both "groups"
  - E.g., one class is compared on scores before and after new curriculum was covered
- **Unpaired** = We think these groups are different
  - E.g., two classes are compared—one class that had the curriculum delivered through distance learning and one that participated in a traditional classroom

T Test: Mean Differences and *P* Values

- The finding tested is based largely the on difference between the means of the two groups.
- The *p* value, or probability value, generated by the *t* test tells you how likely it is that you'd get a mean difference of this size by chance alone (i.e., not due to a real underlying difference).
- A common practice is to require $p < .05$ in order to say that the difference is "statistically significant."
- *Translation:* The probability that you got this mean difference due to chance is equal to or less than 5 percent. Your two groups are different—yahoo!!!

Your turn.
Run a *t* test.

See Sample Analyses in Excel

Example 3 Instructions

Go to the Excel file, Example 3

Go to the “Data” tab → “Data Analysis”

Click “*t* test” for two-sample assuming unequal variances and OK

For “variable 1” box, in the “posttest” column, select the post-test scores for all those who had PD (with a “1” in the “Got PD” column), and for “variable 2” in the posttest column, select the other half of participants who did not get PD (with a “0” in the “Got PD” column)

Click “new worksheet ply” and fill in “Ex3”

Click OK and go to the tab labeled “Ex3”

Example 3

What do you see?

Is the mean difference significant?

Is the mean difference meaningful?

Regression Analysis

- Is often used when you want to predict an outcome ("dependent variable") based on what you know about other variables ("independent variables") you think could be related to that outcome (e.g., student characteristics or program services)
- Expresses the relationship in the form of an equation y = b0 + b1x where
  - intercept (b0) = The value of your dependent variable when the independent variable = 0
  - "beta" b1 = The change in the dependent variable with a unit change in the independent variable 2

Examples of When to Use Which …

- *T* test shows that participation or outcomes differ across two programs
- Correlation shows that attendance rates are positively related to years of teaching experience
- Regression shows how much (b) of an increase in attendance rates (y) is associated with each additional year of teaching experience (x)

Your turn.
Run a regression analysis.

See Sample Analyses in Excel

Example 4 Instructions

Go to the Excel file, Example 4

Go to the “Data” tab → “Data Analysis”

Click “Regression” and OK

For “input y-range” box, select “posttest scores” data and title/header

For the “input x-range” select 3 columns: student satisfaction, got PD, and pretest scores—including headers

Click “labels”

Click “new worksheet ply” and fill in “Ex4”

Click OK

Go to the tab labeled “Ex4”

Example 4

What do you see?

Which variables are significant?

How would you interpret what happened when someone got PD?

Special Case: Using Data From an Entire Population

- Universe/census vs. sample distinction
- Many of you will use data from the entire population you are interested in saying something about
- You do not need to “test” differences or changes

Example Methods/Analyses/Graphs

Methods	Analyses	Displays
Exploratory study or an implementation study using program data (e.g., hours of teacher PD)	Descriptive statistics *T* tests Correlational	Frequency distribution/ histogram/column or bar graph/scatterplots
Implementation study using expert observation and focus groups	Qualitative methods	Frequencies of words and themes
Experimental or quasi-experimental study	*T* tests Regression	Bar graphs Line graphs

¡Cuidado! Danger Zone

- These analyses all have important underlying assumptions; seek professional advice and QC results.
- **Watch your language:** You will raise red flags if you talk about causality. You can only use words like “impact,” “effect,” and “affected” when you’ve done an experimental or strong quasi-experimental study.
- **Remember:** Need to control threats to validity and rule out alternative explanations for findings.

What Can I Say?

- *T* test indicates that two means are different = Example: “The students participating in program X had higher average gain scores than those in program Y.”
- Correlation between two variables is significant = Example: “Hours of participation in the new support service program was positively associated with hours of attendance in ABE instruction.”
- Coefficient for the predictor in regression model is significant = Example: “Hours of attendance in ABE instruction was a significant predictor of posttest scores after controlling for student characteristics and pretest scores.”

What Does It Mean? Interpretation Strategies

- Don’t go beyond the data
  - Avoid explanation without data support … “This must be because …”
- Consider data quality and acknowledge other limitations of your studies
- Look for patterns and differences
  - Disaggregate data
    - » Under what conditions or for whom does something “work”?
  - Don’t discount unexpected findings, but investigate

Wrap-Up, Day 2

Welcome Back and Review of Day 2

Activity: Finalize your Evaluation Plan

1. Work for 1 hour in your e-plan to
   - Refine logic models and research questions
   - Describe inputs, outputs, and outcomes
   - Describe data sources, variables, and quality
   - Discuss feasibility of addressing questions and possible threats to validity
2. Each state gives 5-minute presentation on what has changed since their earlier plan, what has stayed the same, and why?
3. Q&A and feedback from other groups

Break—Please Return in 15 Minutes

Using Your Results

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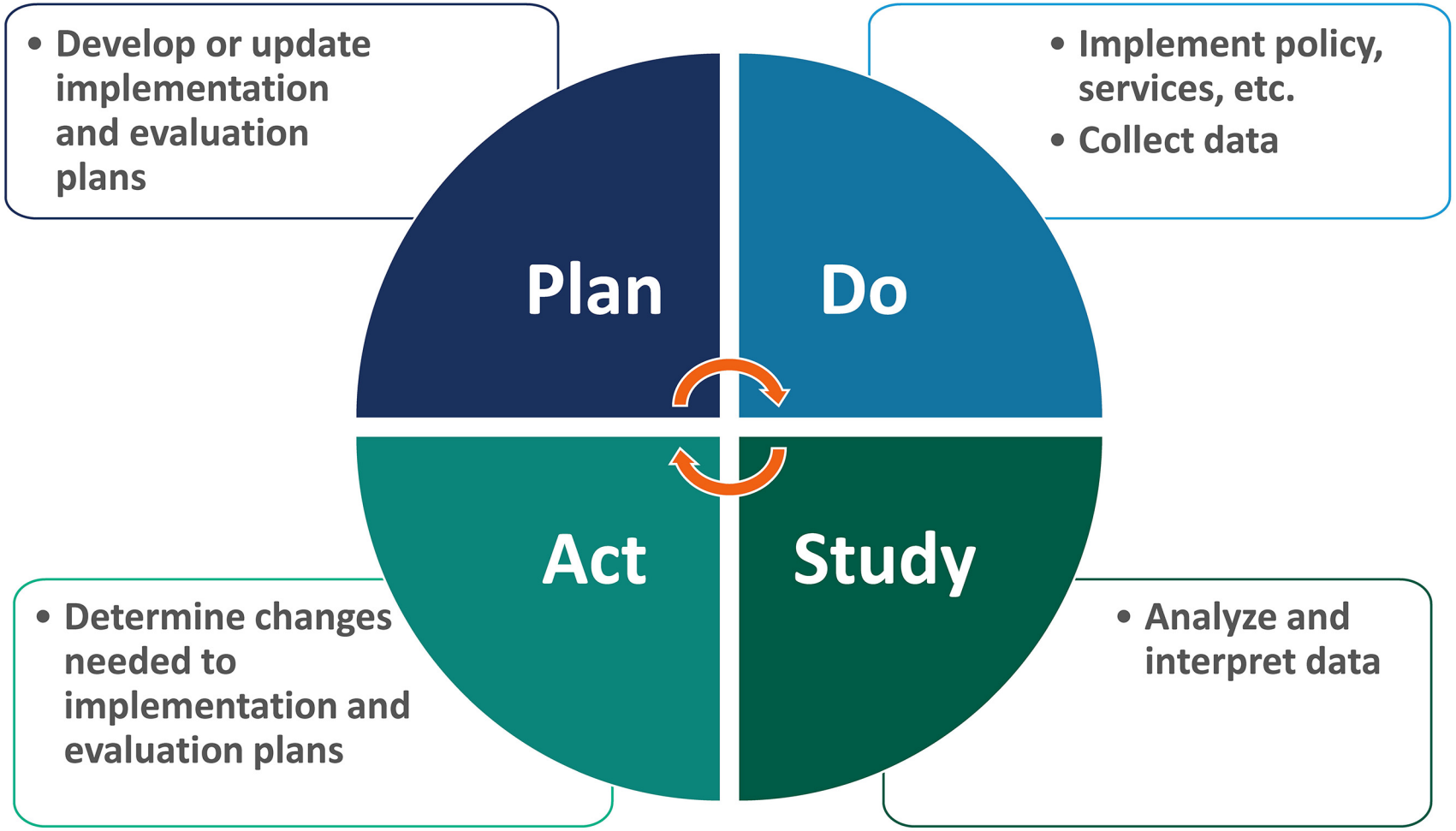
How Will You Use and Report Your Results?

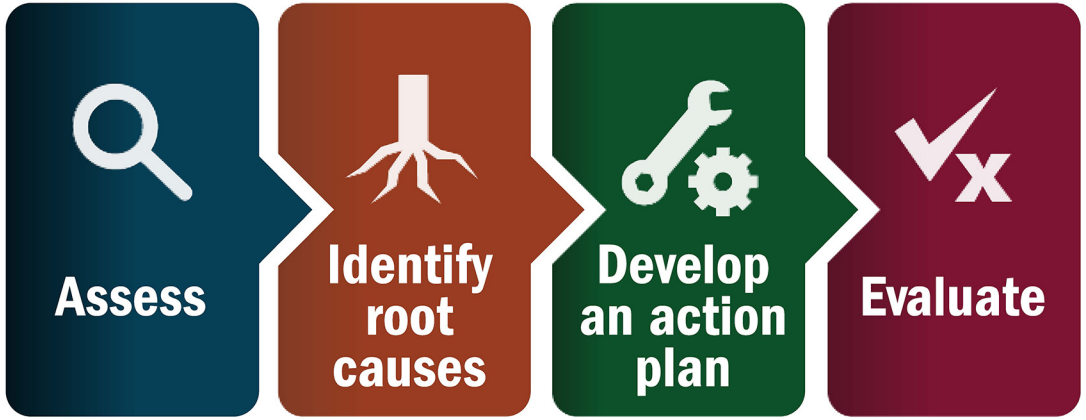
Two main purposes of your research:

- Continuous improvement
  - Make adjustments to what you're already doing
  - Identify new policies, services, or other resources needed to achieve your goals
- Keeping stakeholders informed
  - Accountability
  - Getting buy-in from program staff and others
  - Outreach to potential partners or participants

Common Model for Continuous Improvement

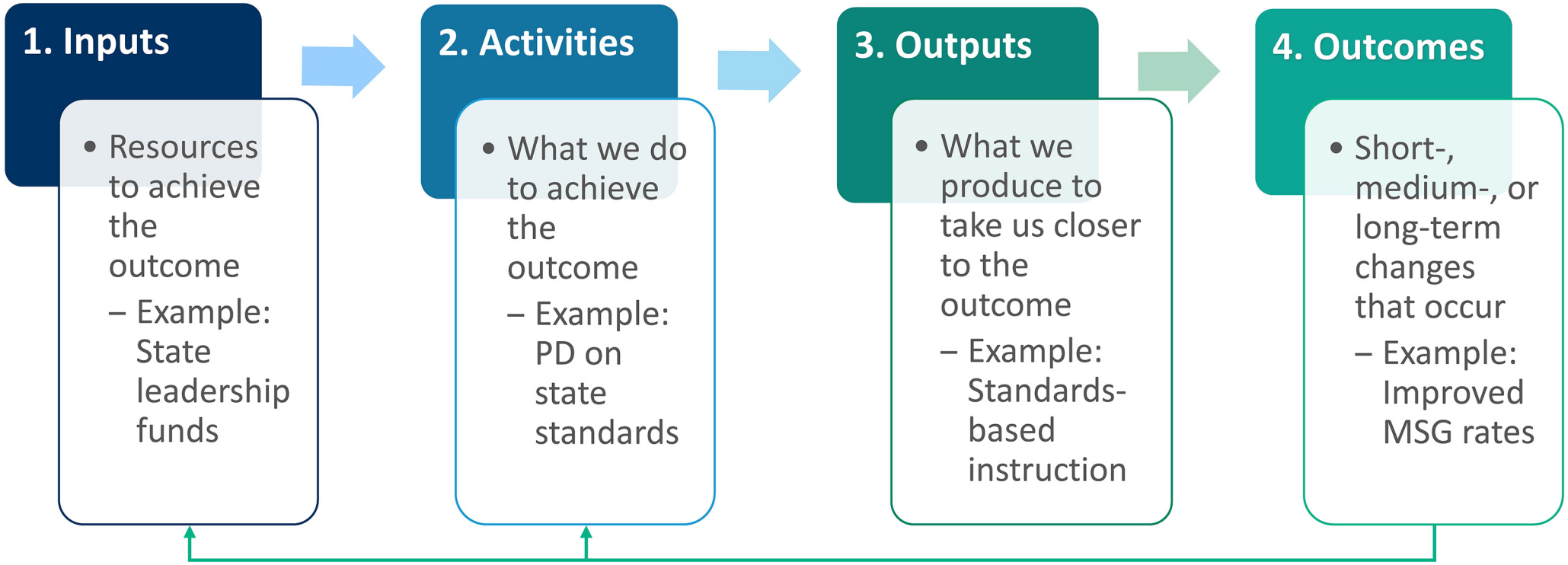


Additional Examples of Continuous Improvement



Logic Models and Continuous Improvement

We often include a feedback loop in our logic models to represent our plans for continuous improvement.



How Will You Continuously Improve?

Once the findings are in, you should:

- Celebrate!
- Determine how will you use your results
  - What might you do with the findings?
  - What potential strategies, improvements, replications might be considered?
  - Who do you share your results with and why?

Activity: Continuous Improvement Considerations?

Working in assigned teams, use the template to guide your responses.

How might your findings inform:

- Policy, programs and process

Who will you communicate the results to and why (what's the value to them)?

What might you do if data changes or new data becomes available that relates to your findings?

What would be the impact if you do nothing at all with the findings?

Select a reporter(s) to share out.

See Planning Guide, p. 24-26

The Reporting Plan

- Audiences
- Messages
- Medium
- Content
- Management

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Who Is Your Core Audience?

- Essential or core audience = “The One”
  - Design your reporting to meet the needs of your core audience
- If you only had one sentence to say to this audience about the study, what would you say to whom?
- What one picture (data evidence) would you give to support your sentence?

Messages

- What you want your audience to remember
- No more than three points per audience
- May include (or imply) desired action steps
- Format might be:
  - Summary point
  - (Additional) data to support point
  - Action based on data

Messages: Example

- Summary point:
  - Our innovative pilot PD program worked.
  - Data to support point:
    - » Students of teachers in our PD program showed twice the rate of retention and completion.
- Action based on data:
  - With similar results in half of our state's AE sites, we could double our completion rate in 2 years.

Medium

Types of “final reports” include:

Research papers

Memos

Policy briefs

Brochures

PowerPoint presentations

YouTube videos

Whatever is appropriate for your core audience

Content

In any medium, make sure to include:

- Answer your question.
- Describe Basic methods, data sources and data quality and limitations
- Look for patterns and differences.
- Use appropriate data and statistics--disaggregate.
- Draw appropriate conclusions.
- Remember serendipity.

Management

Lead

- Who is the person who is taking responsibility for the report or each piece?
- Write it as you are doing it (methods, etc.)

Timeline and drivers

- Schedule backed out from end points
- Drivers or milestones (e.g., schedule a statewide presentation)
- How often will you meet to assess progress?

Quality control and approvals

- Who is the QC reviewer? Outside partner?
- Who else needs to approve the report? Who are the organizational, political, community partners?

Lunch

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Discussion of AIR Support

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Small-Group Discussion

- What kinds of ***support*** do you need?
  - Finalizing the logic model or research questions?
  - Identifying data collection processes and sources?
  - Methodology?
  - Data analysis?
- What kinds of additional training do you need?

Next Steps for the ELC

Timeline

What does the next year look like? Next steps for the ELC:

- Monthly calls with AIR liaison(s)
- Two quarterly (March, September) check-ins of topic-area group: for questions, sharing successes and pitfalls, etc.
- Mid-year (June) check-in: webinar for all states, present 5 minutes each on your status

Timeline (continued)

- Final presentation (December): national presentation to field, recorded and placed on NRSWeb
- Ad hoc webinars on topics of common questions, areas of need, etc.

Key Takeaways

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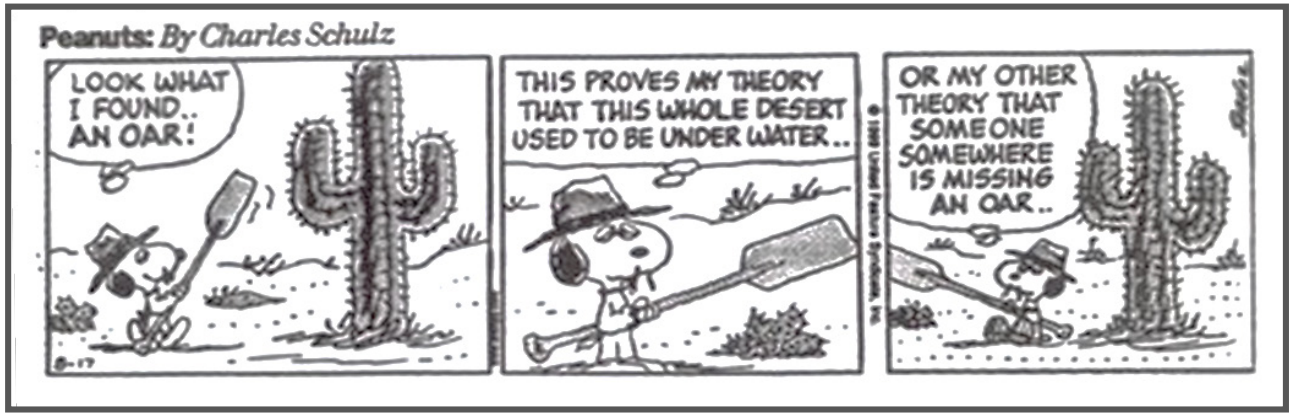
Wrap-Up

A Little Fun for the Journey Home ☺



Remember to think of alternate explanations …

… and make that slide AMAZING!