



Using Data to Support College and Career Readiness Program Improvement

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Goals for this session

- Planning program activities using strong theory,
- Ensuring data system has sufficient information to evaluate program activities, and
- Planning the evaluation to meet evidence of promise standards.



Why is this important?

- Most recent grant competition required:
 - Project design be based on *strong theory*, and
 - Project evaluation showed *evidence of promise*.

Strong Theory

- A rationale for the proposed process, product, strategy, or practice that includes a logic model.
- What is a logic model?
 - It clearly defines the following:
 - starting place or inputs,
 - processes and relationships, that lead to
 - goals and outcomes.

Evidence of Promise Definition

- There is empirical evidence to support the theoretical linkages between at least one critical component and at least one relevant outcome presented in the logic model for the proposed process, product, strategy, or practice.
- What does this mean?
 - Your evaluation uses sound statistical methods to show that at least one of your services or supports (component) has a positive influence on at least one of your goals (outcomes).

Evidence of Promise Definition

- Sound statistical methods include either a:
 - Correlational study with statistical controls for selection bias,
 - Multiple regression
 - Quasi-experimental study or
 - Randomized controlled trial

Activity

- With your tablemates, please discuss the following:
 - Your name?
 - Your GEAR UP grant?
 - Your role?
 - Whether or not you competed in the most recent grant competition?
 - If not, are you aware of the requirement of “evidence of promise” and have you thought about how it might be relevant in your next grant competition?
 - If so, how did you address this concept in the most recent grant competition and what are your current plans for fulfilling this directive?

Logic Model

Goals of the Evaluation

- Do you know whether your program addresses a particular challenge?
- Do you want to justify a program decision?
- Do you want to know whether to modify services?



What if your goal was to make a tastier cheese steak?

Option 1



Option 2



State the problem

- You bought a restaurant in Philadelphia.
- Under previous management, cheese steaks were OK.
- You want to serve an excellent cheese steak and have a successful restaurant.
- What's the best approach?

Research

- Learn about what others have done in preparing excellent cheese steaks
 - ingredients
 - preparation techniques
- Based on research, you develop a recipe.
- Does the recipe create a tastier cheese steak?

Implement

- Hire a cook
- Obtain ingredients
- Start making cheese steaks using each recipe



Evaluate the recipes

- Hypothesize that your new recipe is better
- Collect data: Enlist 50 tasters to try each type and ask their preference
- Examine data: Tally their responses
- Test differences: Conclude which is best

Conceptualizing the study – logic model

- Represent the process of how the program should work.
- State assumptions of key inputs and outcomes
 - If we do this, then that should happen.
- Framed by inputs, activities, outputs, outcomes, and impact

Inputs

- What resources do we need?
- Cheese steak inputs
 - Qualified cook
 - Quality ingredients
 - Kitchen equipment
 - Money



Activities

- What will the program do?
- Cheese steak activities
 - Prepare cheese steaks for recipe that won the earlier taste test
 - Advertise new and improved recipe



Outputs

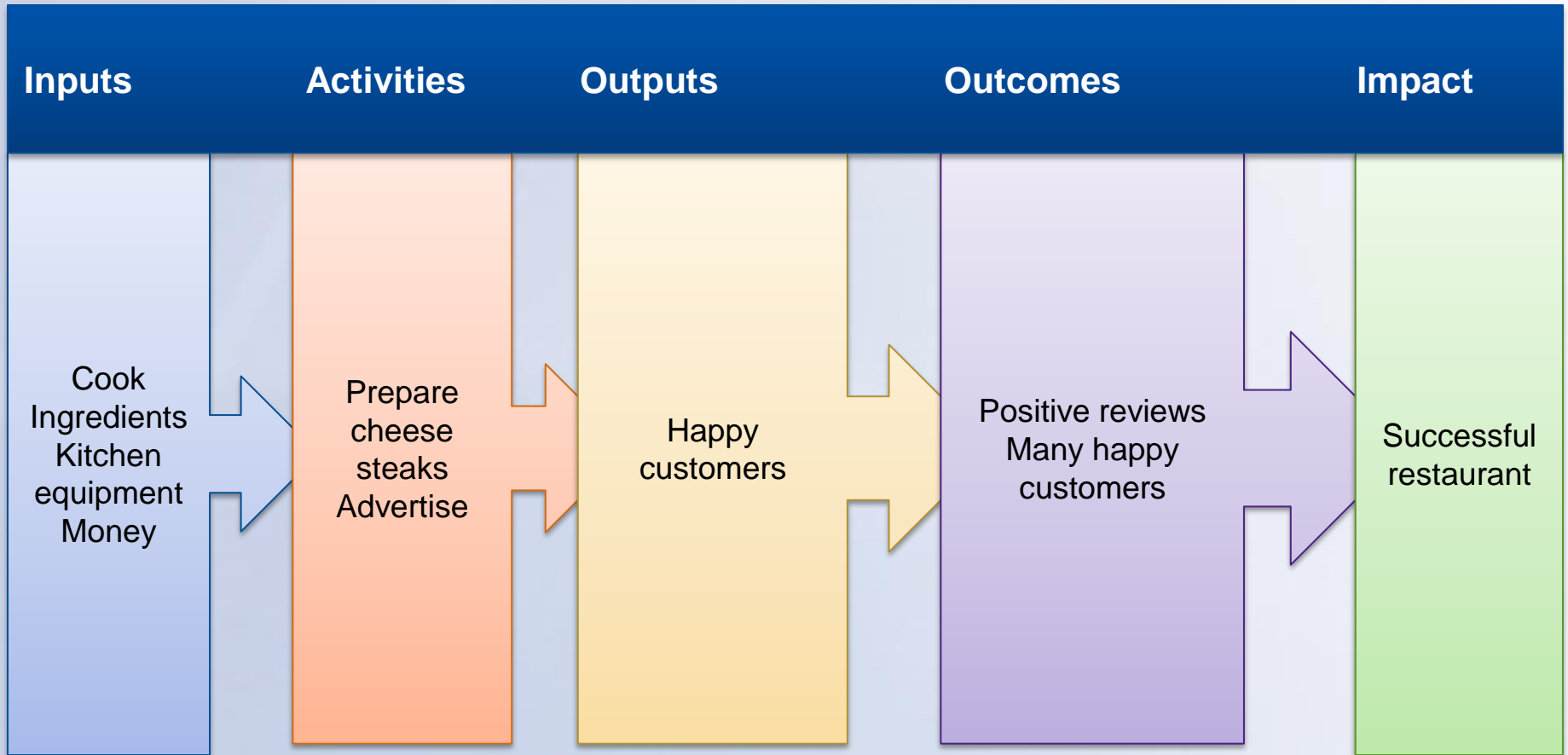
- Immediate results
- What should happen right after we implement these activities?
- This is a time to make adjustments if needed
- Cheese steak outputs
 - Customers like the new cheese steak recipe
 - They come return to restaurant
 - They tell their friends
 - More cheese steaks sold

Outcomes

- Changes that can be expected over time
- Intermediate results
- Is the program meeting its goal?
- Outcomes
 - Positive reviews on Yelp
 - Many customers

Logic model – Impact

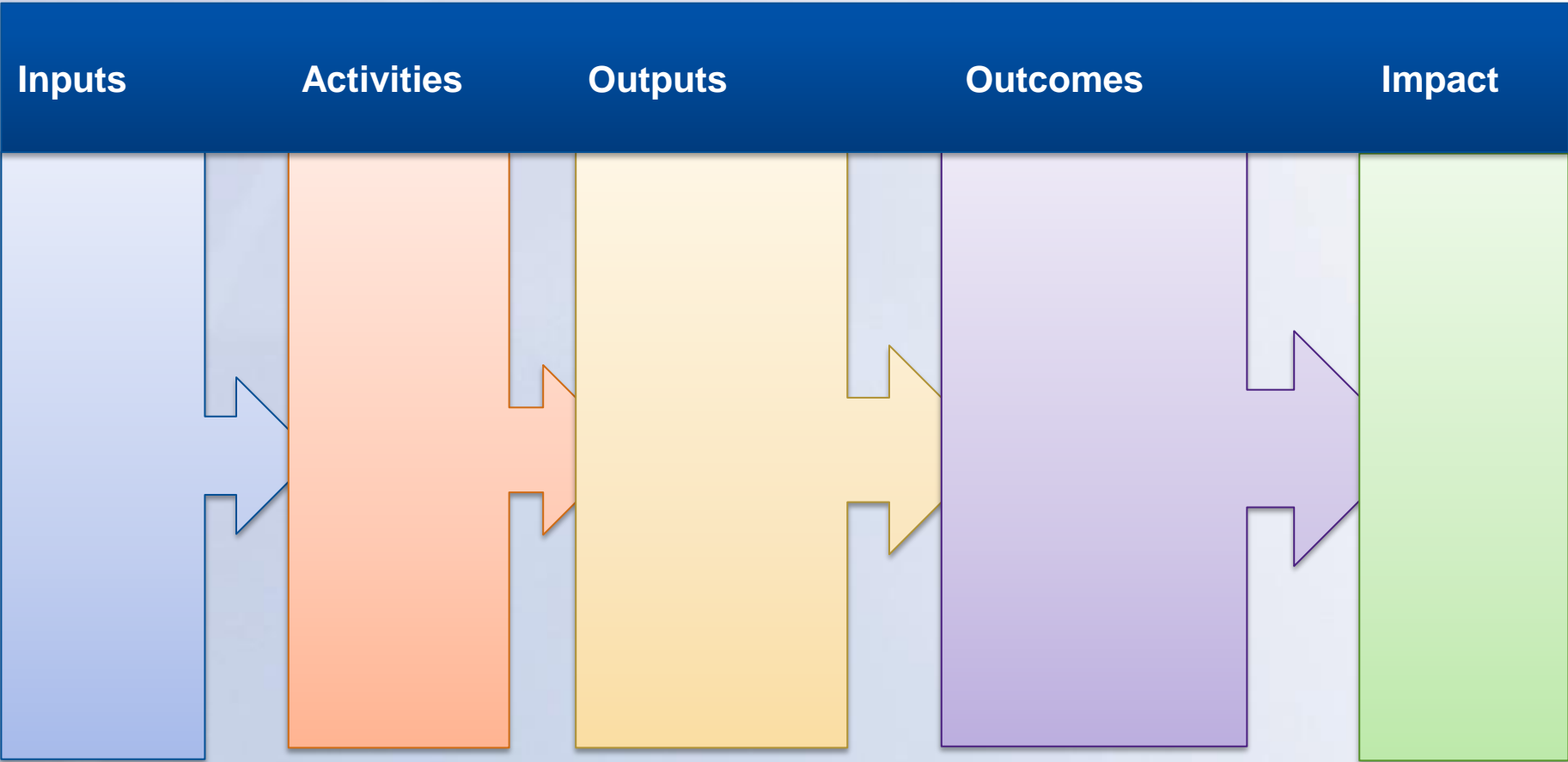
- The ultimate goal of the plan.
- Long term outcomes
- Why are we doing this?
- Impact of making a tastier cheese steak
 - Restaurant is successful
 - Many people get to enjoy delicious cheese steaks



Logic model reflections

- The logic model provides a framework
- It does not guarantee that the activities will necessarily lead to a given outcome!
- People can vary the way they structure logic models – but logic models must highlight the process
- You may not study all of the components in the logic model – you may not have time to analyze outcomes and impact.

Activity



Hypotheses

Next step – a plan

- Move from logic model to a research question.
- How will you determine whether these activities are effective in meeting goals?
- What is the most important question to address?



State the question

- Questions could focus on
 - Description
 - Analysis
 - Evaluation



Sample questions

- Description: How many students participated in the math tutoring this year?
- Analysis: Is participation in tutoring correlated with math test performance?
- Evaluation: Did tutoring help students do better on math tests compared to those who did not?

Specific hypotheses

- Make questions specific
 - What kinds of services?
 - What kinds of outcomes?
- Hypotheses state the relationship between the activity and the outcome.
- If 8th graders participate math tutoring once a week, they will be more likely to pass Algebra I by the end of 9th grade.

Formative and summative evaluations

- When and how will you use the information?
- As you nibble ingredients while you're making the cheese steak sandwich, you're doing a formative evaluation.
- After you serve the sandwich to your customer, you're going to get a summative evaluation.

The Timing of Formative and Summative Evaluations?

- When do you need the information?
- When will you have data?
- For a formative evaluation, you've got to have time to use information for continuous improvement.
- A summative evaluation can wait until the end.
 - Do not wait until the end to begin it!

Student Data

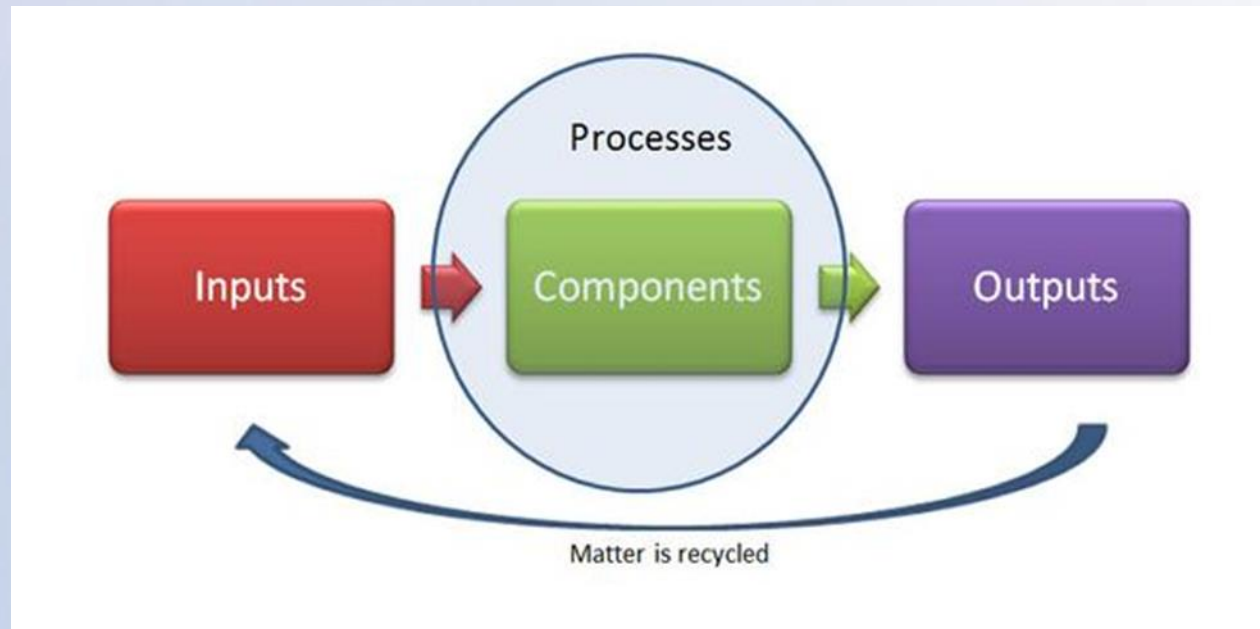
Student Data

- **Complicated**
 - Where it resides
 - Who controls access to it
- **Diverse**
 - What it includes



What student data should you routinely collect?

- Identification (inputs)
- Application (inputs)
- Services (preparation techniques)
- Outcomes



Identifying Data

- Full name
- Student identification number
- Birth date
- Permanent address
- Date of application or entry into the program

Application Data

- Eligibility requirements, usually academic or demographic
- How students enter the program
- Student background characteristics
 - Prior academic experiences
- Family information
 - Family situation
 - Parent highest level of education

Service Data

- In which services did each student participate?
- How often?
- How long?
- Was the service required or elective?



Outcome Data

- Grades
- Test scores
- Promotion to the next grade
- Graduate
- Apply to college
- Enroll in college



Methods of Collecting Data on Students

- Application package
- School records
- Program activity
- Surveys
- Interviews and focus groups
- Classroom or small group observations
- Partnerships

Types of Data

- Student level data
- School level data
- State level data



Other considerations

- Do you collect the data you need?
- Can you get the data you need from someone else?
- How much time would that take?
- Do you have qualified staff who can analyze it? Do you need to hire someone?
- How much would it cost to analyze data?

Making do

- What if you find out that each site collects data differently?
- What if you want to collect data from multiple sources, but you can't get all the data you want?
- What if you can't get the data in time to use it effectively?
- What if you don't have resources to follow your students into postsecondary education?

Activity



Merging Data Files

- Two types of data merges
 - One to one
 - Combining two student-level data files on the same group of students
 - One to many
 - Used with hierarchical data such as a file containing student level data with a file containing school level data

Longitudinal Data Sets

- Merging data from multiple time periods
- Allows examine relationship between services and student achievement

Unique Identifier

- Student id
- Name
- Birth date
- Strongest are combinations of the above

Conceptual Definitions

- Some concepts can be easily measured
 - College entry
 - Instructor
- Some concepts are difficult to measure
 - Motivation
 - College readiness

Example #1

- Research question: Does participation in GEAR UP services affect the likelihood that participants will enroll in college?
- Key concepts: service participation, college enrollment

Defining Variables

- Service participation:
 - Receipt of services
 - Duration of participation
 - Intensity
- College enrollment:
 - Enrolled?
 - Type of college
 - Attendance status
 - Timing of enrollment

Example #2

- *Research question:* Does rigorous course taking in middle school improve the likelihood that students will graduate high school?
- *Key concepts:* rigorous course taking, high school graduation

Defining Variables

- Rigorous coursework:
 - Completion of rigorous courses
 - Subject area
 - Number of rigorous courses taken simultaneously
- High school graduation:
 - Type of credential
 - Timing of graduation

Activity



Comparison groups

Choosing comparison groups

Apples



Oranges



Goal

- To isolate the influence of GEAR UP on a student outcome, compare those students to students who are as similar as possible to your students – *except that they did not receive the service*
- What are sources for information about a comparison group?

Problems with selection

- People who choose to participate in an activity might differ from those who do not.
 - Motivation
 - Interest
 - Parental involvement
 - Teacher advocacy
 - School policies

Selection

- Any of these factors may be associated with student academic outcomes.
- If you don't account for them, you might draw the wrong conclusion.

Pre and post

- Comparing baseline scores to post scores
- Exactly the same students
- Look at change over time
- Not a comparison group. Can't isolate influence of service

Matches

- Students in another school with same demographic characteristics and past performance
- Prior cohort
- Within GEAR UP students – recipients of different kinds or levels of service.

Disadvantages

- May not account for all differences
- Evaluator is deciding whom to include in the control group – bias?

Propensity score

- Statistical technique used to match control group students
- Estimate which individuals had a strong likelihood of receiving the service
- Create control group by matching students who received service to similar students who did not.

Tradeoffs to propensity score

- Advantage -
 - Reduce bias
 - Account for multiple factors
- Disadvantage –
 - Requires large sample
 - Requires sophisticated statistical techniques
 - Unobserved variables

Random assignment

- Students, classrooms, or schools are randomly assigned to get the service -- or not.
- It happens by chance
- No student characteristics affects her chances of getting this service?

Methodologically sound - But is it fair?

- If more people are interested in the service than can get it, then you have to choose who will get it.
- Before doing random assignment
 - Determine eligibility
 - Set priorities for types of students served
 - Confirm that you have enough people who will participate
- Exceptions to the rule?

Crossovers

- Once students are assigned to treatment or control, they keep that designation – even if they opt out or cross over. (Intent to treat)
- At that point, their receiving the service is not random and some characteristic associated with performance may have affected the decision.

Limitations

- No retrospective analysis
- Difficulties in assigning students

Final considerations

- After selection, compare treatment and control groups.
- Analyses should account for differences in analyses.
- You have to collect same kinds of data on both groups.
- Try to find out what services/opportunities control group students had.

Activity



Show evidence of promise

Evidence of promise

- Show that a service has a positive influence on an outcome
- Does not include
 - Counts of students participating in service
 - Stories of students who have done well in a service
 - Pre-test versus post-test

Evidence of promise

- Need a test of statistical significance
- T-tests and correlations are first steps – but they may not account for other factors.
- Requires
 - Statistically selected treatment and comparison group
 - Models account for other factors that may be associated with outcomes.

What next?

- Strongly-defined comparison groups and models that account for other factors can isolate the influence of a program -- and demonstrate its success.
- Share information with staff, district partners, other GEAR UP grantees – and others
- Let others build on your success!

More Information

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