


# Developing Questions for Effective Surveys

January 16, 2013




## EvaluATE

EVALUATION RESOURCE CENTER for advanced technological education




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## Introductions

|   |  |  |
|---|--|--|
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**EvaluATE**



WESTERN MICHIGAN UNIVERSITY



NETWORKS



MARICOPA COMMUNITY COLLEGES®

## Objectives

By the end of the webinar, you will be able to:

1. identify how survey questions fit into and inform broader evaluation purposes
2. apply guidelines for question construction to develop sound survey items
3. develop survey items that align with analysis needs and/or constraints

## The Role of Surveys in ATE Evaluation



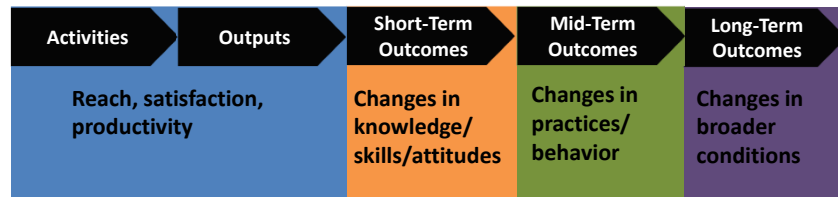
Lori



## Examples of ATE Project Survey Data

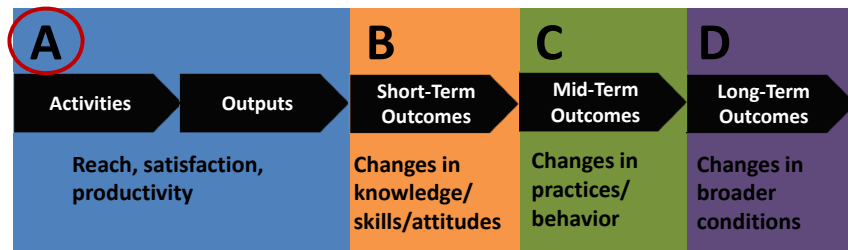
- Feedback from participants at outreach events
- Student/faculty feedback on curriculum materials
- Expectations about a child’s participation in a program
- Faculty self-assessment of knowledge, skills
- Student self-assessment of knowledge, skills
- Feedback from workshop participants
- Faculty reports of use of professional development content
- Project advisors’ perceptions of project operations
- Students’ intent to pursue STEM education/career
- Stakeholder perceptions about overall project and its resources
- Program graduate employment

## Logic Model

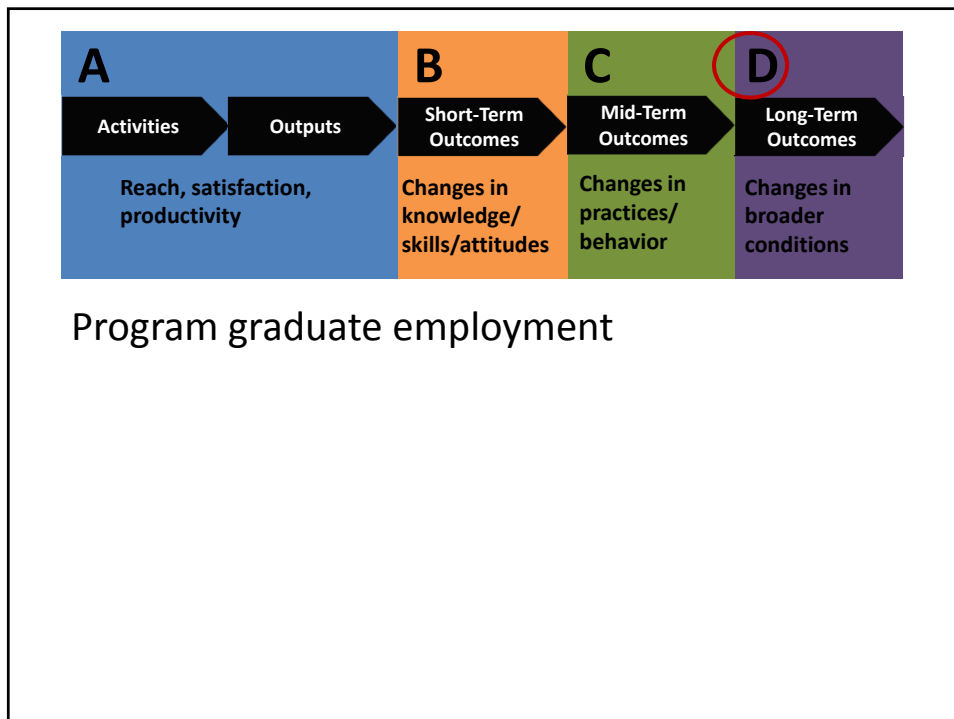
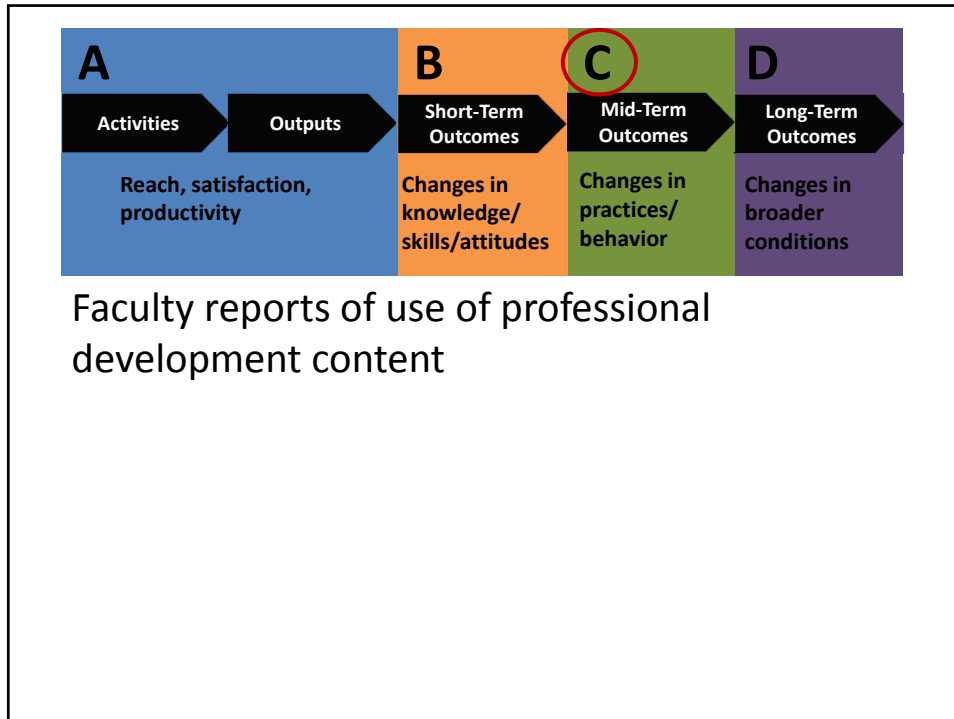


## Examples of ATE Project Survey Data

- **Feedback from participants at outreach events**
- Student/faculty feedback on curriculum materials
- **Expectations about a child's participation in a program**
- Faculty self-assessment of knowledge, skills
- Student self-assessment of knowledge, skills
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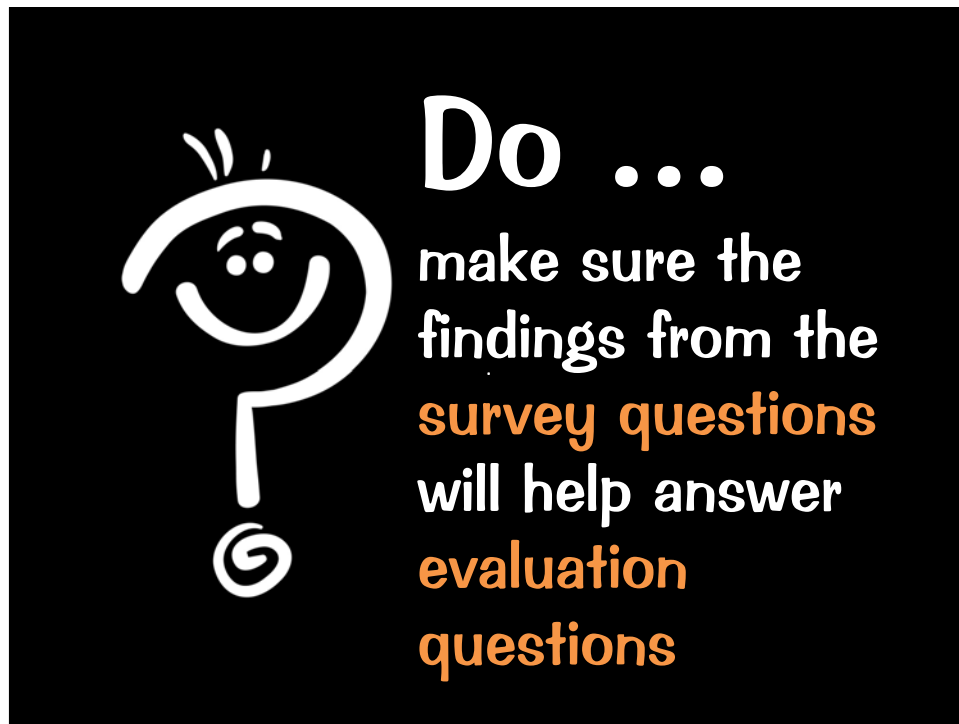
Feedback from participants at outreach events



Students' intent to pursue STEM education/  
career

Parent expectations about a K-12 student's  
participation in a program

?



## Evaluation Questions v. Survey Questions

### Evaluation Questions

- About a project's reach, quality, and effectiveness
- Typically require multiple data sources and methods to answer



### Example

To what extent has the project increased interdisciplinary collaboration among faculty?

### Survey Questions

- Items on a questionnaire



### Example

How satisfied are you with this webinar?



## Survey

Surveys are useful for collecting data on

- Demographics
- Attitudes
- Behaviors

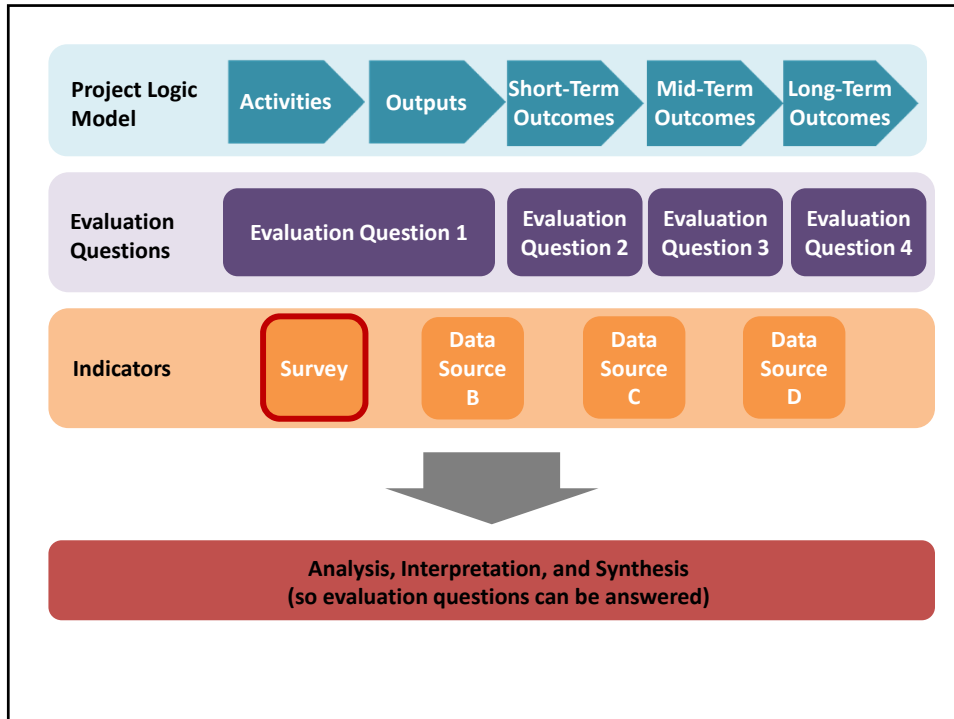


## Survey

To get good data from surveys, you need

- sampling frame to identify potential respondents
- **well chosen and crafted survey items**
- representation/good response rates





## Crosscheck

**Will the results from this survey item help us**

- Identify ways to improve?
- Determine the project's quality and impact?
- Account for use of our grant money?



## Crosscheck

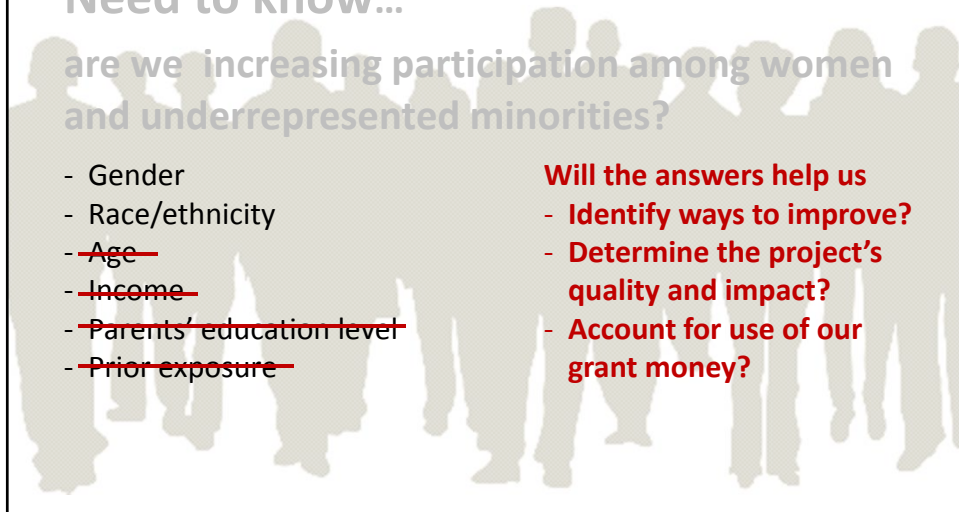
Need to know...



are we increasing participation among women and underrepresented minorities?

## Crosscheck

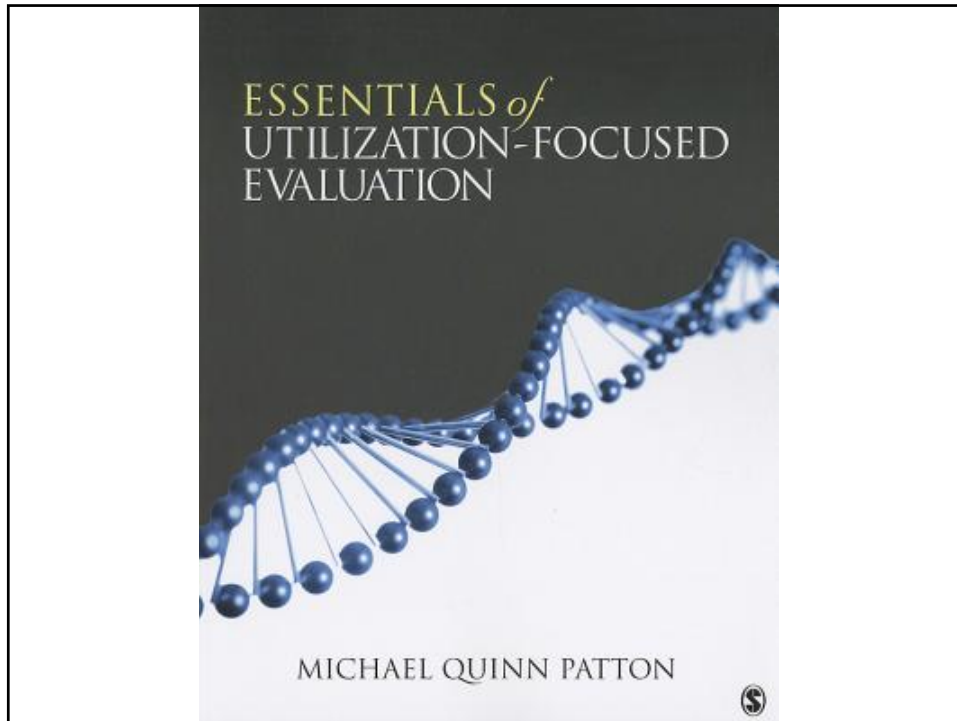
Need to know...



are we increasing participation among women and underrepresented minorities?

- Gender
- Race/ethnicity
- ~~Age~~
- ~~Income~~
- ~~Parents' education level~~
- ~~Prior exposure~~

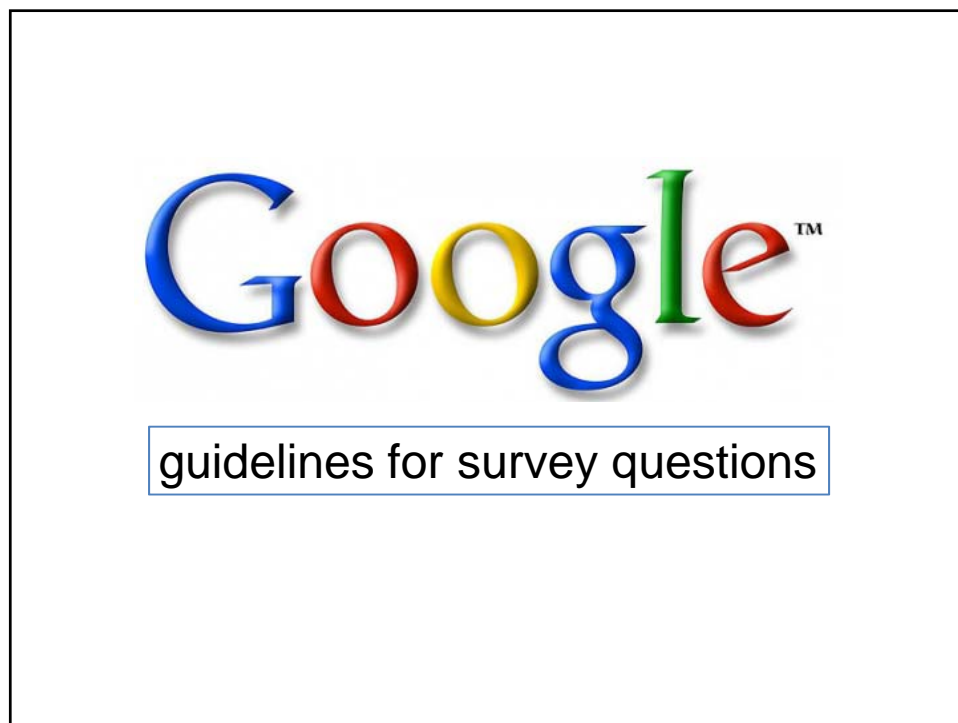
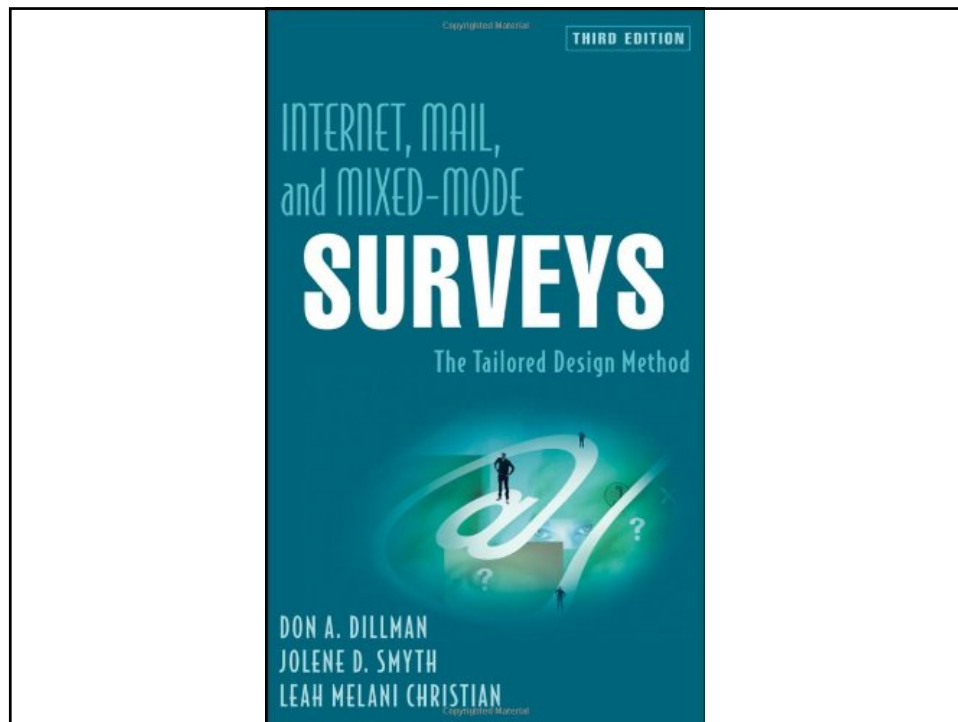
- Will the answers help us**
- **Identify ways to improve?**
- **Determine the project's quality and impact?**
- **Account for use of our grant money?**

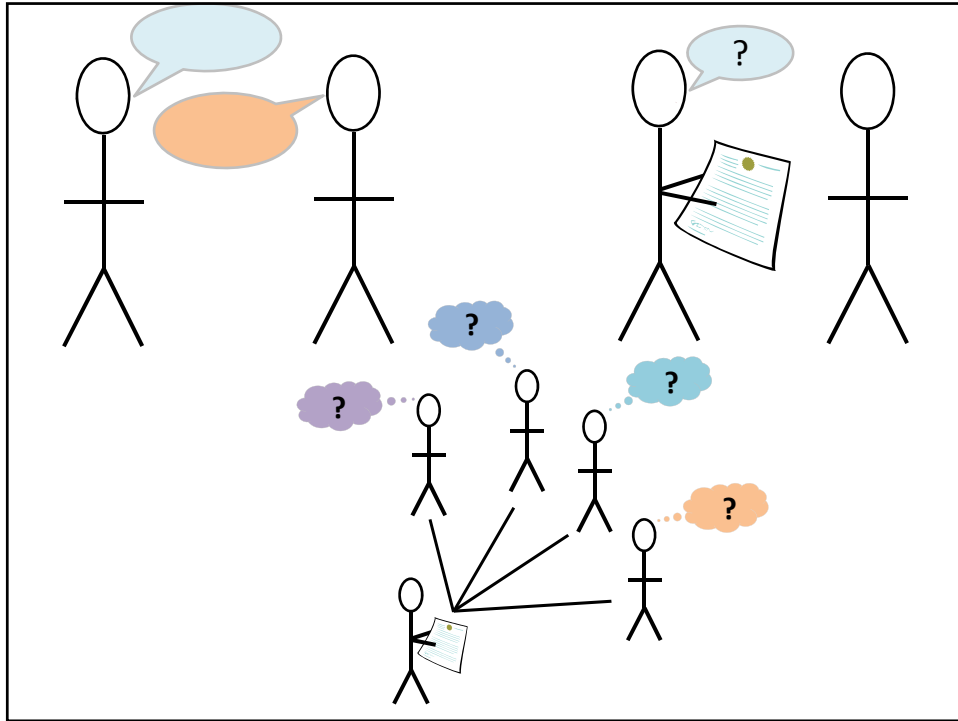


**Survey Item Construction**



**Lori**





## Question Appraisal System (QAS-99)

Steps for identifying **problems** with survey questions

- Assumptions
- Clarity
- Sensitivity/Bias
- Response Categories

## Assumptions

“ Determine whether there are problems with assumptions made or the underlying logic.”

## Assumptions

- attitudes
- experiences

**Attitudes**

Did the workshop meet your **expectations**  
in terms of learning about **new funding**  
**opportunities?**

- No
- Somewhat
- Yes





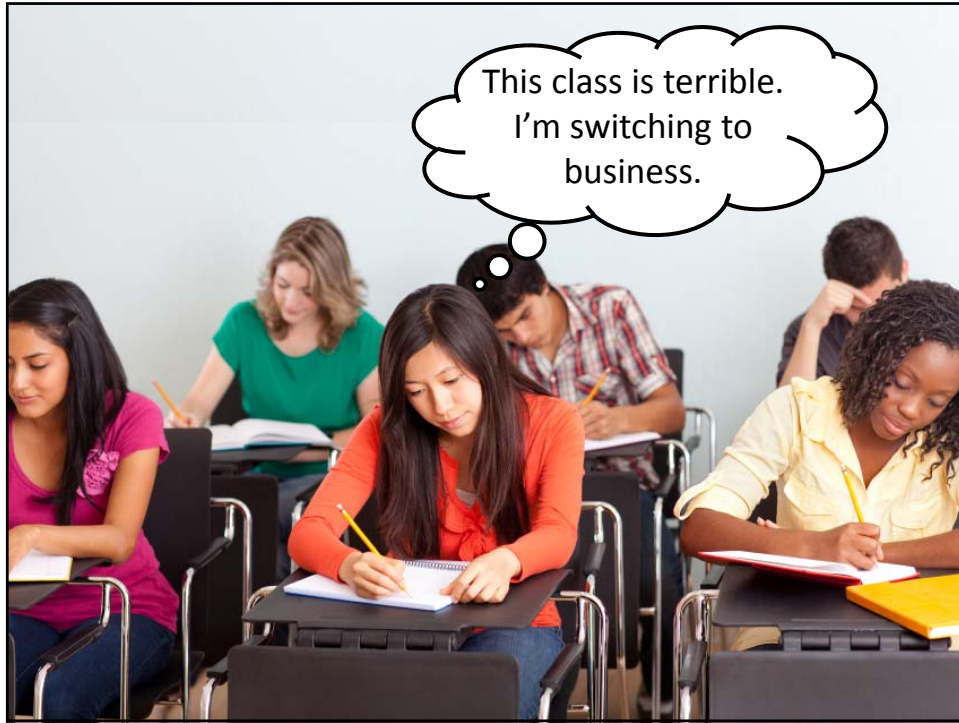


**Attitudes**

Did this course influence **your decision** to pursue a **career in technology**?

- No
- Somewhat
- Yes





### Attitudes

Are you considering a career in Engineering, Mathematics, Science or Technology as a result of your participation on a robotics team?

- Yes, being on the team has influenced me to pursue a career in science, math, technology or engineering.
- No, I am not considering a career in math, science, technology or engineering
- No, being on the robotics team has discouraged me from pursuing a career in math, science, technology or engineering
- No, I would have pursued a career in math, science, technology or engineering regardless if I was on the team

Rosemarie Cybulski. (2010). Educational Outcomes of FIRST Robotics and Robofest Competitions. [www.robofest.net/STEMedu/Cybulski\\_Capstone.pdf](http://www.robofest.net/STEMedu/Cybulski_Capstone.pdf)



## Clarity

“Identify problems related to communicating the intent or meaning of the question to respondents.”

## Clarity

- be precise
- ask about one thing at a time
- don't be wordy

Precision

Do you own or have access to a tablet computer?

- Yes
- No

**Is the purpose of this question to learn about**

- ownership?
- access?
- use?
- likelihood of using an app to support learning or teaching?

Precision

Do you own or have access to a tablet computer?

- Yes
- No

**Lack of precision in question wording diminishes the usefulness of the results**

**Precision**

Who does most of the student advising for your program?

- Faculty in your program
- Other staff in your program
- Advisors in a campus-wide office
- Advisors in a department office
- No formal student advising available

**Admissions?  
Careers?  
Program?  
Financial?**



Double-barreled questions

|                         | Poor                     | Fair                     | Good                     | Excellent                |
|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 <u>Activities</u> and | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 <u>materials</u>      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 Instructor's          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 <u>knowledge</u> and  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 <u>preparedness</u>   |                          |                          |                          |                          |

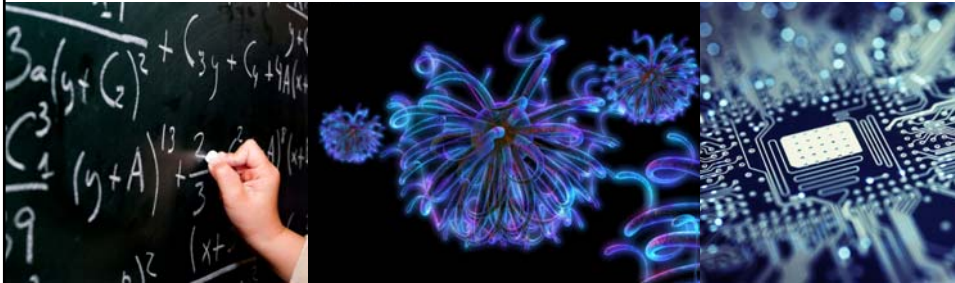
Do you NEED to know about all 4 things?  
Then ask four questions....

Double-barreled questions

|                                 | Poor                     | Fair                     | Good                     | Excellent                |
|---------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Activities                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Materials                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Instructor's<br>preparedness | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Instructor's<br>knowledge    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Double-barreled questions

“math, science, and technology”



Double-barreled questions


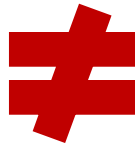
“ability and confidence”





Double-barreled questions

“pay and job conditions”



**Don't**  
ask about more  
than one thing at a  
time

**Wordiness**

|   | Strongly Disagree        | Disagree                 | Agree                    | Strongly Agree           |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. <del>I found that</del> the workshop increased my knowledge of evaluation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. <del>I found that</del> the materials .....                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. <del>I found that</del> the instructor .....                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**3 unnecessary words x 15 items**  
**= 45 extra words**



## Sensitivity/Bias

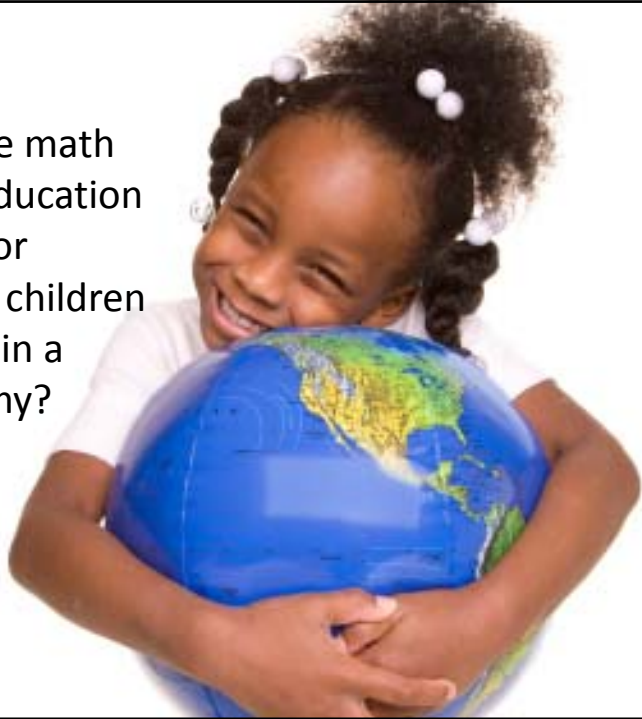
“ Assess question for sensitive nature or wording and for bias.”

## Bias

- leading questions
- anonymity and sample size

**Leading Questions**

Do you believe math and science education is important for preparing our children to participate in a global economy?



**Please rate the quality of this workshop.**





**Don't**  
ask leading  
questions



**Do**  
be aware of how  
sample size and  
lack of  
anonymity may  
affect responses

## Response Categories

“Assess the adequacy of the range of responses.”

## Response Categories

Response options should be

- aligned with question prompt
- nonoverlapping
- exhaustive

**Alignment**

|  | Poor                     | Fair                     | Good                     | Excellent                |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| The workshop increased my knowledge of evaluation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Alignment**

|  | <del>Poor</del><br>Strongly disagree | <del>Fair</del><br>Disagree | <del>Good</del><br>Agree | <del>Excellent</del><br>Strongly Agree |
|--|--------------------------------------|-----------------------------|--------------------------|--|
| The workshop increased my knowledge of evaluation. | <input type="checkbox"/>             | <input type="checkbox"/>    | <input type="checkbox"/> | <input type="checkbox"/>               |

**Alignment**

Not at all Fair Somewhat Very much

The workshop increased my knowledge of evaluation.





Nonoverlapping & Exhaustive

How many years have you worked at your institution?

- 1-5 years *< less than 1 year*
- ~~6~~ 10 years
- ~~11~~ -15 years
- ~~16~~ or more years

Nonoverlapping & Exhaustive

What is your role within the ATE program?

- PI *Check all that apply ^*
- Co-PI *(takes care of overlapping*
- Staff *problem)*
- Grant writer
- Evaluator
- Industry partner
- Advisor
- Researcher *Easy fix to make sure options are*
- Other *exhaustive*



**Do**  
provide response  
options that are  
-nonoverlapping  
-exhaustive



**Do**  
review and pilot  
test all questions

## Implications for Analysis

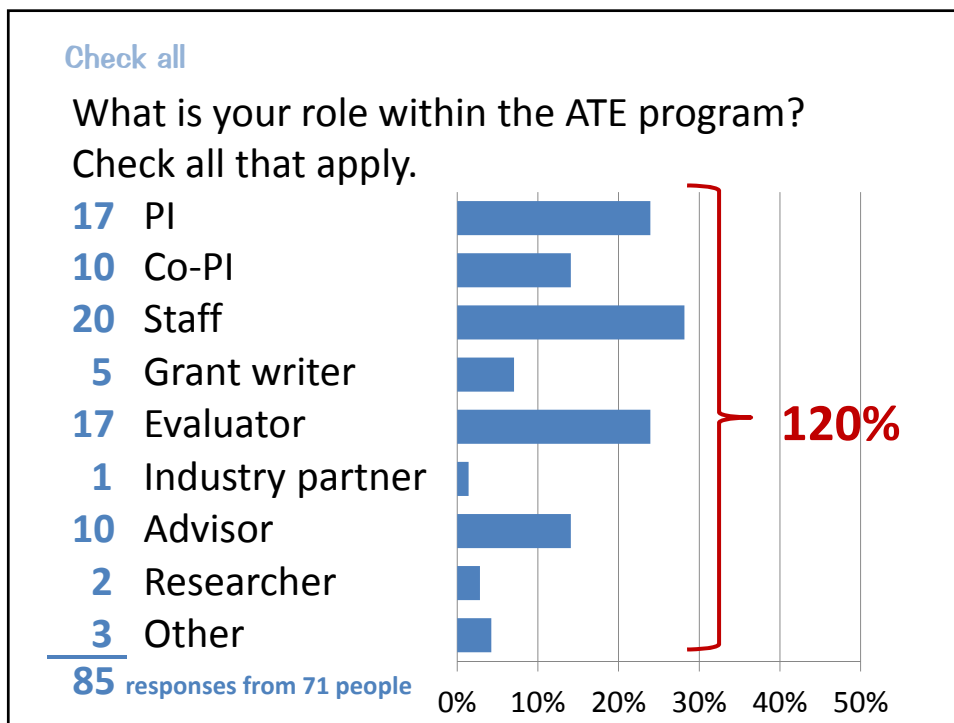
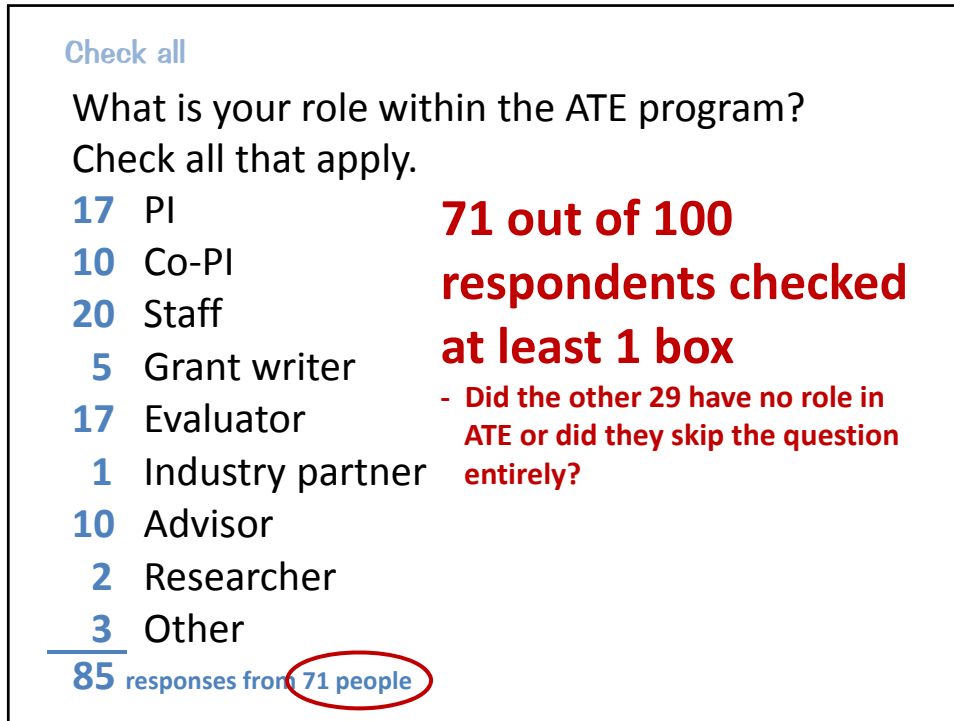


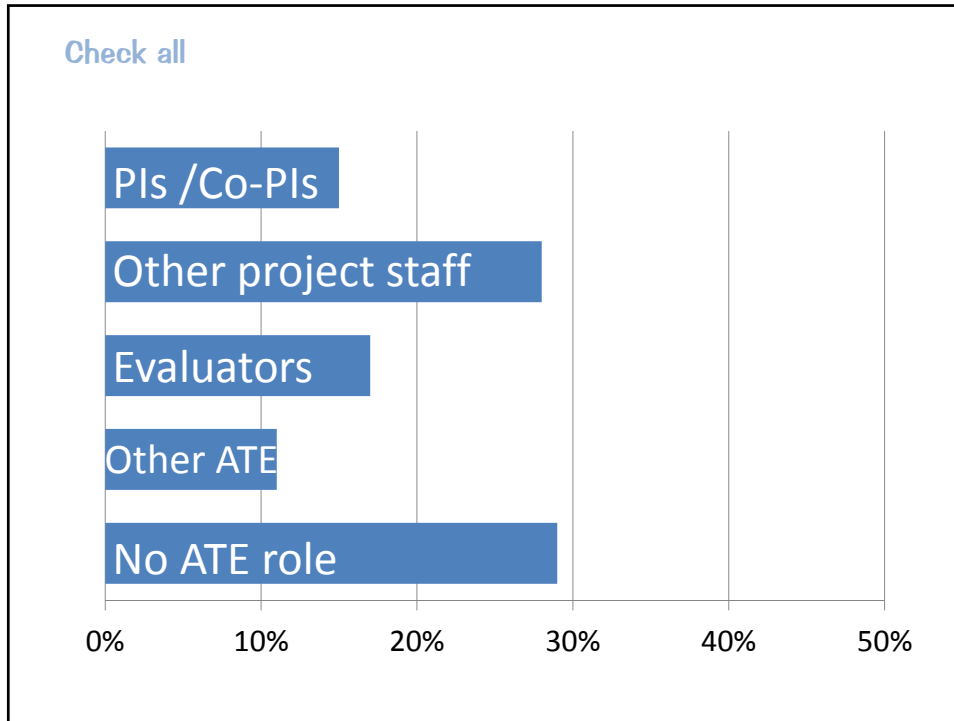
Lori



## Implications for Analysis

- Check-all-that-apply issues
- Ordinal data
- Even v. odd-number response options
- Pre-post surveys

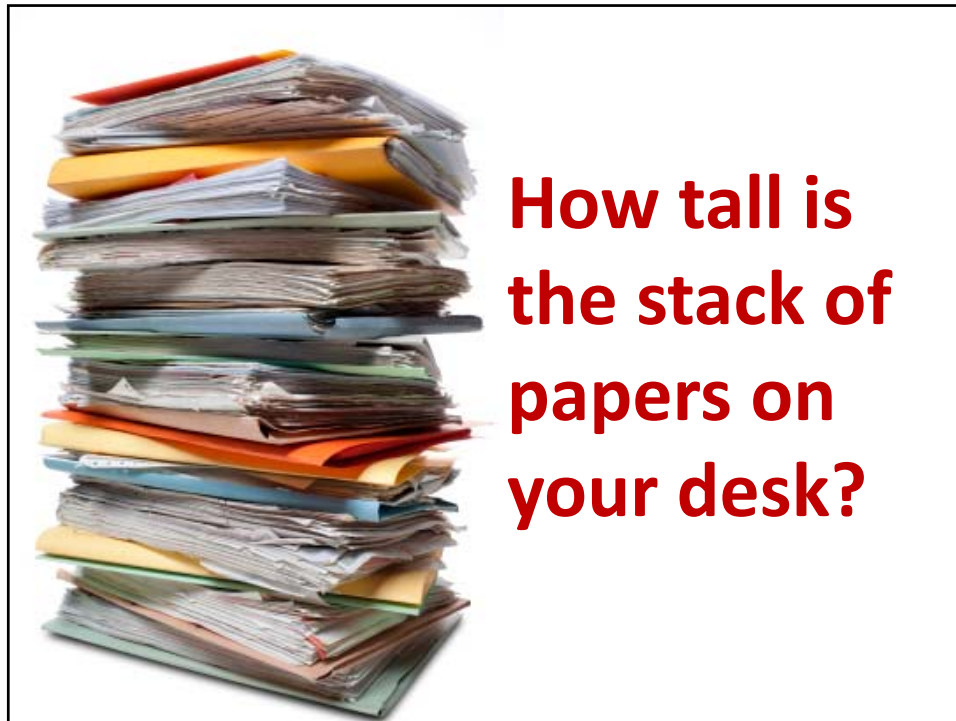




Check all


As a result of attending a MATEC webinar, I have:

- Added new instructional materials
- Tried new pedagogical methods
- Changed the way I assess student learning
- Added new technology topics
- Added a new activity/course
- Implemented new recruiting strategies
- None of the above




Ordinal v. ratio data

**Lori's stack is 6 times the height of Krystin's**




**Average is 3.5 inches**

**Lori's: 6 inches**



**Krystin's: 1 inch**



Ordinal v. ratio data

How often do you...

- All of the time
- Most of the time
- Seldom
- Never

Ordinal v. ratio data

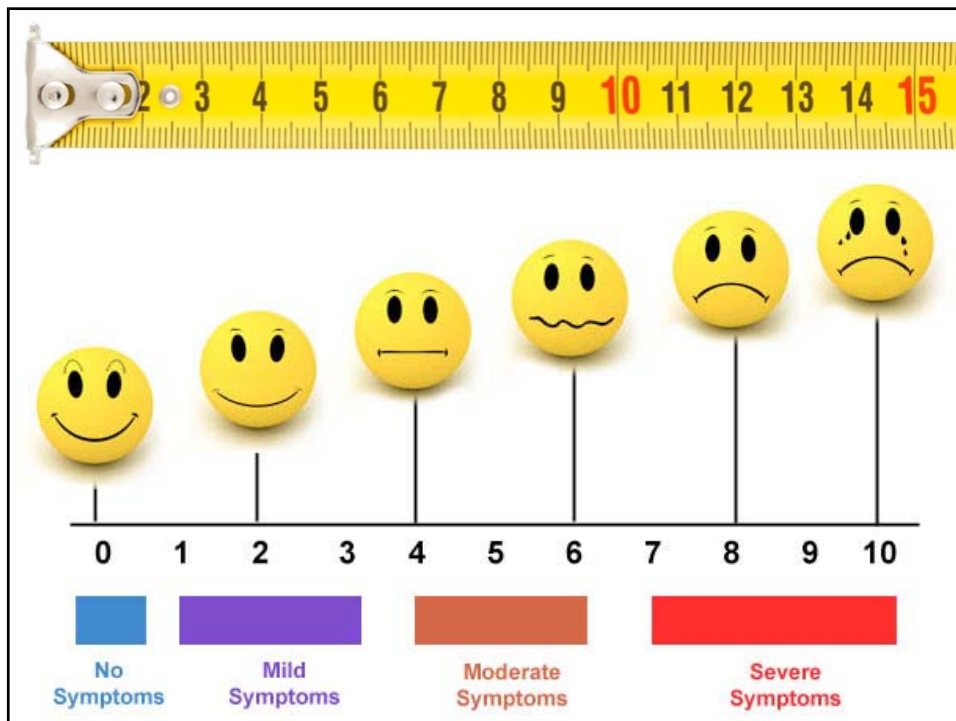
I will use...

- Strongly disagree
- Disagree
- Agree
- Strongly Agree

Ordinal v. ratio data

What is the quality of...

- Poor
- Fair
- Good
- Excellent



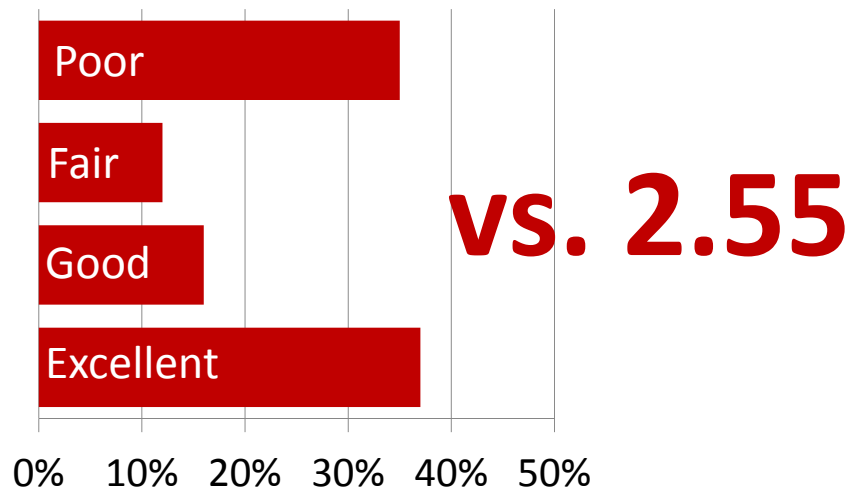


Ordinal v. ratio data

What is the quality of this webinar?

- 1 Poor
  - 2 Fair
  - 3 Good
  - 4 Excellent
- mean rating = 2.55**

Ordinal v. ratio data



Even v. Odd

1. [Question/statement]

- Strongly disagree
- Disagree
- Agree
- Strongly Agree

} **Forces respondents to choose**

Even v. Odd

1. [Question/statement]

- Strongly disagree
- Disagree
- Neither agree nor disagree**
- Agree
- Strongly Agree

} **Allows respondents to be neutral**

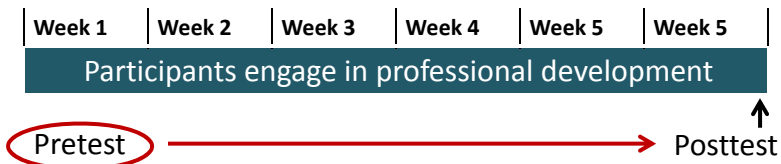
Even v. Odd

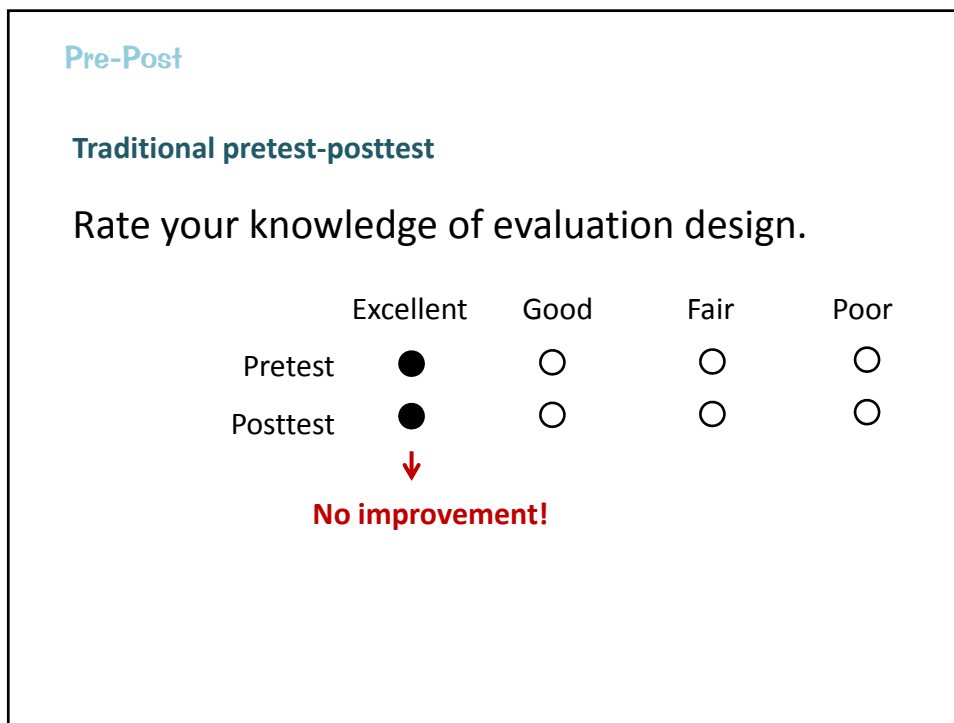
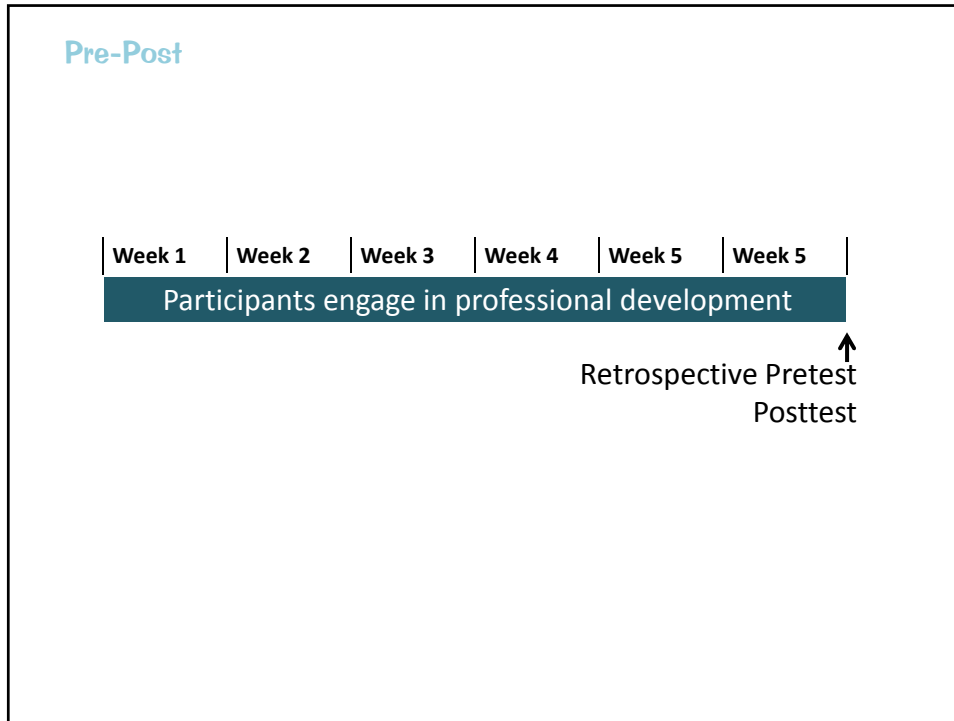
1. [Question/statement]

- Strongly disagree
- Disagree
- Agree
- Strongly Agree
- No opinion

**Allows respondents to indicate they have not formulated an opinion**

Pre-Post





**Pre-Post**

**Retrospective pretest-posttest**

Rate your knowledge of evaluation design.

|                     | Excellent                        | Good                  | Fair                             | Poor                  |
|---------------------|----------------------------------|-----------------------|----------------------------------|-----------------------|
| BEFORE the workshop | <input type="radio"/>            | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> |
| AFTER the workshop  | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> |

Big improvement!



**Do**  
 plan ahead for  
 how data will be  
 analyzed

## EvaluATE Events


**From Valuing to  
Visualization: Data  
Interpretation and  
Reporting**


March 20 | 1-2:30 p.m. EST


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