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

<table>
<thead>
<tr>
<th>Activities</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reach, satisfaction, productivity</td>
<td>Changes in knowledge/skills/attitudes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Short-Term Outcomes</th>
<th>Mid-Term Outcomes</th>
<th>Long-Term Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in practices/behavior</td>
<td>Changes in broader conditions</td>
<td></td>
</tr>
</tbody>
</table>
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

Feedback from participants at outreach events
Developing Questions for Effective Surveys

Faculty reports of use of professional development content

Program graduate employment
Students’ intent to pursue STEM education/career

Parent expectations about a K-12 student’s participation in a program
Do ... 
make sure the findings from the survey questions will help answer evaluation questions.

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?
Surveys are useful for collecting data on
- Demographics
- Attitudes
- Behaviors

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?

- 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
guidelines for survey questions
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
I just want tips on how to write ATE proposals.

I was just hired and want to learn everything I can about grants.
Attitudes

Did this course influence your decision to pursue a career in technology?
☐ No
☐ Somewhat
☐ Yes

This class fit my schedule and met a gen-ed requirement. I want to be a nurse.
This class is terrible.
I’m switching to business.

I’ve known I wanted to work in technology since I was in middle school.
Attitudes

Are you considering a career in Engineering, Mathematics, Science or Technology as a result of you 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


Don't assume your respondents think like you do
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


Do be precise
Developing Questions for Effective Surveys

<table>
<thead>
<tr>
<th>Quality Rating</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Activities and materials</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>2. Instructor’s knowledge and preparedness</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I found that the workshop increased my knowledge of evaluation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I found that the materials .....</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I found that the instructor .....</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3 unnecessary words x 15 items  
= 45 extra words

Don’t be wordy
Sensitivity/Bias

Assess question for sensitive nature or wording and for bias.

Bias

- leading questions
- anonymity and sample size
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

The workshop increased my knowledge of evaluation.

Alignment

The workshop increased my knowledge of evaluation.
The workshop increased my knowledge of evaluation.

Alignment

Not at all  A little  Somewhat  Very much

Do make sure response options align with question phrasing.
Developing Questions for Effective Surveys

How many years have you worked at your institution?

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

What is your role within the ATE program?

- □ PI
- □ Co-PI
- □ Staff
- □ Grant writer
- □ Evaluator
- □ Industry partner
- □ Advisor
- □ Researcher
- □ Other

Check all that apply (takes care of overlapping problem)

Easy fix to make sure options are exhaustive.
Do provide response options that are 
- nonoverlapping 
- exhaustive

Do review and pilot test all questions
Implications for Analysis

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

What is your role within the ATE program?
Check all that apply.

17 PI
10 Co-PI
20 Staff
5 Grant writer
17 Evaluator
1 Industry partner
10 Advisor
2 Researcher
3 Other

71 out of 100 respondents checked at least 1 box

- Did the other 29 have no role in ATE or did they skip the question entirely?
Check all

- PIs /Co-PIs
- Other project staff
- Evaluators
- Other ATE
- No ATE role

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
How tall is the stack of papers on your desk?

Lori’s stack is 6 times the height of Krystin’s

Lori’s: 6 inches

Average is 3.5 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
What is the quality of this webinar?

1. Poor
2. Fair  **mean rating = 2.55**
3. Good
4. Excellent
Developing Questions for Effective Surveys

Even v. Odd

1. [Question/statement]
   - [ ] Strongly disagree
   - [ ] Disagree
   - [ ] Agree
   - [ ] Strongly Agree
   - [ ] Neither agree nor disagree
   - [ ] Agree
   - [ ] Strongly Agree

Forces respondents to choose

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

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants engage in professional development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pretest → Posttest
Participants engage in professional development

Retrospective Pretest Posttest

**Pre-Post**

**Traditional pretest-posttest**

Rate your knowledge of evaluation design.

- **Pretest**: Excellent ●, Good ○, Fair ○, Poor ○
- **Posttest**: Excellent ●, Good ○, Fair ○, Poor ○

**No improvement!**
Pre-Post

Retrospective pretest-posttest

Rate your knowledge of evaluation design.

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEFORE the workshop</td>
<td>〇</td>
<td>〇</td>
<td>●</td>
<td>〇</td>
</tr>
<tr>
<td>AFTER the workshop</td>
<td>●</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
</tbody>
</table>

Big improvement!

Do plan ahead for how data will be analyzed
Developing Questions for Effective Surveys

EvaluATE Events

From Valuing to Visualization: Data Interpretation and Reporting
March 20 | 1-2:30 p.m. EST

www.evalu-ate.org/events

www.evalu-ate.org

Resource Library
Evaluator Directory
Events (including past webinars)
Newsletters
Thank You!

EvaluATE
Evaluation Resource Center for advanced technological education

©2013 EvaluATE www.evalu-ate.org