March 22, 2017

Evaluation Support Center
For the National Science Foundation’s
Advanced Technological Education (ATE) Program
WEBINAR
Outcome Evaluation: Step-by-Step

Materials

Slides  Handout  Recording

www.evalu-ate.org/webinars
Introductions

Miranda Lee  Lori Wingate

Behind the Scenes

Cheryl Endres  Emma Perk  Mike Lesiecki  Janet Pinhorn  Tim Suchomski

evalu-ate.org
Overview

1. Identifying Intended Outcomes and Evaluation Questions
   Question Break

2. Planning for Data Collection and Beyond
   Question Break

3. Interpreting Results
   Question Break

This material is based upon work supported by the National Science Foundation under grant number 1600992.

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the presenters and do not necessarily reflect the views of NSF.
Identifying Intended Outcomes and Evaluation Questions

Outcome Evaluation Steps

1. Define intended outcomes
2. Identify evaluation questions
3. Plan for data collection and beyond
4. Collect and analyze data
5. Interpret results (answer evaluation questions)
Webinar Sections

1. Define intended outcomes
2. Identify evaluation questions
3. Plan for data collection and beyond
4. Collect and analyze data
5. Interpret results (answer evaluation questions)

Outcome

Any change resulting from project activities and outputs
Activity

What a project does, the actions it takes

Goal

An achievement being sought
May focus on activities or outcomes
Activity goal
(what a project will do)
EvaluATE will deliver 4 webinars per year, serving 1,000 people

Outcome goal
(what difference it will make)
Webinar participants will improve their evaluation knowledge and practices

Real goal statements from real ATE projects
Excerpt of actual ATE project abstract from www.nsf.gov/ate

The goal of the project is to increase the supply of qualified cybersecurity professionals for industry and government.

outcome: more qualified workforce
The goal of this project is to develop an associate's degree in mechatronics, incorporating pathways from local high schools into the degree offering at three partner colleges.

**Activity: Create degree program**
This project has the overarching goal of increasing awareness of opportunities in science, technology, engineering, and mathematics (STEM) disciplines for women and underrepresented minorities.

Outcome: Change what people know about STEM disciplines
The project's goal is to build a sustainable program to enhance process technology education by introducing new hands-on opportunities through use of light-weight extremely low-cost miniature industrial equipment with a small footprint that fits on a standard desktop or which can be taken home for use in homework assignments.

Activity: Create program, use new equipment
INTENDED OUTCOMES

**specific, realistic**
statements about what is expected to **change** for individuals or groups
**relevant** to the need that the project is designed to address

Current wind energy workforce:

**CASE** Growing a New Generation of Energy Technicians and Professionals
Projected retirement within 10 years:

**CASE** Growing a New Generation of Energy Technicians and Professionals

- Increase academic rigor
- Design and activate career pathways
- Enhance recruitment, retention, and placement efforts

**CASE** Growing a New Generation of Energy Technicians and Professionals
**Project Goals**

1. **Improve** and **expand** academic rigor and relevance across core technology curriculum and wind energy technology specific curriculum.
2. **Design and put into action** wind/renewable energy career pathways.
3. **Enhance and expand** recruitment, retention, and placement efforts across technology programs.

**Project actions = Activities**

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**ACTIVITIES**

- Improve and expand academic rigor and relevance across curriculum
- Design and put into action wind/renewable energy career pathways.
- Enhance and expand recruitment, retention, and placement efforts

**SHORT-TERM OUTCOMES**

**MID-TERM OUTCOMES**

**LONG-TERM OUTCOME**

Increased supply of qualified technicians to regional wind and renewable energy employers

“"The American energy sector needs to attract and retain a new generation of human capital.""
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ACTIVITIES
- Improve and expand academic rigor and relevance across curriculum
- Design and put into action wind/renewable energy career pathways
- Enhance and expand recruitment, retention, and placement efforts

SHORT-TERM OUTCOMES
- Instructors update energy technology course content and methods
- Students utilize career pathways
- Number and diversity of students who enroll and persist in energy programs increases

MID-TERM OUTCOMES
- Students gain competencies needed by energy industry employers

LONG-TERM OUTCOME
- Increased supply of qualified technicians to regional wind and renewable energy employers

3/22/2017
Focus of the outcome evaluation:

- **Instructors update energy technology course content and methods**
- **Students utilize career pathways**
- **Students gain competencies needed by energy industry employers**
- **Number and diversity of students who enroll and persist in energy programs increases**
- **Increased supply of qualified technicians to regional wind and renewable energy employers**

**SHORT-TERM OUTCOMES**

**MID-TERM OUTCOMES**

**LONG-TERM OUTCOME**

**Did students use career pathways established by the project?**
Outcome Evaluation: Step-by-Step

**SHORT-TERM OUTCOMES**
- Instructors update energy technology course content and methods

**MID-TERM OUTCOMES**
- Students gain competencies needed by energy industry employers

**LONG-TERM OUTCOME**
- Increased supply of qualified technicians to regional wind and renewable energy employers

Did students use career pathways established by the project?

Yes – No questions

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**SHORT-TERM OUTCOMES**
- Instructors update energy technology course content and methods

**MID-TERM OUTCOMES**
- Students gain competencies needed by energy industry employers

**LONG-TERM OUTCOME**
- Increased supply of qualified technicians to regional wind and renewable energy employers

Outcome Evaluation Question 1
To what extent are students using career pathways established by the project?
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Outcome Evaluation: Step-by-Step

3/22/2017

SHORT-TERM OUTCOMES
Instructors update energy technology course content and methods
Students utilize career pathways
Number and diversity of students who enroll and persist in energy programs increases

MID-TERM OUTCOMES
Students gain competencies needed by energy industry employers

LONG-TERM OUTCOME
Increased supply of qualified technicians to regional wind and renewable energy employers

How many students enrolled in the program?

SHORT-TERM OUTCOMES
Instructors update energy technology course content and methods
Students utilize career pathways
Number and diversity of students who enroll and persist in energy programs increases

MID-TERM OUTCOMES
Students gain competencies needed by energy industry employers

LONG-TERM OUTCOME
Increased supply of qualified technicians to regional wind and renewable energy employers

AVOID
Number questions

How many students enrolled in the program?
Outcome Evaluation Question 2
What impact is the project having on student diversity, enrollment, and persistence?

Outcome Evaluation Question 3
To what extent are students gaining competencies needed by energy industry employers?
Outcome Evaluation: Step-by-Step

**Summary**

- Clearly define intended outcomes.
- Identify multiple levels of outcomes.
- Frame evaluation questions around outcomes.
- Ask evaluation questions that allow for a range of conclusions.
- **Bonus** - Always include an evaluation question like this:
  
  “What are the project’s unintended positive or negative side effects or outcomes, if any?”
Resources

Getting to Outcomes™

Logic model template, online course, and more

Evaluation Questions Checklist

Michael Patton on defining outcomes

Questions?

Lori  Miranda
Planning for Data Collection and Beyond

For each evaluation question, specify:
**Indicators**

What will be measured in order to answer evaluation questions

**Data Sources & Methods**

Where information related to indicators will be obtained and how
People

Who will be responsible for which aspects of data collection

Timing

When data will be collected and with what frequency
How collected data will be transformed into usable information

How evaluation findings will be translated into conclusions
For each evaluation question, specify:

- ✔ Indicators
- ✔ Data sources and methods
- ✔ People
- ✔ Timing
- ✔ Analysis
- ✔ Interpretation

### Outcome Evaluation Question 1:
To what extent are students using career pathways established by the project?

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>DATA SOURCE &amp; METHOD</th>
<th>PEOPLE</th>
<th>TIMING</th>
<th>ANALYSIS</th>
<th>INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of high school students who are dual enrolled</td>
<td>Institutional data</td>
<td>Project director obtains from institutional research office</td>
<td>End of each semester</td>
<td>No analysis – use raw numbers</td>
<td>Comparison against performance target using rubric</td>
</tr>
<tr>
<td>Number and percentage of dual-enrolled students who intend to pursue degree and certificate programs</td>
<td>Survey of dual-enrolled students</td>
<td>External evaluator develops survey and conducts analyses; faculty administer survey</td>
<td>End of each semester</td>
<td>Descriptive statistics, disaggregated by demographic characteristics; inductive coding of qualitative data</td>
<td>Comparison against performance target using rubric</td>
</tr>
</tbody>
</table>

**WHAT** will be measured

**HOW** information will be obtained
The evaluation will include a survey of students and secondary analysis of institutional data.

But what will be measured?

The evaluation will include a survey of students and secondary analysis of institutional data.
The evaluation will include a survey of students and secondary analysis of institutional data.

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>DATA SOURCE &amp; METHOD</th>
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</thead>
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<tr>
<td>Number of high school students in dual enrollment courses</td>
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<tr>
<td>Number and percentage of dual-enrolled students who intend to pursue degree and certificate programs</td>
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If an “outcome” is not caused by the intervention, it is NOT an outcome. It’s merely a coincidence.

—Jane Davidson

A → B
Outcome
change resulting from project activities

- effect
- cause or contributor

Linking cause and effect

- Use control or comparison groups
- Scan environment for other influences
- Ask participants directly
How likely are you to seek a job in the renewable energy field?

- Not at all likely
- Somewhat likely
- Very likely
- Extremely likely

How much impact has this course had on the likelihood that you will seek a job in the renewable energy field?

- Negative impact
- No impact
- Slight positive impact
- Moderate positive impact
- Major positive impact

**Summary**

- Align data collection to evaluation questions.
- Develop concrete plans for analysis and interpretation.
- Build cause-and-effect into data collection when possible.
Resources

Getting to Outcomes™

Data collection plan matrix template

Variety of resources on causation

Questions?

Lori Miranda
Interpreting Results

Percentage of women in wind energy program

Target: 15%

2% of wind turbine technicians in the U.S. are women
### Interpretation requires comparison

- Comparison or Control Groups
- Performance Targets
- National Data
- Historical Data
- Standards
- Stakeholder Expectations

### Outcome Evaluation Question 2:
What impact is the project having on student diversity, enrollment, and persistence?

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of women completing program</td>
<td>10%</td>
</tr>
<tr>
<td>Number of veterans enrolled</td>
<td>5-10</td>
</tr>
<tr>
<td>Percentage of underrepresented minority students completing program</td>
<td>10%</td>
</tr>
</tbody>
</table>

Performance targets from project proposal
### Outcome Evaluation: Step-by-Step

**3/22/2017**

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#### Met or not met (Yes/No)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Original Target</th>
</tr>
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<tbody>
<tr>
<td>Percentage of women completing program</td>
<td>10%</td>
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</table>

#### Continuum

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Original Target</th>
<th>Below Target</th>
<th>On Target</th>
<th>Above Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of women completing program</td>
<td>10%</td>
<td>Less than 8%</td>
<td>8-12%</td>
<td>More than 13%</td>
</tr>
<tr>
<td>Number of veterans enrolled</td>
<td>5-10</td>
<td>Fewer than 5</td>
<td>5-10</td>
<td>More than 10</td>
</tr>
<tr>
<td>Percentage of underrepresented minority students completing program</td>
<td>10%</td>
<td>Less than 8%</td>
<td>8-12%</td>
<td>More than 13%</td>
</tr>
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[evalu-ate.org](http://evalu-ate.org)
### Alternative Rubric

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Low Impact</th>
<th>Minimal Impact</th>
<th>Moderate Impact</th>
<th>High Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of women completing program</td>
<td>2% or less</td>
<td>3-5%</td>
<td>6-12%</td>
<td>More than 13%</td>
</tr>
<tr>
<td>Number of veterans enrolled</td>
<td>2 or fewer</td>
<td>3-5</td>
<td>5-10</td>
<td>More than 10</td>
</tr>
<tr>
<td>Percentage of underrepresented minority students completing program</td>
<td>2% or less</td>
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**Outcome Evaluation Question 2:**
What impact is the project having on student **diversity**, enrollment, and persistence?

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<td>5-10</td>
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<td>2% or less</td>
<td>3-5%</td>
<td>6-12%</td>
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</tr>
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</table>
Overall, the project had a high impact on the diversity of enrolled students, as determined by comparing the project results with rubrics established by project stakeholders.

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</tbody>
</table>

Rubrics can be **qualitative**, too

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Low Engagement</th>
<th>Minimal Engagement</th>
<th>Moderate Engagement</th>
<th>High Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry engagement</td>
<td>There is little or no tangible evidence of involvement by industry in any aspect of program</td>
<td>Industry involvement mainly characterized by attendance at meetings, with limited input on program</td>
<td>Industry involvement has provided important contributions to certain aspects of program, such as advising on curriculum or offering facility tours</td>
<td>Industry has substantial involvement on multiple aspects of program, including direct involvement with students though workplace-based learning or mentoring</td>
</tr>
</tbody>
</table>
Engage stakeholders in making decision rules

Creating rubrics, setting standards:

1. Research context
2. Facilitate dialogue among stakeholders
3. Draft together
4. Try out with fictional data
Summary

 ✓ Answer evaluation questions in the same terms in which they are asked.
 ✓ Make interpretive processes explicit and transparent.

Resources

Guide to developing and using rubrics in evaluation
Questions?

Lori
Miranda

Thank you!