Reducing the Outcomes Angst
A Step-by-Step Approach to Identify What to Measure

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Introductions

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Handout

Available from
www.evalu-ate.org/resources

Keyword search:
angst

Objectives

By the end of this webinar, you will...

1. understand the process of defining evaluation questions and measures based on project objectives

2. recognize the value of using existing research and instruments to inform your evaluation design

3. be able to identify or improve outcome measures for your current or upcoming projects
Steps to Reduce the Outcomes Angst

1. Establish an evaluation team
2. Create a model of the project
3. Articulate evaluation questions
4. Design evaluation and identify measures
5. Collect data, analyze & interpret
6. Communicate findings
7. Incorporate lessons learned

ATE Project
Dayton Urban STEM Teacher Academy

A STEM teacher talent professional development initiative
in partnership with ...
ATE Project
Dayton Urban STEM Teacher Academy

Goals
(1) A new education paradigm utilizing an inquiry-based pedagogical framework among current high school STEM teachers
(2) An environment where urban high school students pursue urban teaching careers
(3) A STEM teacher development pipeline

Discussant
Lalitha Locker
The goal of the team is to ensure that multiple stakeholder perspectives are represented.

Include:
- PI
- Co-PI(s)
- Project Manager
- External Evaluator
- Other key stakeholders?
Develop a project model

Input/Resources
Activities
Outputs
Outcomes

Lana

NSF funding
STEM community partners
Collab w/ Dayton Public, Sinclair, & area universities
Established tech prep program
Facilities

Recruit teachers
Teacher mentoring
Teacher professional development workshops
Recruit students
Purchase technology
Matriculation activities
Establish STEM teacher pathway & advisory board

# professional development activities
# teacher participants
# advisory board meetings
# matriculation activities
# teacher cadets

Knowledge of inquiry-based pedagogy
Commitment
Inquiry-based teaching & use of tech
Desire to pursue STEM-related subject
Student engagement
Student self-efficacy
Retention in the pathway
Increase among Student Teacher Cadets

Increase interest in inquiry-based pedagogy
Increase interest in STEM in school population
Cadet enrollment in 2 yr college & performance
Student competence
3 Articulate the evaluation questions

How effectively is the project being implemented? (Formative)

What influence is the program having on the teachers? (Summative)

What difference is the program having on the students? (Summative)

What components were most effective? (Summative)

Is the project replicable and transportable? (Formative)
**4 Design evaluation & identify measures**

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<th>Results/Resources</th>
<th>Activities</th>
<th>Outputs</th>
<th>Short-term Outcomes</th>
<th>Intermediate Outcomes</th>
<th>Long-term Outcomes</th>
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<tbody>
<tr>
<td>NSF funding</td>
<td>Recruit teachers</td>
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**4a Define/describe key terms**

**Outcome 1**

**Increased teacher knowledge**

**inquiry-based pedagogy**

“An approach to learning whereby students find and use a variety of sources of information and ideas to increase their understanding of a problem, topic, or issues ... It espouses investigation, exploration, research, pursuit, and study.”
4b Conduct a literature search

Keep track of the measures used in the articles that you review as you do the general literature review

Complete a search in PsycINFO (or another database)

Search “forwards” using ISI Web of Knowledge

Search key words for measures online

4 Local Systemic Change (LSC)

Questionnaire developed by Horizon-Research, Inc.

7 composites (or subscales)

– Teacher Opinions
– Teacher Preparation
– Instructional Control
– National Standards for Science and Mathematics Education
– Factors Affecting Instruction
– Teaching Practices
– Instructional Objectives
Responses on a scale from 1 (never) – 7 (all or almost all lessons)

- Introduce content through formal presentations
- Read a science/math textbook in class
- Ask students to use multiple representations

- Pose open-ended questions
- Design or implement their own investigation
- Have students present their work in class

Pre-/post-test format
Design evaluation & identify measures

Outcome 2

Increased teacher commitment

Definition
The willingness to become fully involved and enthusiastic about teaching. The use of discretionary effort into their work in the form of extra time, brainpower and energy.

4 Measurements

Workshop surveys
- How will you use or apply what you learned in your classroom?
- What level of support would you need in order to incorporate these ideas into your classroom?

Enrollment in discretionary course
**4 Triangulation**

When a construct is operationalized differently.

Ideally, should produce similar findings.

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**4 Design evaluation & identify measures**

Outcome 3

*Increased inquiry-based teaching (and use of technology)*

**Definition**

Use of inquiry-based teaching within the classroom

**Measurement**

RTOPS – Reformed Teaching Observation Protocol (RTOP) Rubric
The lesson was designed to engage students as members of a learning community.

4 – All students in the small group contribute to the construction of ideas and theory building.

3 – Some students in the small group contribute to the construction of ideas and theory building.

2 – There is some student-to-student interaction and discussion but little or no construction of ideas or theory building.

1 – The lesson employs only large group discussion with little evidence of community.

0 – This lesson is completely teacher-centered, lecture only.

Outcome 4

*Increased student STEM self-efficacy*

Definition
The belief in one’s abilities to perform within STEM subjects

Measurement
Questionnaire on beliefs around the ability to perform in STEM-related subjects.
4 STEM Self-Efficacy

How prepared do you feel to complete a college-level course on ...

Earth Science: Earth features and physical processes
Biology: Structure and function of human systems
Science Process & Inquiry: Writing a hypothesis

5 Collect Data & Analyze

Pre/Post-Tests
$X_1$ intervention $X_2$

Comparison Groups
$X_1$ intervention $X_2$
$X_1$ NO INTERVENTION $X_2$
**Possible Outcome**

**Scores on Self-efficacy Scale**

<table>
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<tr>
<th>Group</th>
<th>Time 1</th>
<th>Time 2</th>
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</thead>
<tbody>
<tr>
<td>Participants</td>
<td>3.45</td>
<td>3.49</td>
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<tr>
<td>Nonparticipants</td>
<td>3.42</td>
<td>2.21</td>
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**Subsequent Steps**

**Step 6**
Communicate Findings

**Step 7**
Incorporate Lessons Learned
Discussant

Lalitha Locker

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