Maximizing the Impact of STEM Outreach (MISO) through Data-Driven Decision-Making

Spring 2011 Workshop
Clarifying and Sharing Project Logic
April 19, 2011
Agenda

- 1:00-1:15  Introductions & MISO Overview
- 1:15-1:30  Activity Introduction
- 1:30-2:15  Team Activity
- 2:15-2:30  Identify Project Strategies & Outcomes
- 2:30-2:45  Break
- 2:45-3:30  Create Logic Model
- 3:30-3:55  Walkabout
- 3:55-4:00  Wrap-up and Next Steps
Introductions

• MISO Project Team: Warwick Arden, Jim Zuiches, Eric Wiebe, Sharon Schulze, Tracey Collins, Jeni Corn, Tricia Townsend, Alana Unfried

• MISO Workshop Attendees
MISO Purpose

- To creatively integrate longitudinal evaluation with innovation within NC State’s K-12 STEM outreach programs, particularly those funded by NSF, to help ensure the breadth and depth of the future U.S. STEM workforce.
MISO Goals

• Provide an innovative network of support and communications among University-based outreach project directors and educational evaluation experts
• Develop and demonstrate a system of data-driven planning and analysis guided by best practices
• Support more seamless transitions across critical educational junctures
• Broaden participation among underrepresented groups in pre-college STEM outreach activities through integrated recruitment and support strategies
MISO Partner Projects

• NC State STEM Outreach Initiatives
• Major Year 1-2 MISO Activities
  – Define project activities and outcomes
  – Identify commonalities
  – Identify/develop surveys and outcome indicators
  – Collect survey data across projects
  – Identify student and teacher participants and pull individual student and teacher data
  – Share data reports with project teams
Workshop Objectives

1. Describe your project’s purpose, strategies, and goals in clear and concise language.
2. Create a logic model which explains how your project/program operates.
3. Learn about various STEM Outreach projects across NCSU.
Activity

To start, identify one project you think will be a good MISO Partner Project that ideally includes:
  – Middle and high school focus
  – Teachers and/or students
  – STEM education outcomes
  – NC State STEM Outreach
• As a project team, answer each of the following questions.
• Each response to the question should be recorded on a separate notecard/post-it.
• Use a different color notecard/post-it for each question so that you can easily identify question’s responses.
Understanding the Projects

• Ultimately, what good is your project going to do for your students?
Understanding the Projects

• Ultimately, what good is your project going to do for your students?
• What are the major activities that you’re going to do? (How are you going to spend your time, energy, and money?)
Understanding the Projects

• Ultimately, what good is your project going to do for your students?
• What are the major activities that you’re going to do?
• If you’re successful at implementing these activities, what will your project accomplish this year?
Understanding the Projects

• Finally, arrange your sticky note cards in a logical order on your table or flip chart paper.
• Work from left to right—from major activities to ultimate good for students.
Basic Concepts

Goals

• Goals tell the ultimate purpose(s) of the project or program. They answer the question “What difference will the project or program make in the long run?”

• In education, goals usually say what long-term impact the project will have on learners and learning.
  – Raise STEM interest and awareness
  – Increase student engagement and achievement in STEM courses
  – Promote STEM educator effectiveness through professional development
Basic Concepts

• Objectives
  – Focus on project outcomes.
  – Answer the question “How will learning, (teaching, the school, etc.) be improved as a result of this project?”
  – Describe what you hope will happen as a result of the project.
Basic Concepts

• Objectives for STEM projects that serve teachers often focus on:
  – What teachers do (instructional practice) as a result of the project;
  – What students do (student learning) as a result of the project;
  – What the school/community/learning environment is like as a result of the project.
Basic Concepts

• Strategies
  – Identify the major components of the project;
  – Are larger in scope than day-to-day project activities; and
  – Provide details about how the project funds are spent.
Basic Concepts

• Strategies for STEM projects could include:
  – Provide monthly professional development sessions for teachers.
  – Provide a structured online professional learning community for teachers.
  – Offer monthly STEM enrichment courses for students.
  – Invite students to attend informational events such as open houses or other events that promote STEM.
Logic Models

• A logic model is a graphic representation of the relationships among the key elements of a project (goals, objectives, strategies, and inputs).
  – Helps to articulate the key elements of the project.
  – Can lead to evaluation efficiency and effectiveness.
  – Promotes stakeholder buy-in by helping clarify how the project works.

Logic Model Example

**Strategies (what I do)**
1. Increase physical activity
2. Eat healthy foods
3. Get regular check-ups with health professionals
4. Sleep 7-8 hours a night

**Objectives (what I hope will happen)**
A. Lose weight
B. Reduce illness
C. Reduce stress

**Ultimate Goal**
I. Be a healthy person
<table>
<thead>
<tr>
<th>Inputs</th>
<th>Activities</th>
<th>Outputs*</th>
<th>Short-Term Outcomes*</th>
<th>Medium-Term Outcomes*</th>
<th>Long-Term Outcomes*</th>
</tr>
</thead>
<tbody>
<tr>
<td>In order to accomplish our goals will need the following resources</td>
<td>Accomplishing the following activities will result in the following measurable deliverables</td>
<td>Accomplishing these activities will result in the following evidence of progress</td>
<td>We expect the following measurable changes within the life of the grant</td>
<td>We expect the following measurable changes within the next one to three years</td>
<td>We expect the following impacts/trends within the next three to seven years or more</td>
</tr>
<tr>
<td>Staff – Outreach Coordinators</td>
<td>Professional Development for K-12 math &amp; science teachers</td>
<td>Teacher content knowledge and pedagogical skills are increased.</td>
<td>The number of K-12 teachers and students served by The Science House will increase.</td>
<td>N/A</td>
<td>Increase student enthusiasm for science by partnering with K-12 teachers and promote hands-on inquiry-based science learning</td>
</tr>
<tr>
<td>Faculty Support</td>
<td>Master Teachers (outreach coordinators) model instruction and assist in the K-12 classroom</td>
<td>The number of K-12 teachers and students served by The Science House will increase.</td>
<td>K-12 student population chooses to pursue STEM degrees.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(NCSU &amp; partner universities)</td>
<td>Laboratory equipment distribution and support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community partners (School systems, local museums, cooperative extension services, etc.)</td>
<td>Train the Trainer workshops to develop teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K-12 Schools, Teachers, &amp; Students</td>
<td>Funding to support project</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Logic Model for the State Climate Office of North Carolina

technical or expert assistance, public events and understanding, experiential/service learning, and knowledge creation and transfer

Mark Brooks, SCO, BEDI NC State University

Resources
- CRONOS
- University faculty
- Staff
- Technology
- Funding
- Public interest and needs

Activities (mission)
- Extension
  - Information dissemination
  - Product automation
  - NC ECONet
  - Multidisciplinary projects
  - Newsletters
- Research
  - Climate analysis
  - Case studies
  - Undergraduate/graduate students involved
- Education
  - Demonstrations
  - Science clubs, groups

Outputs
- Climate data
- Decision support tools
- Applications / products
- Climate analyses
- Increased knowledge
  - Community interaction

Outcomes
- Diffusion of knowledge
- Improved practices / policies
- New ideas understanding
- Growers make better crop decisions
- Clients have more insight into their Best Management Practices
- Investment in local minds of (young) people
- Student job placement and graduate school

Impacts
- Economic savings
- Crop loss mitigation
- $2.2 million peanut crop savings in 2005
- Enhanced knowledge
- Productivity
- Improved profile / image
- Other economic development impacts
Logic Model Example (BEDI, p. 48)
1. Start with the *ultimate benefit to students*, on the right side – these will become the *goals* of your project, so label that column.

2. Label the column of items describing *how you invest your time, energy, and money* as your *strategies*, on the left.

3. The *immediate outcomes* are the *objectives* of your project, so put a label above them.
Understanding the Projects

4. Draw lines to show the linkages between the inputs and strategies, between the strategies and objectives, and between the objectives and goals, as your team sees fit. *Strive for consensus.*

Your logic model should represent a consensus understanding of “how your project works,” to turn major STEM Outreach activities into good for your participants.
Understanding the Projects

• Some hints to make your logic model useful
  – You can color code your elements, columns, and linkages.
  – You can have more than three columns, if it helps explain your thinking.
  – Use concise language. Make each element straightforward.
  – Resist the temptation to link everything.
  – Check for dead ends – each element (box) should link to at least one other element.
• Once you return from a short break, you’ll begin creating your logic models using the pieces you have generated thus far.
Digitizing your Logic Model

- Inspiration: [http://www.inspiration.com/Freetrial](http://www.inspiration.com/Freetrial) (free 30-day trial)
- CMAPS: [http://cmap.ihmc.us/](http://cmap.ihmc.us/) (free)
- MS Office: Excel, Word, PowerPoint – Draw Tools, Tables
- Other ideas?
PowerPoint 2010 SmartArt

Strategies  Objectives  Ultimate Goal
Checking Your Logic Model

"I think you should be more explicit here in Step Two."
Checking Your Logic Model

• Use if-then reasoning to check the relationship between components of the example logic model.
• Use the same process to check the logic of each linkages in your model.
Checking Your Logic Model

Strategies
- Exercise regularly
- Eat foods low in fat, high in protein, fiber, vitamins
- Get regular check-ups with health professionals
- Sleep 7-8 hours a night

Objectives
- Lose weight
- Reduce illness
- Reduce stress

Ultimate Goal
- Be a healthy person

(what I do)
(what I hope will happen)
Checking Your Logic Model

• Work out any differences between the logic model in your project materials and your new model.
• This should represent a consensus understanding of “how your project works,” to turn major project activities into good for your students.
Checking Your Logic Model

• As a team, consider these questions as you resolve the remaining differences
  – What is the same? *These probably stay*
  – What is different? *Choices must be made*
    • What do you keep?
    • What do you set free?
  – What is truly important? *Are there too many goals? Or objectives?*
  – What is reasonable for a one year project?
Learning about MISO Partner Projects

• Museum Walk
  – Walk around and visit other teams’ tables to learn about their projects
  – Write any questions on the note cards provided and leave them at each table
  – On MISO Project Commonalities sheet – make note of where you see common strategies, objectives, and goals
Next Steps – MISO Project Partners

Complete session evaluation form, please.

Send to Tracey Collins (tracey_collins@ncsu.edu):
1) Use the rough draft of your project logic model to create a final version after consultation with other project staff.
2) Copies of any existing data collection tools.

Target Due Date: April 29
Next Steps – MISO Project Team

• Use logic models to identify commonalities across projects
• Identify/develop surveys and outcome indicators
• Collect survey data Summer and Fall 2011
  – Looking for volunteers

Questions?