Evaluation Approaches: Two Examples

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Goal is to use two examples to illustrate different evaluation approaches by considering program and project contexts.
Example 1: Math Achievement Common Core (MACC)

- State-level Math and Science Partnership
- Three year funding cycle
- All MSP projects are required to have the same goals that were outlined by the funding agency
  - Increase teacher content knowledge
  - Improve classroom instruction
  - Improve student achievement
  - Build a sustainable partnership
Project Context

• Professional development for middle and high school math teachers
  – Summer content courses led by UNCW faculty
  – Lesson study during school year
  – Classroom coaching support

• # teachers
  – 24, 25, 46
Evaluation Approach

• Outcomes-based
  – Links project activities to anticipated outcomes
  – Keeps project team focused
  – Identifies how the project makes a difference in the participant’s lives
  – Improves program services
  – Provides feedback loop
## Evaluation Matrix

### Goal 1: Increase teacher content knowledge

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Data Source</th>
<th>Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD meets needs of teachers.</td>
<td>Coach, Teachers, University</td>
<td>Interviews, Pre/Post Content Measures, Observations</td>
</tr>
<tr>
<td>Teacher scores on content exams improve after PD</td>
<td>Faculty, Project Management Team</td>
<td></td>
</tr>
<tr>
<td>Teachers self-report increase in content knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop a professional learning experiences based on CCSS.</td>
<td>Coach, Teachers, Project Management Team, University Faculty</td>
<td>Document Review, Post PD Survey, Annual Participant Survey Interviews</td>
</tr>
<tr>
<td>PD aligns with CCSS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers report increase in understanding of CCSS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Goal 2: Increase student achievement

<table>
<thead>
<tr>
<th>Objective</th>
<th>Indicators</th>
<th>Data Source</th>
<th>Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Lesson Study cycles during school year with coaching support.</td>
<td>Teachers deliver improved standards-based lessons. Increased student achievement on formalized exams is seen. Teacher’s classroom instruction improves. Teacher’s self-efficacy towards math improves.</td>
<td>Coach, Teachers, Project Management Team</td>
<td>Document Review, Interviews, Annual Participant Survey, EQC or equivalent Student Measure, RTOP Observations, MTEBI Survey</td>
</tr>
<tr>
<td>Leadership training meets needs of teachers. Lead teachers report growth in leadership abilities. Lead teachers build relationships with participating teachers.</td>
<td></td>
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</tr>
<tr>
<td>Complete Lesson Study cycles during school year with coaching support.</td>
<td>Individual teacher teams will develop 1-2 model lesson studies each year. Teachers plan and deliver improved standards-based lessons using multiple representations, strategies, and appropriate technologies. Teachers demonstrate greater familiarity with standards. Teachers report better understanding of how to incorporate standards. Number of coaching</td>
<td>Teachers, Coach, Project Management Team</td>
<td>Document Review, Annual Participant Survey, Interviews, RTOP Observations, MTEBI</td>
</tr>
</tbody>
</table>
Example 2: CyVerse (iPlant)

• NSF funded cyberinfrastructure project
• 5 year initial funding with 5 year extension
• Expectation: Create cyberinfrastructure for plant science
  – Foster computational thinking in Biology
  – Be by, for, and of the community
  – Be interdisciplinary
  – Reinvent itself and its capabilities
Project Context

- Awarded to University of Arizona in 2008
- Renewed in 2013
- Rebranded in 2016
- “Dynamic virtual organization” that provides:
  - Computational infrastructure to handle large datasets and complex analyses
  - Data storage, bioinformatics tools, image analyses, cloud services, APIs, etc.
Example 2: CyVerse (iPlant)

• Multi-site (current sites):

  TACC  

  UA     

  CSHL   

  UNCW   

  CyVerse
Evaluation Approach

• Human System Dynamics (HSD)
  – Participants possess a moderate degree of freedom of action
  – Systems are defined by function over structure
  – Change over time is dynamical
  – Outcomes are emergent
  – System boundaries are open
  – Change occurs in different units simultaneously

CDE Model

Multi-Scale Evaluation in STEM Education
Pre-conference Tutorial
<table>
<thead>
<tr>
<th>Evaluation Question</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>What results when analyzing iPlant as a complex human system?</td>
<td>• Synthesis of all data collected</td>
</tr>
</tbody>
</table>
| What is the management structure and how does it facilitate communication, decision-making, and progress? | • Document review (wiki, email, reports)  
• Staff interview series  
• Meeting attendance  
• PI phone calls |
| What are the project strategies and how do they bring about change?                | • Document review (wiki, email, reports)  
• Meeting attendance  
• Targeted user interviews  
• PI phone calls |
| What evidence exists that indicates iPlant is fulfilling its mission and vision?  | • Data gleaned from metrics tables                                    |
| What are the benefits to the community of users?                                  | • Targeted user interviews  
• Post WS surveys  
• General user satisfaction surveys  
• Document review (forums, wiki, email, presentations, publications) |
Within context of INCLUDES

- Program Backbone
- Local Backbone
- Alliance
- Pilot Projects

Complexity
## Breakout Session Information

<table>
<thead>
<tr>
<th>Case Study #</th>
<th>Room</th>
<th>Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>109</td>
<td>Pam Bishop</td>
</tr>
<tr>
<td>2</td>
<td>103</td>
<td>Barbara Heath</td>
</tr>
<tr>
<td>3</td>
<td>105</td>
<td>Sondra LoRe</td>
</tr>
<tr>
<td>4</td>
<td>123</td>
<td>Frances Lawrenz</td>
</tr>
</tbody>
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