Best Practices for Evaluating CI and Modeling Environments

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EPIC STEM Evaluation Services

Types of Services

• Culturally responsive evaluation
• User experience evaluation
• Evaluation capacity building and training
• Dashboard development

Evaluation and Research Projects

• Cyberinfrastructure systems
• Research institutes
• Education and outreach programs
Introduction

What is your experience with evaluation?

• How many of you have provided data for an evaluation?
• How many of you have been involved in the design and implementation of an evaluation?

What words come to your mind when you think of “evaluation”? 
Agenda

• Introductions
• Overview of Evaluation
• Data Collection Methods
• Using Evaluation Data
• Evaluation Resources
• Panel Discussion on Evaluation
What is Evaluation?

Evaluation:

• A strategy to answer questions about the implementation and outcomes of a program, policy, or system
  o Purpose is to assess effectiveness and attest to impacts
  o Collect data to inform decisions and improvements

How does evaluation differ from research?

• Research primarily addresses questions of theoretical interest
  o Purpose is to contribute to knowledge base and have broader impacts
  o Concerned with generalizability and ability to replicate
Why Conduct Evaluation?

Needs Assessment
• Informs the development of systems

Formative
• Assists in the implementation of systems as they roll out
• Helps identify system strengths and weaknesses to improve
• Increases the likelihood that systems will achieve intended outcomes

Summative
• Provides knowledge about effective practices for the program/system
• Provides evidence of the benefits and impact of systems
• Useful in attracting others to engage with and support systems
Evaluation Process

1. Describe the System & Goals (e.g., logic model)
2. Focus the Evaluation
3. Determine Design & Data Collection Methods
4. Collect Data
5. Analyze Data & Interpret Findings
6. Develop Recommendations & Action Plans
7. Stakeholder Engagement
Describe the System and Goals

Create a Framework or Logic Model:

• Provides a co-constructed visual representation of the system/project and how it achieves its goals
• Illustrates logical relationships among inputs, outputs, and outcomes

• Logic models typically include:
  o Resources needed
  o Target users/participants
  o Key activities/components
  o Intended short- and long-term outcomes and impacts
  o Contextual factors
# Example Logic Model

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Activities/ Components</th>
<th>Participation Metrics</th>
<th>Short-Term Outcomes</th>
<th>Long-Term Outcomes</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources</td>
<td>• Online platform</td>
<td>• 2K unique users/year</td>
<td>• Increased awareness of platform</td>
<td>• Improve quality of research</td>
<td>• Improve geoscience knowledge base</td>
</tr>
<tr>
<td>• Staff</td>
<td>• Conferences/ trainings</td>
<td>• 500 new users/year</td>
<td>• Increased access to data</td>
<td>• Improve field infrastructure for data sharing</td>
<td>• Improve disaster preparedness capacity</td>
</tr>
<tr>
<td>• Funders</td>
<td>• Digital outreach (email, social media)</td>
<td>• 50 training participants</td>
<td>• Increased efficiency of data analytics</td>
<td>• Use of data in research</td>
<td></td>
</tr>
<tr>
<td>• Partners</td>
<td>• Students</td>
<td>• 600 social media followers</td>
<td>• Use of data in research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target Users</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Researchers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Policy analysts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contextual factors: Data sharing policies, research funding priorities</td>
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Evaluation Questions

Process Questions:

- Who are the system users? How many users are engaged?
- How is the system used?
- What is the quality of the user experience?
- What aspects of the system are most useful/valuable?
- What are challenges or barriers to using the system?
- How could the system be improved? What is the feasibility and priority of potential improvements?
Evaluation Questions

Outcome Questions:

• What changes occurred as a result of the system?
  • **Individual-level changes**: Attitudes, skills, behaviors, use of data/research, improve quality of research
  • **Organization/field/community-level changes**: Policy changes, capacity building, knowledge generated, broadening participation

• What, if any, unexpected changes occurred as a result of the system?
  • Examples: emergent collaborations, technological innovations, availability of new resources
### Collect Evaluation Data

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>• User profile data</td>
<td>• Tech support logs</td>
</tr>
<tr>
<td>• Web activity data</td>
<td>• Planning documents</td>
</tr>
<tr>
<td>• Social media analytics</td>
<td>• User interviews</td>
</tr>
<tr>
<td>• Stakeholder surveys</td>
<td>• Stakeholder interviews</td>
</tr>
<tr>
<td>• User surveys</td>
<td></td>
</tr>
</tbody>
</table>
## Example Data Collection Plan

<table>
<thead>
<tr>
<th>Component</th>
<th>Data Collection Methods</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online platform</td>
<td>• Web analytics</td>
<td><strong>Process</strong></td>
</tr>
<tr>
<td></td>
<td>• Stakeholder survey</td>
<td>• Number of users</td>
</tr>
<tr>
<td></td>
<td>• Annual user survey</td>
<td>• User experience quality</td>
</tr>
<tr>
<td></td>
<td>• User micro survey</td>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased user access to data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of data in research</td>
</tr>
<tr>
<td>Conferences/trainings</td>
<td>• Training survey</td>
<td><strong>Process</strong></td>
</tr>
<tr>
<td></td>
<td>• Stakeholder survey</td>
<td>• Number of participants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Participant satisfaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased awareness of platform</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased knowledge/confidence in use of platform</td>
</tr>
<tr>
<td>Digital outreach (email, social media)</td>
<td>• Social media analytics</td>
<td><strong>Process</strong></td>
</tr>
<tr>
<td></td>
<td>• Newsletter list data</td>
<td>• Number of followers/likes</td>
</tr>
<tr>
<td></td>
<td>• Annual user survey</td>
<td>• Number of newsletter subscribers</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased awareness of platform</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased dissemination of platform resources</td>
</tr>
</tbody>
</table>
Evaluation Planning Considerations

• Prioritize metrics for ongoing assessment
• Decide what to track ahead of time
• Consider data quality (e.g., completeness, up-to-date)
• Engage a range of stakeholders in the evaluation process (internal and external)
• Use an iterative process and build up the evaluation over time
Assessing User Experience

- Consider the broad range of potential users (e.g., needs, field, experience level, active vs inactive, etc.)
- Create relevant survey questions
- Be transparent about data confidentiality and use
- Collect different types of data (e.g., qualitative and quantitative) and use multiple strategies to elicit user input
Using Evaluation Data

- Share and interpret data with stakeholders
- Use findings to improve the system
- Integrate data into planning processes
- Prioritize evaluation recommendations
- Revise evaluation plan over time
Evaluation Resources


Questions
Evaluation Panel:

Integrating Evaluation and Assessment from the Beginning
Panel Members

Emily Clark, Project Manager
Consortium for Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI)

Tim Cockerill, Director of User Services
UT TACC, DesignSafe Deputy Project Director

Stephanie Baker, Research Associate
UT TACC EPIC STEM Evaluation Services

Miriam Jacobson, Research Associate
UT TACC EPIC STEM Evaluation Services
Panel Introductions

• Please introduce yourself and give a brief overview of the cyberinfrastructure (CI) that you work with and of your role in the project and its evaluation
Panel Questions
Thank you!

Please contact us with any additional feedback or questions:

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https://www.tacc.utexas.edu/epic/stem-evaluation-services