

Putting the Framework Into Practice

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Purpose of the Presentation

- **Define impacts and indicators**
- **Provide examples of impacts and indicators**
- **Outline generic steps for identifying impacts and indicators**
- **Discuss implications for the field**

Impacts: goals that a project hopes to achieve with its audiences

- **Categories of ISE Impact**

- Awareness / knowledge / understanding
- Engagement / interest
- Attitude
- Behavior
- Skills

Example

“Plants: Unsung heroes of our planet”



This project aims to help visitors appreciate the fundamental role that plants play in our ecosystems; to encourage visitors to marvel at the role of plants as carbon dioxide consumers and oxygen producers; to realize that, in spite of their immobility, plants are highly complex and sophisticated living things; and to address some common misconceptions about plants.

Example

Intended project impacts

- Knowledge:

Visitors will understand aspects of the basic chemistry, properties, and role of plants in ecosystems.

- Attitude:

Visitors will appreciate plants, in terms of their sophistication as organisms and their vital role on earth.

Indicators: a precise and measurable indication of a given impact

- **Impact**

- *Visitors will seek out additional information about the Earth's moon after attending the exhibit*

- **Indicators**

- *Visitors will go to the museum's Internet site about the moon after attending the exhibit*
- *Visitors will read a book about the moon after attending the exhibit*

Impacts/indicators are commonly used to delineate...

- **Who** (*will be impacted*)
- **What** (*the learning impact will be*)
- **Where/when** (*the learning impact will occur/be measured*)
- **How** (*the learning impact will be measured*)
- **Quantity** (*the proportion of a target audience that will be impacted*)

Critical steps for articulating impacts and indicators

- **Define your target audiences**
- **Identify any underserved audiences that are a special focus of your project**
- **Clarify how your project will affect your target audiences**
- **Develop impacts and corresponding indicators**
- **Match impacts/indicators with your target audiences**

Step 1: *Define your target audience*

- **Public audience**

- *Preschoolers (0-5)*
- *Children (6-12)*
- *Youth (13-18)*
- *Adults (19-54)*
- *Seniors (55+)*

- **Professional audience**

- *Board members*
- *Directors/presidents/CEOs*
- *Educators*
- *Exhibit designers*
- *Funders*
- *Media producers/disseminators*
- *Other professional staff*
- *Policymakers*
- *Researchers/evaluators*
- *Scientists/engineers/mathematicians*

Step 2: Identify any underserved audiences that will be targeted by your project

- **Persons living in isolated rural communities**
- **Persons living in inner city urban environments**
- **Persons with disabilities**
- **Minorities underrepresented in science-related fields**
- **Women/girls**

Step 3: Will your project affect your target audiences'...

- **Awareness, knowledge, or understanding** of STEM or a STEM-related topic?
- **Engagement or interest** in STEM or a STEM-related topic?
- **Attitude** regarding STEM or a STEM-related topic?
- **Skills** for STEM or a STEM-related topic?
- **Behavior** pertaining to STEM or a STEM-related topic?

Step 4: *Develop impacts for each category that applies to your project*

- **Intended target audience**
 - *“Youth who visit the exhibit will...”*
- **Type of change that will be observed**
 - *“increase their knowledge of...”*
- **STEM content area that is the focus of the impact**
 - *“the Earth’s moon.”*

Step 4a: Match impacts with your target audiences

Anticipated Impacts	Target Audiences		
	Youth (ages 13-18)	Adults	Female youth in inner cities
Impact #1	X		X
Impact #2	X	X	X
Impact #3		X	

Step 5: *Develop indicators*

Impacts	Indicators
Impact #1	<i>Indicator 1</i>
	<i>Indicator 2</i>
	<i>Indicator 3</i>
Impact #2	<i>Indicator 1</i>
	<i>Indicator 2</i>
Impact #3	<i>Indicator 1</i>
	<i>Indicator 2</i>
	<i>Indicator 3</i>

Issues to consider when developing indicators

- **Should you develop separate indicators for each target audience?**
 - *Youth* will read a book about the moon after attending the exhibit
 - *Adults* will purchase a telescope after attending the exhibit
- **Should you delineate benchmarks for your target audiences?**
 - *60 percent of visitors will read a book about the moon after attending the exhibit*
 - *Visitors will read a book about the moon after attending the exhibit*
- **What data will you collect to assess progress in meeting a particular indicator?**

And remember...

- **Impacts/indicators should be stand-alone statements that can be understood with no additional context**
 - Do not assume that the person reading your impact/indicators will be familiar with your project
- **The ultimate audience for impact/indicator statements may be future applicants**
 - One goal is to develop an inventory of impacts and indicators (by project type and/or impact category) that help guide future applicants

Implications for the Field

- **Addresses needs of practitioners and PIs**
 - Data for ISE to make case within the NSF that our field be funded
 - Evidence of impact on public for “advocacy” at national, state & local
- **Positive impact on practice also**
 - Identifies audiences, impacts & strategies for attaining up front
 - Planning aid, early involvement of evaluator in project design
 - Offers opportunities for process outcomes, as well as products
 - Quality data aligned with benchmarks
 - Data to use in future projects to build the field
- **Trade-offs (cost, time, flexibility, capacity of field, other evaluation types) but misconceptions**
 - Inhibits exploratory/experimental projects
 - Evaluation must all be quantitative