

Evaluating Facilities-based Education and Public Outreach Activities

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Incorporated Research Institutions for Seismology

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Technology for Learning

5/26/16 – Large Facilities Workshop

Facilitate – Collaborate – Educate



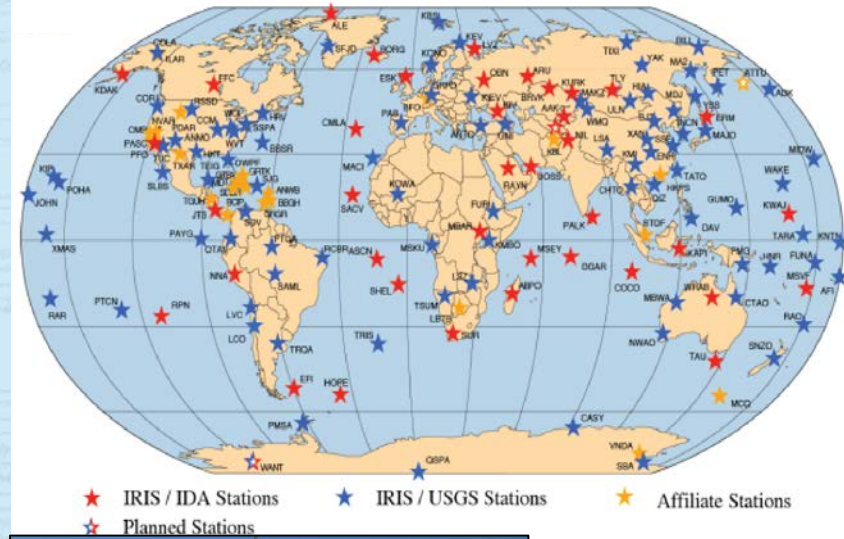
Overview



- Why Education and Public Outreach (EPO) in a research facility?
- EPO evaluation needs
- One collaborative approach: Impact Analysis Method
- Potential outcomes
- Critical success factors for implementation

Incorporated Research Institutions for Seismology

- Formed in 1984
 - Global Seismic Network (with USGS)
 - Portable seismographs (PASSCAL)
 - Data management center
- Now includes
 - Education and Public Outreach
 - EarthScope Transportable Array
 - Ocean Bottom Seismograph Instrument Pool
 - Other instrumentation
- Over 120 member organizations and over 100 educational and foreign affiliates



Why EPO in a research facility?

- Strong NSF encouragement to add EPO
 - Initiation of NSF Broader Impacts criteria (1997)
 - First staff member in 1998
- Value of a facility EPO program
 - National consortium with local university connections
 - Strong community involvement
 - Unique data and scientific resources
 - Stable consortium structure for long-term programs
 - Professional staff
 - Considerable emphasis on outreach

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Positioning facility EPO programs

Education and outreach spectrum



Education research
Detailed external evaluation

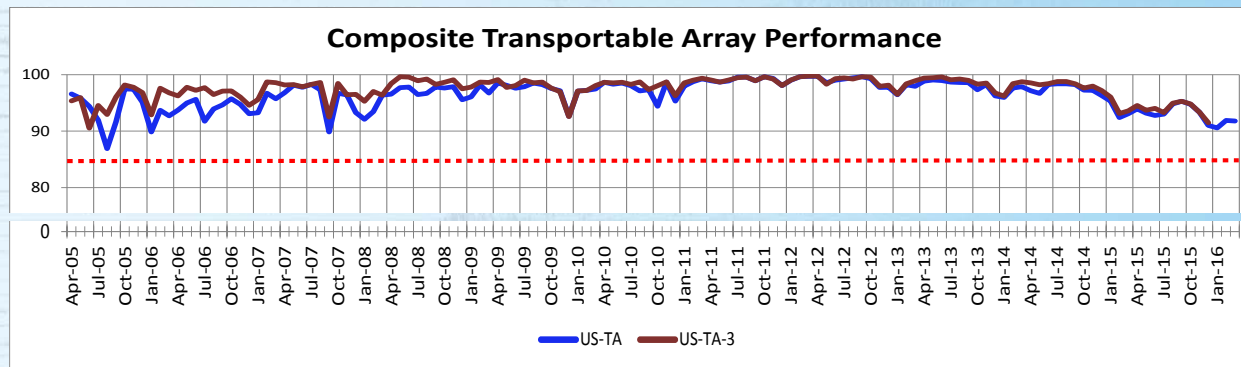


Single PI outreach
Self reporting, counts

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Reporting metrics to NSF

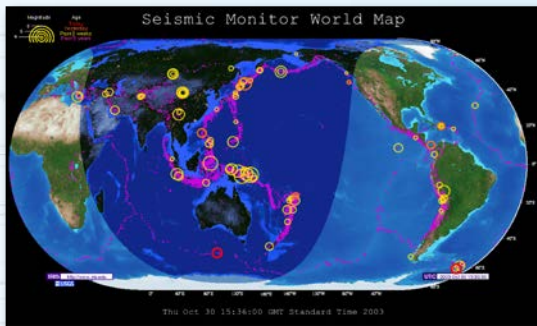
- Instrumentation and data
 - Number of portable instruments available for the research community
 - % data availability of each seismic network



- % uptime for the Data Management Center
- EPO
 - Number of products and services provided

Prior IRIS EPO evaluation approach

- Internal assessment during development and implementation
- Occasional external assessment at conclusion of projects
- Regular oversight by community steering committee
- Difficult to decide on appropriate level of evaluation for a very wide range of products and services
 - Millions of website visitors for a minute
 - 15 research interns for an entire summer



Need of IRIS EPO



We evaluate the products and programs in our portfolio....

but could benefit from increased consistency and rigor.

Need to assess both quality and impact



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Desired Outcome:



Make evaluation an integral part of IRIS EPO staff's work so

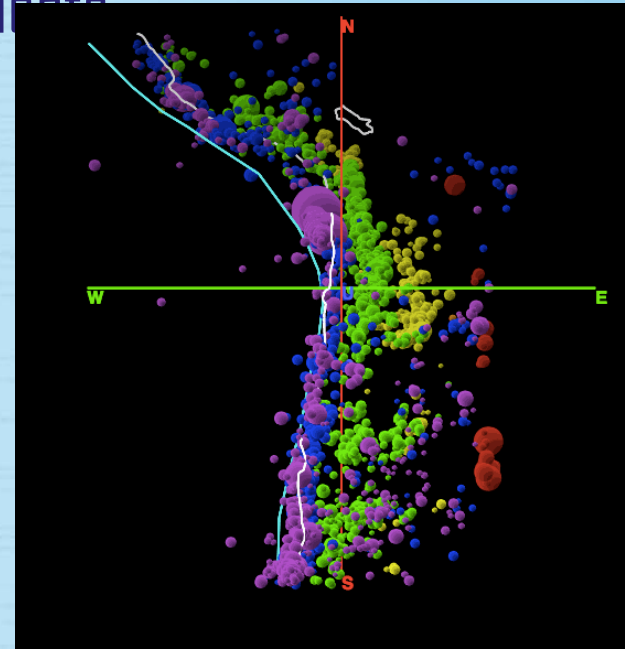
- we can state why we do the activities we do (needs assessment),
- enhance the impact, and
- make evidence-based claims about our work.

Impact -The intended and unintended effects on the Behavior, Attitudes, Skills, Interest, Knowledge, (BASIK) of the participants (Friedman, 2008)

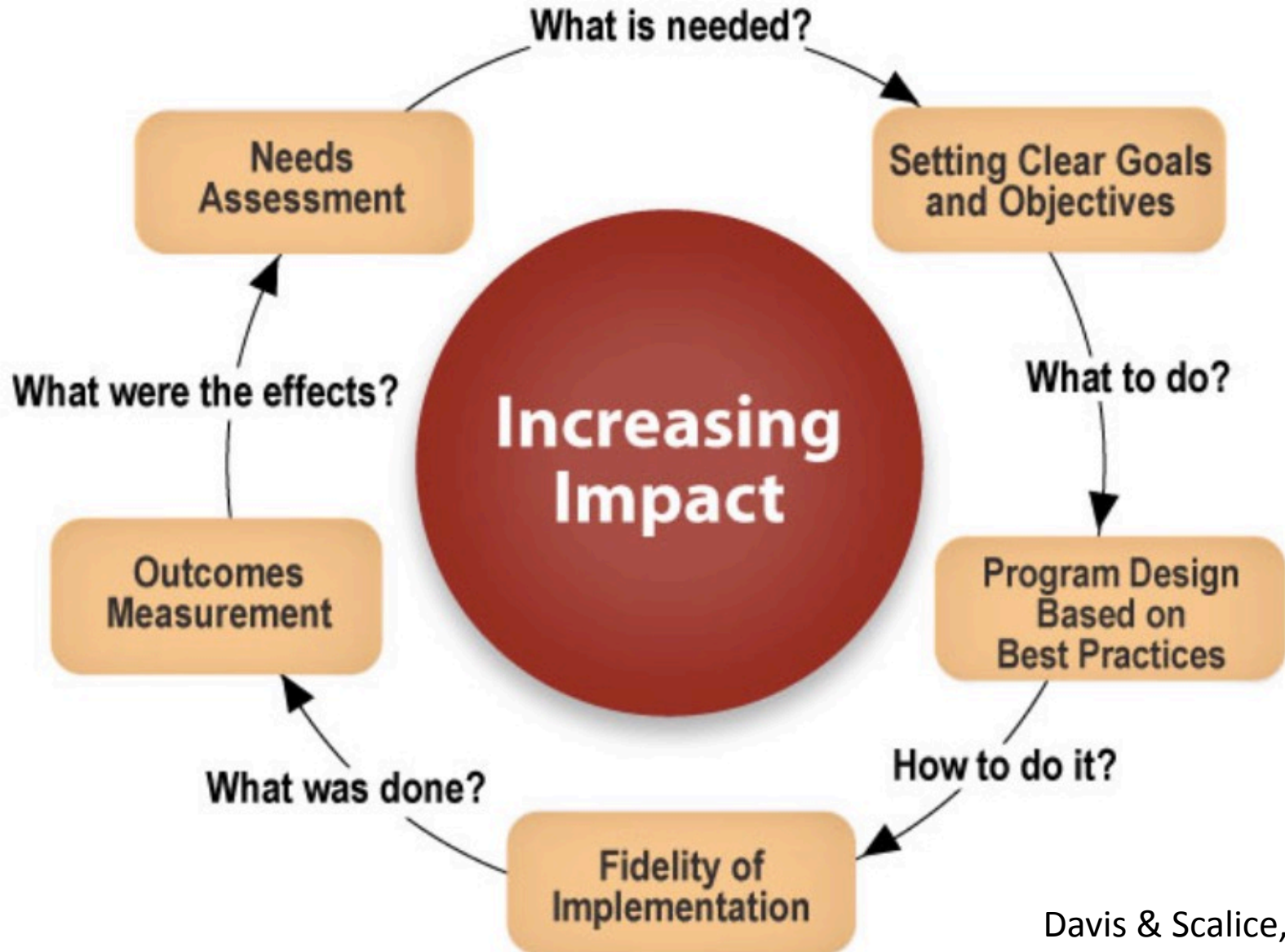
Evaluation choice



- Adopted the Collaborative Impact Analysis Method of Davis and Scalice, 2015
- Used by a number of NASA EPO programs
- Designed to be implemented within an existing EPO program
 - Focus on incremental improvements



Evaluation Approach



Process

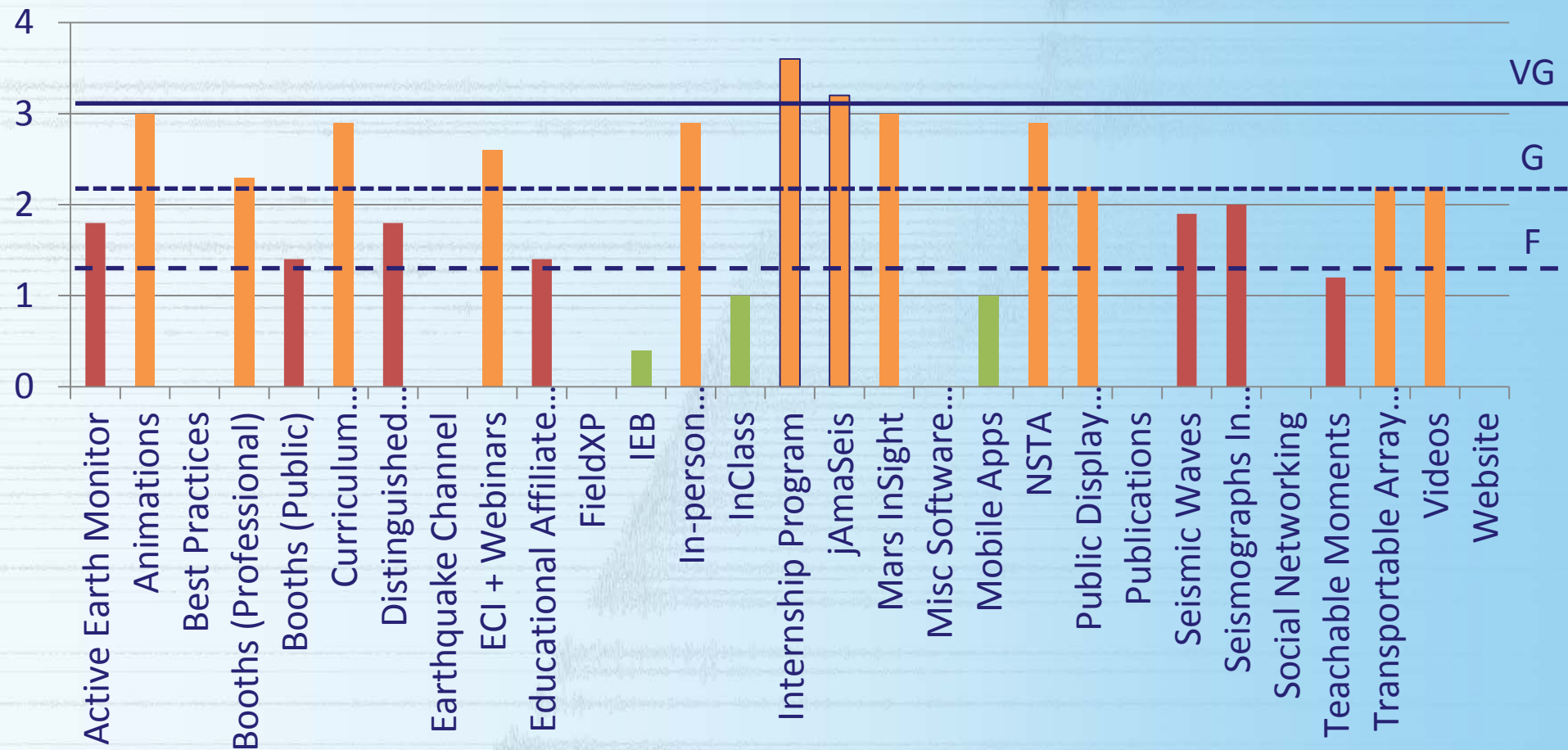


- Consultations with external evaluator - Assess current evaluation for each project
- Internal staff development - Consultations with external evaluator, presentation, reading
- Action plans - Develop internal structures and reporting mechanisms to support evaluation
- Implementation - Make incremental changes to our projects to improve rubric scores

Quantitative Collaborative Impact Analysis Method

Project Phase	Fair (1)	Good (2)	Very Good (3)	Excellent (4)
Needs Assessment What is the evidence of need?	Prior experience; "Seems like a good idea"	Research on what works; Literature review on similar programs/ products/ populations/ goals	Conversation with and/or direction from stakeholders (Focus Group); Experts review the ideas/plan	Survey of or pilot with potential audience/ users about the draft program
Goals and Objectives How measurable are the goals and objectives?	General direction; Understood by team; Agenda substituting for objectives	Explicit, written; For a target audience	Objectives are SMART: Specific, Measurable, Action-oriented, Realistic, Time-bound	Logic model of inputs, outputs, and outcomes in place
Design of Project How evidence- or research-based is the design?	Series of activities; Uses what has worked before	Based on objectives; Connects to standards; Includes contingency plans for emerging needs	Thematic; Has continuity; Participatory, personalized, responsive; Uses advanced organizers	Developmental; Embeds evaluation/ reflection
Implementation How true to the design is the implementation? (fidelity)	Facilitators prepare to implement the design	Collect and use feedback during implementation	High fidelity to design OR implements contingency plans to meet objectives if needed	Participants able to monitor their own progress against objectives
Outcomes Assessment/ Methods What is the evidence of impact on BASIK?	Post only survey or reflection; Follow up survey or interview; Web stats; Anecdotes; Facilitator reports	External evaluator observes, or does case studies; Pre/post self-report survey, reflections; Post only measure (test, retrospective survey, task)	Pre/post measures (tests, performance tasks, observation); Pre/post follow-up	Comparison group studies (quasi-experimental); Experimental study (random assignment)

Collaborative Impact Analysis Scores



Min = 0, Max = 3.6, Median 1.9

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Post-consultation

- What we expect
 - Incremental improvement everywhere
- What we don't expect
 - Achieve a 4 everywhere, *unless*
 - Core to the mission
 - Additional funding for enhancement/expansion
 - A gap in the literature we can uniquely fill



Action Plan - Examples



- Write SMART Objectives
- Conduct survey of existing users
- Review and update design criteria/critical features
- Request pre/post survey data from collaborative workshops
- Create a logic model for project
- Conduct needs assessment of Educational Affiliate members of IRIS

IRIS/SSA Distinguished Lectureship - Example

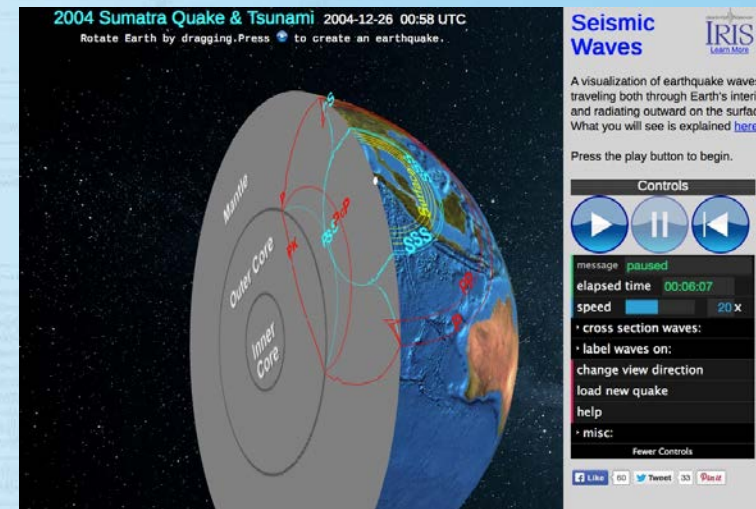
- Initial Score 1.8
 - Needs Assessment - 4
 - Goals and Objectives - 2
 - Design - 2
 - Implementation - 1
 - Outcome Assessment - 0
- Action Plan
 - Rewrite goals as SMART Objectives
 - Post lecture surveys
 - Speakers
 - Venue
 - Obtain feedback from SSA (partner organization)
- Projected Score 2.6



2016 Distinguished Lecturers

Seismic Waves web application - Example

- Current Score 2.8
- Actions
 - Needs assessment & competitive analysis - 4
 - SMART objectives - 3
 - Critical feature list (design)
 - Beta/Usability testing (implementation) - 3
 - Revision based on testing (design) - 4
 - Promotion (built from the above)
 - Measuring effects of use (outcomes) - 1



Positive Effects on IRIS EPO

- Each project is explored in consultation with the evaluator, which provides
 - expert outside feedback
 - a benchmark score
 - possible pathways to improve the evaluation
- Promotes improvement, no matter the initial state

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Positive Effects on IRIS EPO

- Change in staff knowledge, attitude and behavior
 - Development of staff knowledge and skills regarding evaluation
 - Common language among staff
 - Increased enthusiasm to collect and share data
 - Desire for consultations to get evaluation ideas
 - Inclusion of evaluative approaches up front for discussion of new activities
- Improved impact of products and programs

Evaluation cycle

- Combines internal and external assessment
- Annually
 - Build internal capacity through consultations with external evaluator
 - Develop action plans to increase level of evaluation
 - Collect data and prepare annual report which is reviewed by external evaluator
- Every 2-3 years
 - Conduct total portfolio evaluation with external evaluator, followed by strategic planning

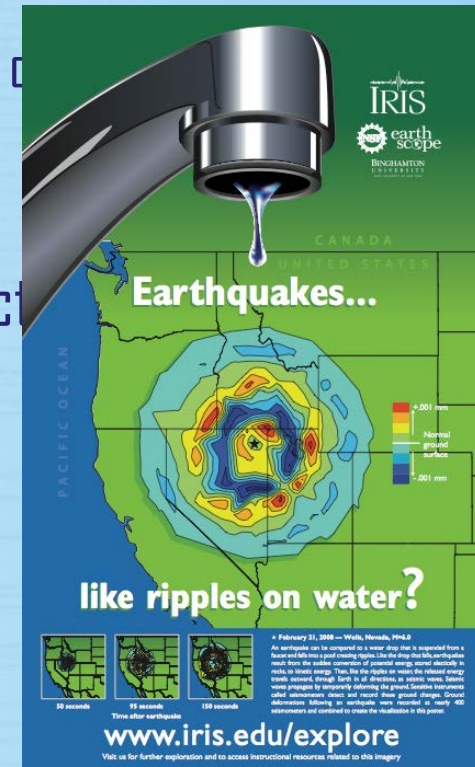
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Potential items to report

- Lists of products/activities
- Accomplishments by project
- Audiences
- Types of impact (BASIK),
 - Counts of participants
 - Deeper intervention –evidence and nature
 - How measured
 - Generalizability
- Annually – impact analysis scores by project

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Evaluation process



- How does this process differ from typical, single project evaluations?
 - Lower cost for external evaluator
 - Instead of commonly used 10% of budget
 - Depending on staff time instead
 - Greater staff involvement and ownership
- Still challenging to include in flat budget environment

Potential facility model for evaluation



- Planning discussion with leadership
- Evaluator consultations with individual staff
- Staff develop/implement action plans
- Expert review and support with evaluation tools and analysis
- Discuss and report results

Critical Success Factors

- Some existing internal evaluation expertise
- Clear leadership commitment and involvement
- Intentional cultural change
- Ongoing support from external evaluator
- Use of evaluation results for improvement and reporting

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Summary

- Collaborative evaluation method
 - Capacity building of implementers
- Can be initiated at any stage of the project
- Evaluation integrated throughout the project life cycle
 - Ongoing use of data
- More focused implementation
 - More efficient use of resources
- Richer reporting to NSF
- Greater impact

