PROGRAM EVALUATION 101

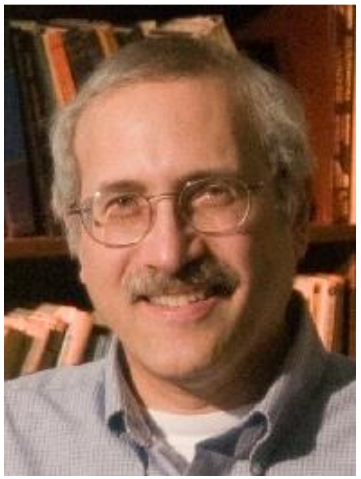
Multi-Scale Evaluation in STEM Education

Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (NSF INCLUDES)

NIMBioS
National Institute for Mathematical and Biological Synthesis

NISER
NATIONAL INSTITUTE FOR STEM EVALUATION AND RESEARCH

MEET YOUR MODERATOR



Louis J. Gross, PhD

***Founding Director**, NIMBioS*

***Professor of Ecology and Evolutionary Biology and Mathematics,** University of Tennessee, Knoxville*

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WHO IS THIS PRESENTATION FOR?

Principal Investigators

of NSF INCLUDES Pilot Projects

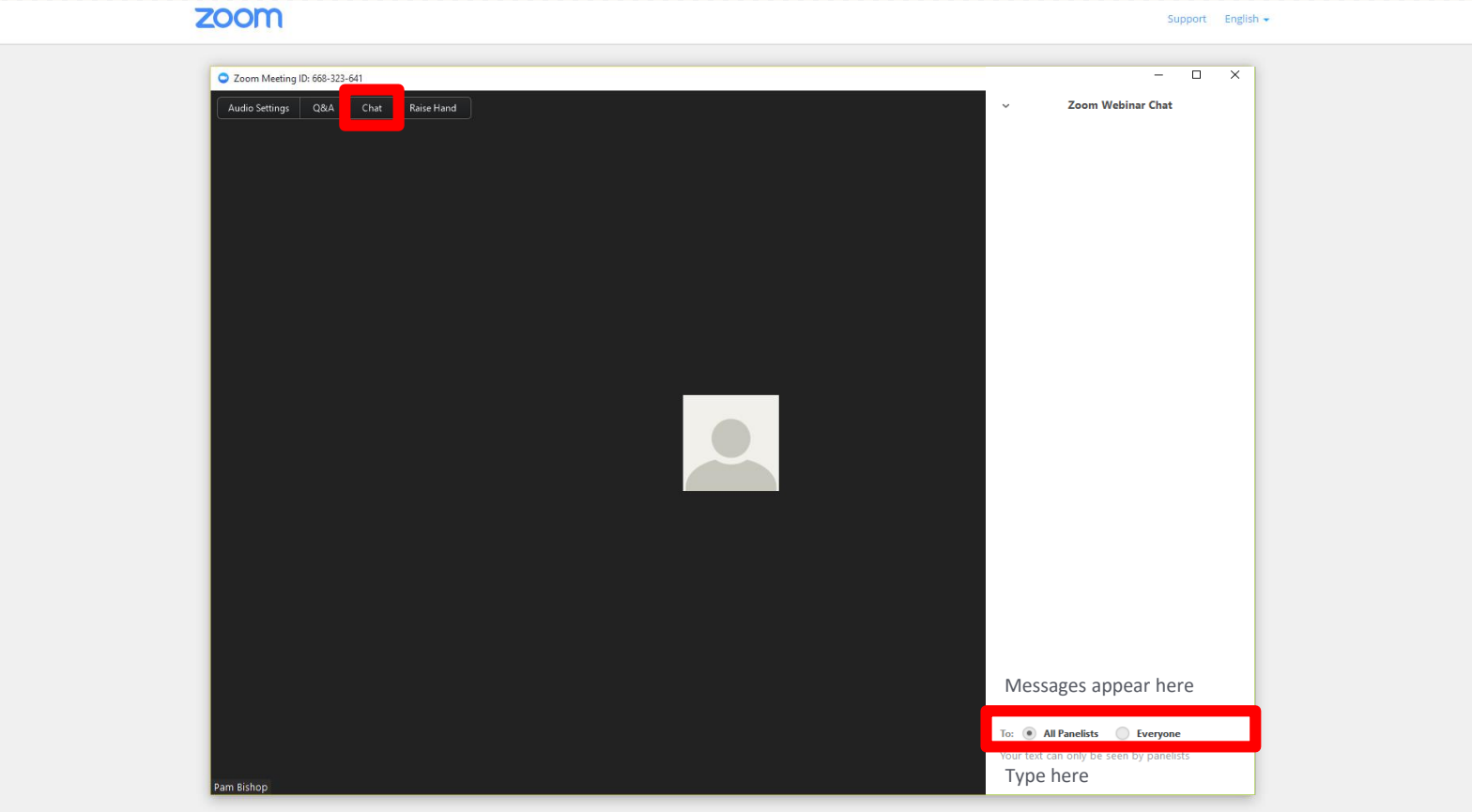
STEM educators

planning to submit INCLUDES Pilot Projects

STEM Educators

Interested in learning more about program evaluation

HOW TO INTERACT TODAY



MEET YOUR PRESENTERS

Pam Bishop, PhD

Director, *National Institute for STEM Evaluation and Research (NISER)*

Associate Director for STEM Evaluation*, National Institute for Mathematical and Biological Synthesis (NIMBioS)*

Sondra LoRe, EdS

Evaluation Associate, *National Institute for STEM Evaluation and Research (NISER)*

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TODAY'S Presentation

1. WHAT IS PROGRAM EVALUATION?
2. APPROACHES TO EVALUATION
3. WORKING WITH AN EVALUATOR
4. THE EVALUATION PROCESS
5. QUESTIONS and COMMENTS
6. HOW TO LEARN MORE

WHAT IS **PROGRAM EVALUATION**?

PROGRAM EVALUATION IS:

Systematic collection of data about the activities, characteristics, and results of programs to (1) to make judgments about the program, (2) improve or further develop program effectiveness, (3) inform decisions, and/or (4) increase understanding.

Michael Quinn Patton

4 Elements of evaluation definitions

1. Systematic process
2. Data collection
3. Enhances knowledge
4. Decision making

Why is evaluation important?

PROGRAM EVALUATION

- ✓ Enhances your project design
- ✓ Defines your resources and timeline for deliverables
- ✓ Improves the implementation and effectiveness of projects
- ✓ Supports plans for sustainability
- ✓ Provides evidence to support future funding

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APPROACHES TO EVALUATION

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APPROACHES TO EVALUATION

How we assess success?

Formative Evaluation

Summative Evaluation

How we assess success?

Developmental Evaluation

What looks good for tonight's menu?

How do we assess success?

Developmental Evaluation

Create a new signature Brussel sprout recipe.

Develop new approaches and be responsive to changing conditions.

Formative Evaluation

Taste the recipe while cooking and adjust to improve.

Improve as you implement.

Summative Evaluation

Find out in what ways your recipe was a success.

Determine the ways in which you were successful.

1. Systematic process
2. Data collection
3. Enhances knowledge
4. Decision making

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WORKING WITH AN EVALUATOR

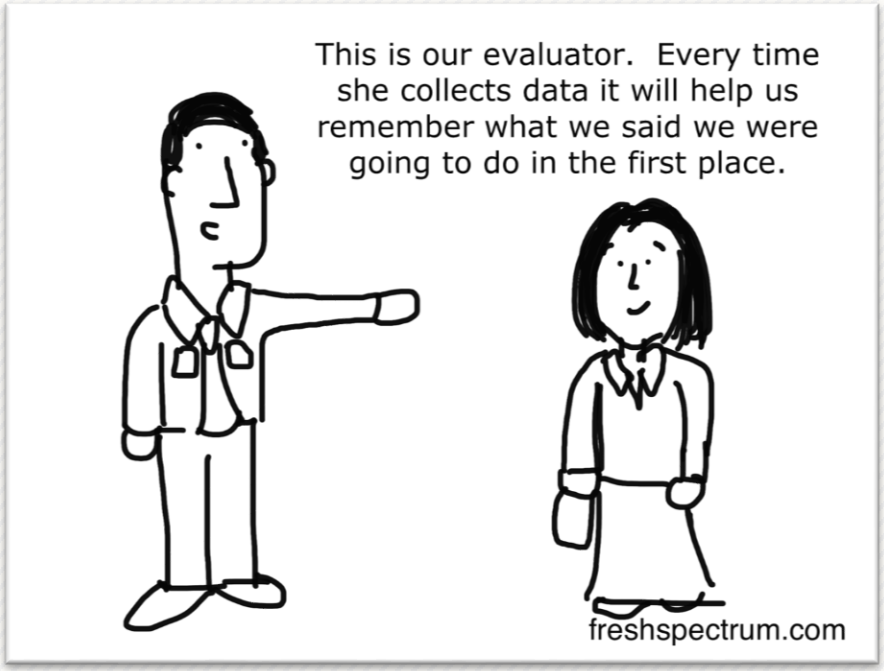
Q: When is the right time to get started with an evaluator?

A: As soon as possible!

How to find the right evaluator

- ✓ Ask STEM education colleagues for a reference
- ✓ Ask your sponsored projects officer
- ✓ American Evaluation Association Find an evaluator directory

Considerations when choosing



Questions to answer

- ❑ Does the evaluator have experience evaluating STEM education projects?
- ❑ Does the evaluator understand your STEM education project?
- ❑ Does the evaluator take a collaborative approach to evaluation design? (i.e. will he/she work with you to determine your project's evaluation needs?)

Tips for working effectively

- ✓ Discuss expectation, processes, and timeline up front
- ✓ Review goals and objectives of the evaluation regularly
- ✓ Communicate data and reporting needs, including who will need what data when
- ✓ Appoint a project liaison to work directly with the evaluator
- ✓ Create a shared document system

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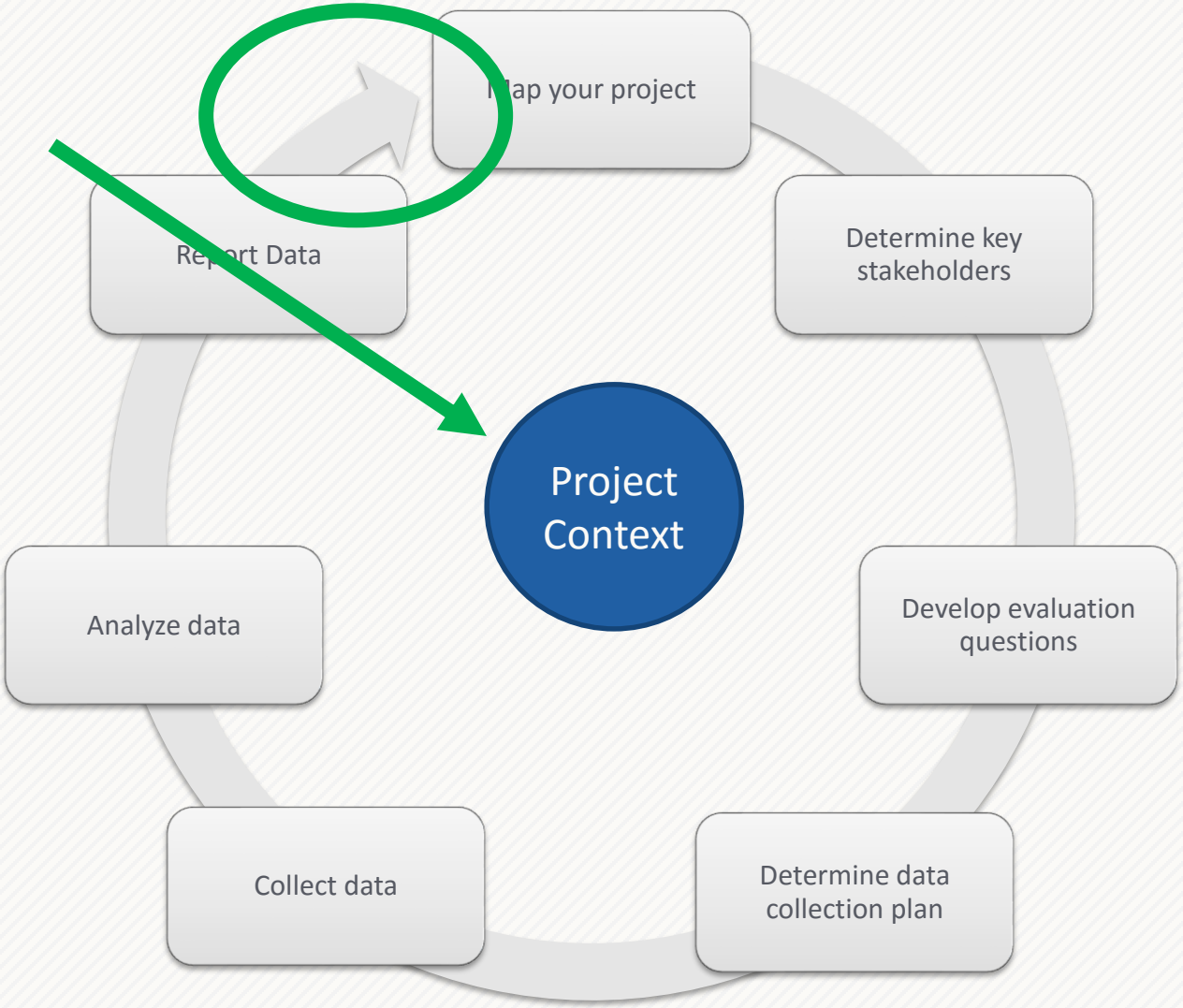
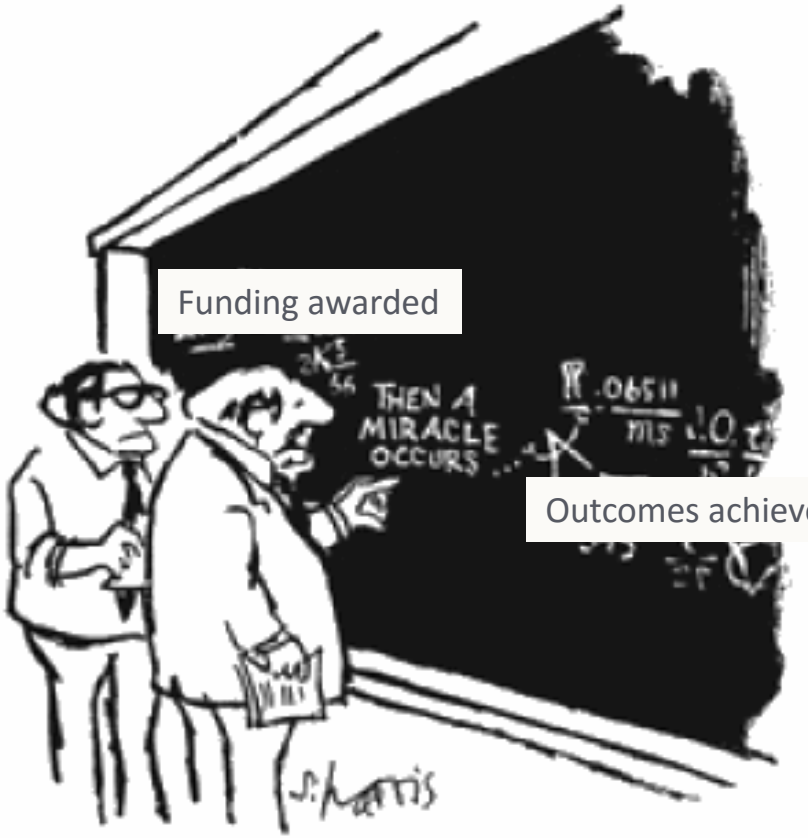
TYPICAL EVALUATION PROCESS



TYPICAL EVALUATION PROCESS

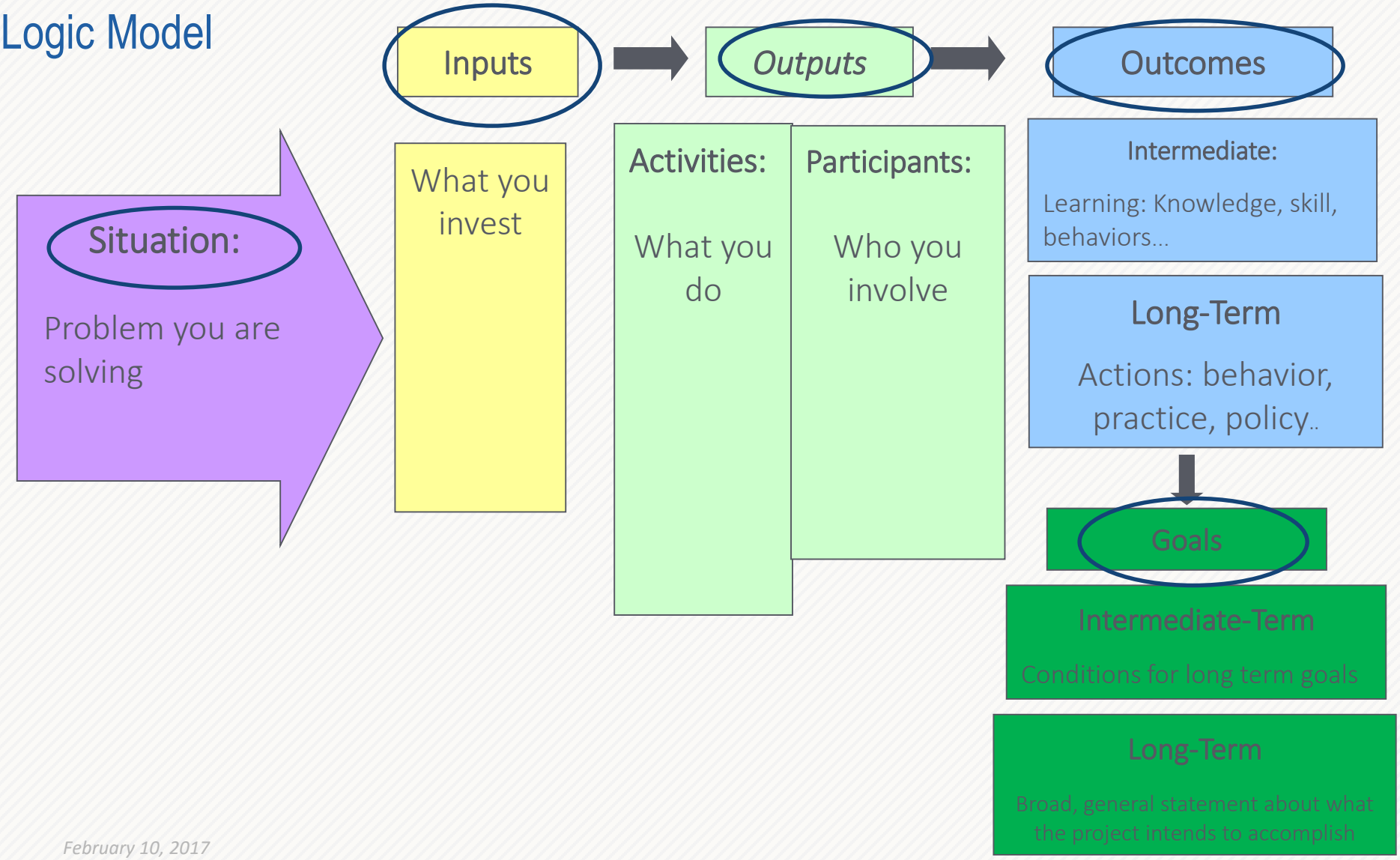
Mapping your project



"I think you should be more explicit here in step two."

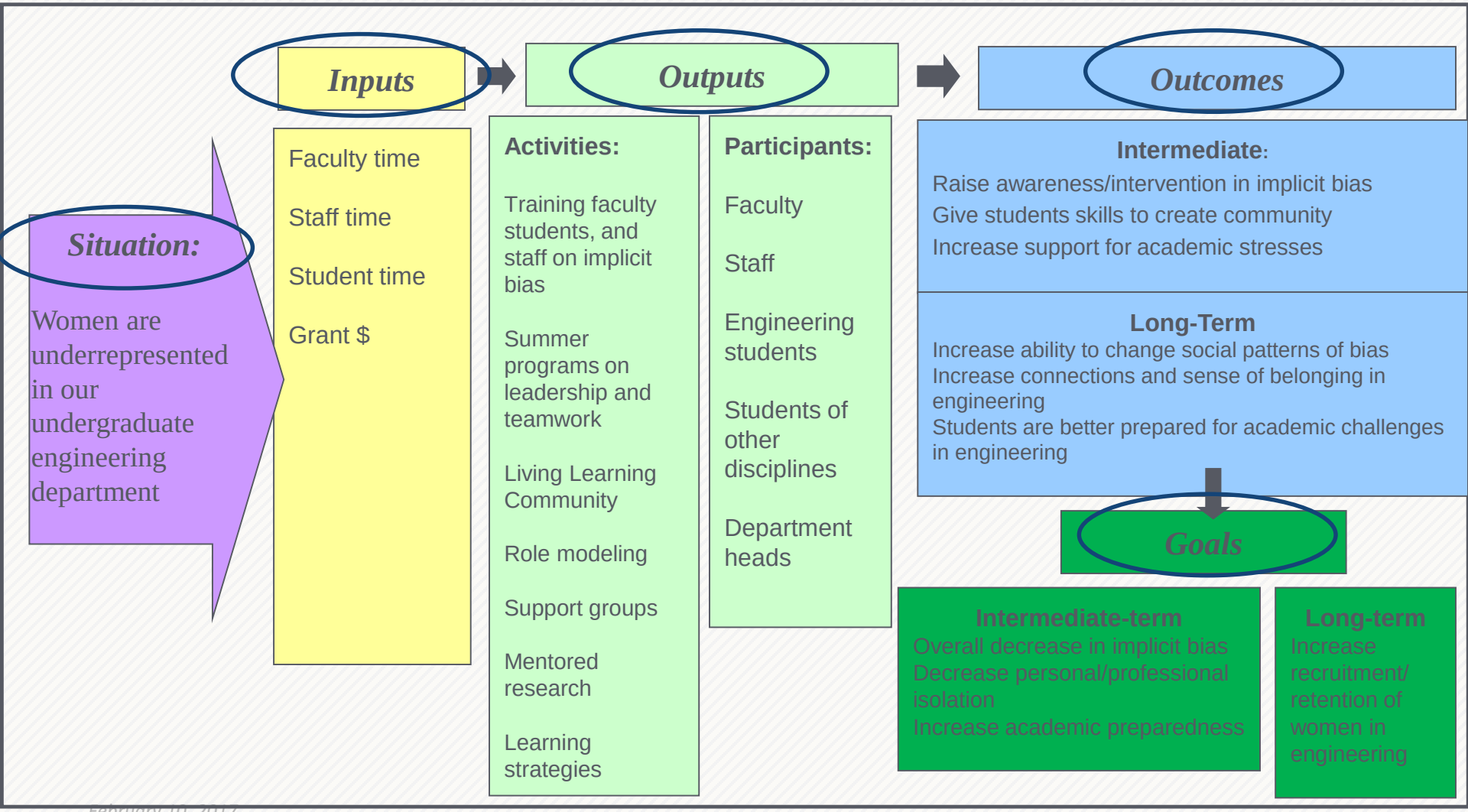
Mapping your project

Logic Model



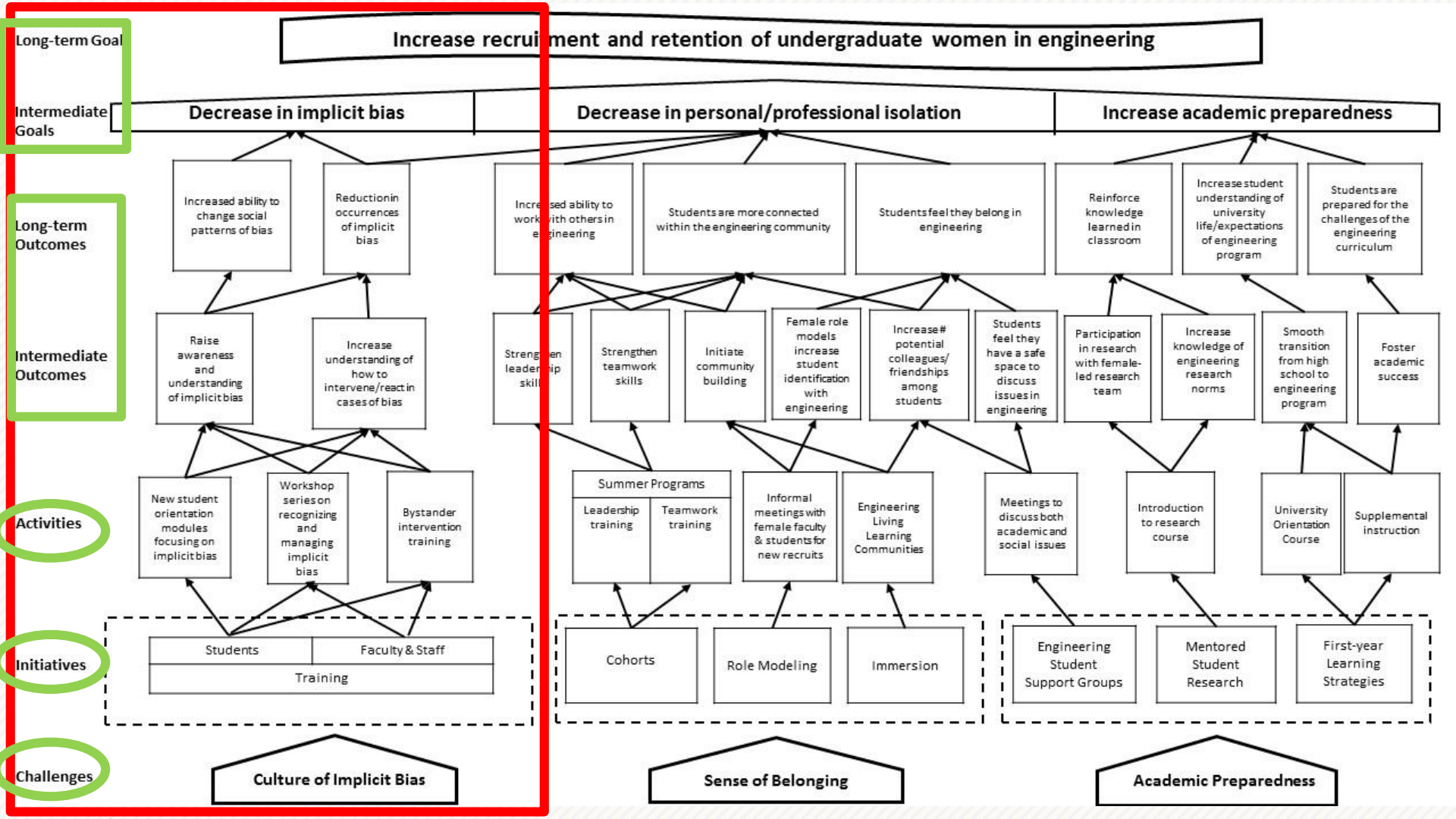
Mapping your project

Logic Models

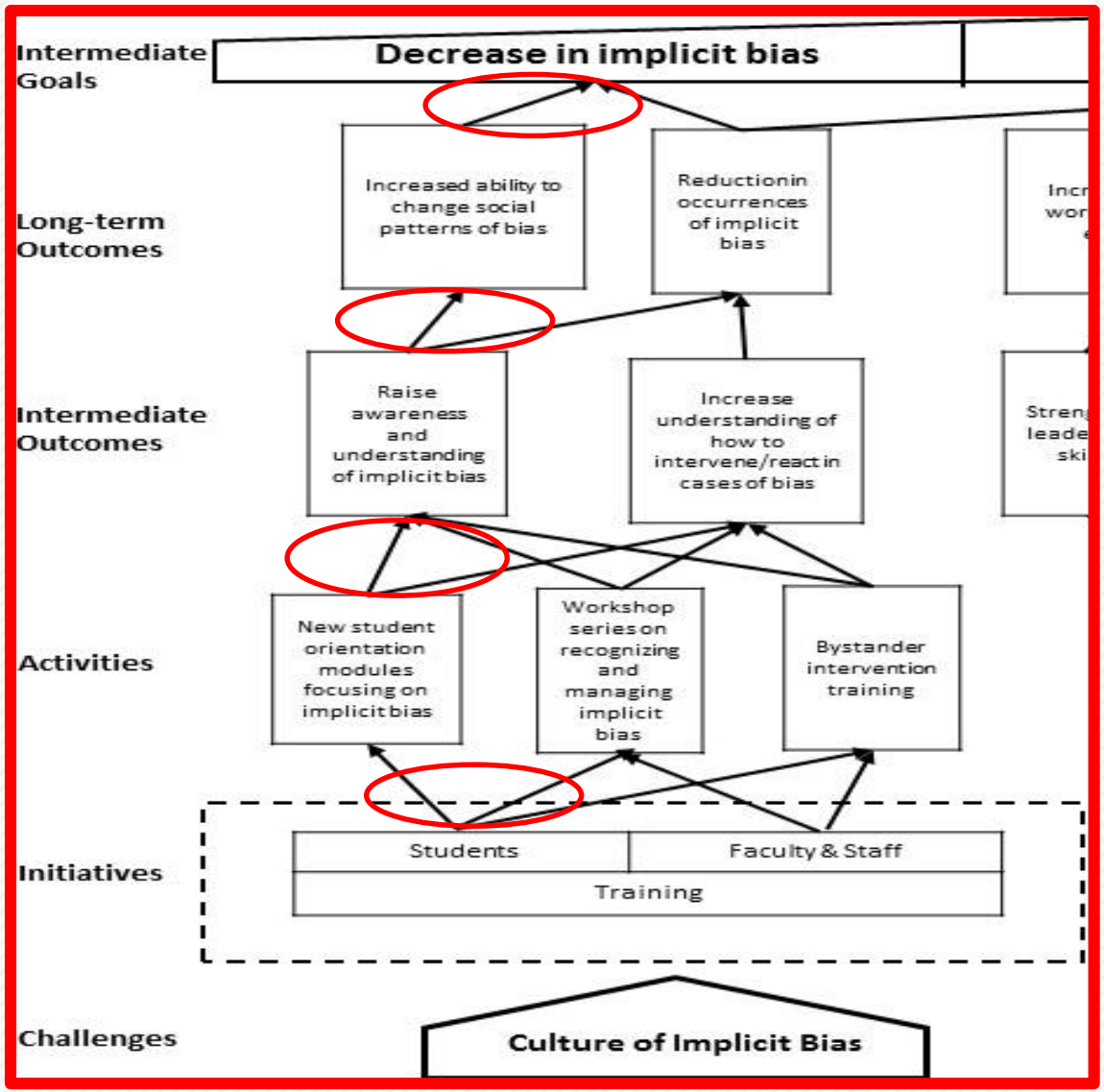


Mapping your project

Theory of Change Models



Mapping your project

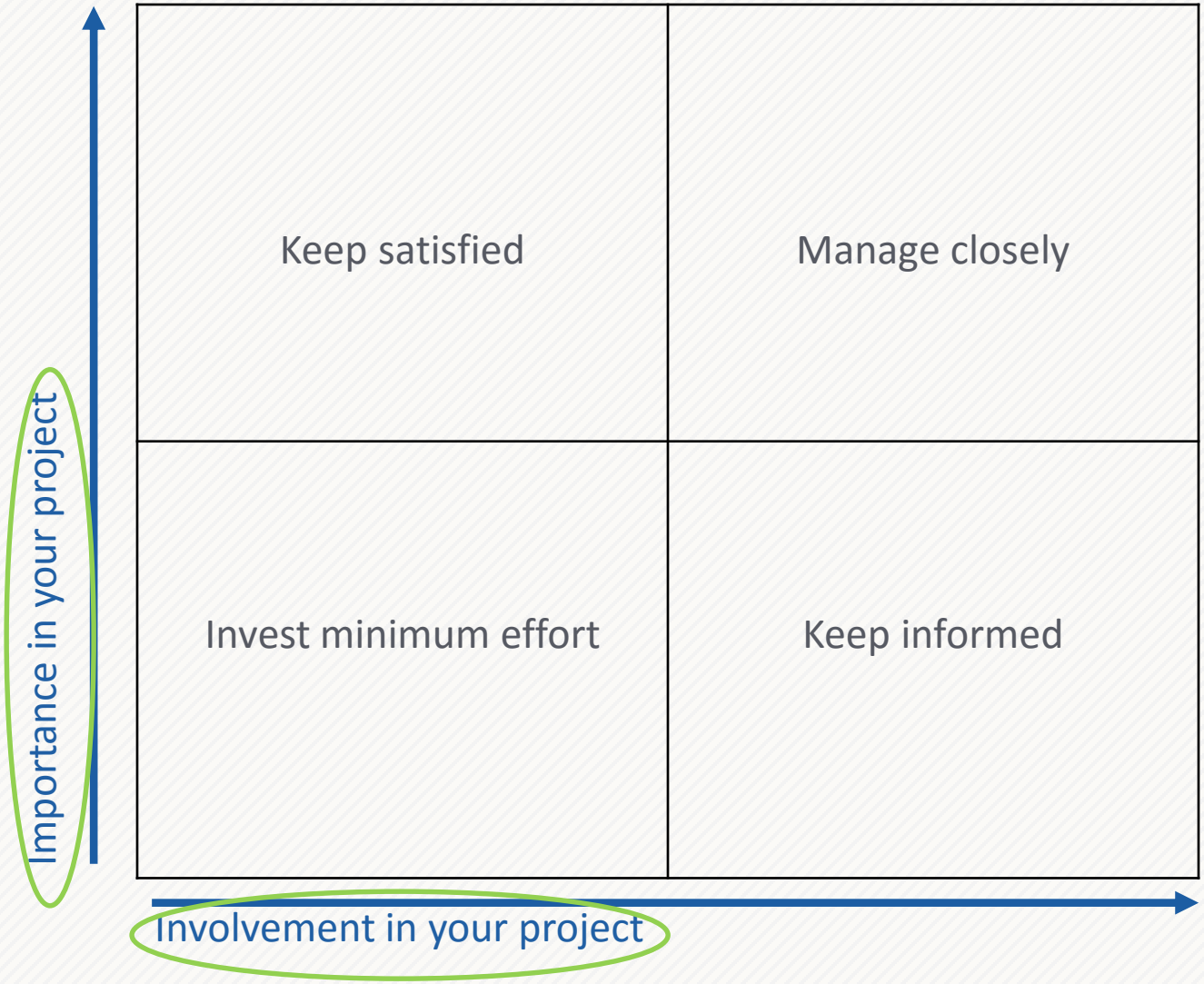


Logic model vs. TOC

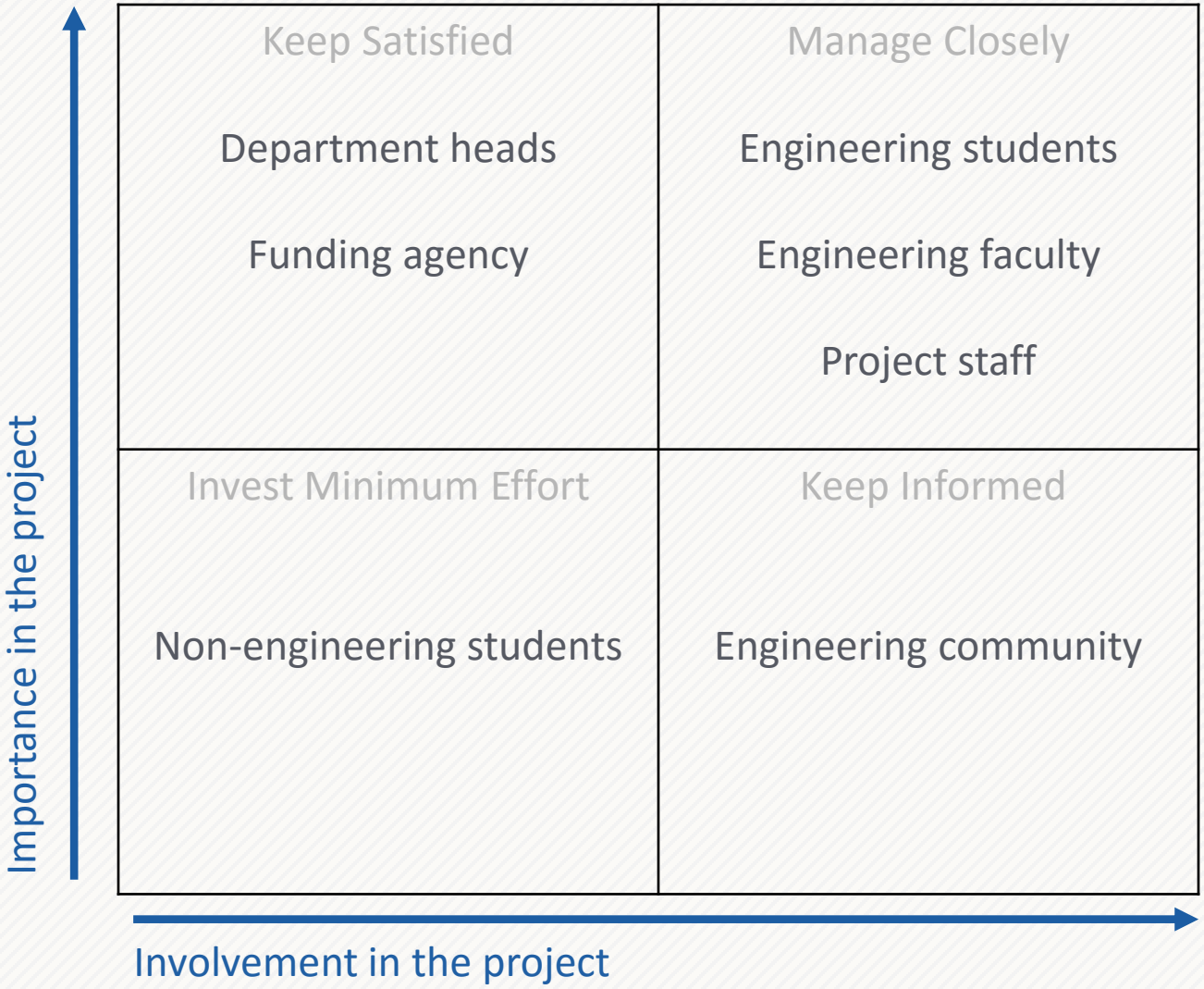
	Logic Model	Theory of Change Model
What it depicts	✓ Show a list of project components ✓ Linear representation ✓ Descriptive	✓ Shows relationship among project components and goals/outcomes ✓ Helps stakeholders clearly identify project path
Pros	✓ Useful to give quick overview ✓ Summarizes a complex program into simple parts	✓ Useful when showing **how** outcomes will be accomplished ✓ Can help explain why and where a project component worked or did not work
Cons	✓ Does not include causal pathways ✓ Too simple to show enough detail for evaluation	✓ Can be a lot of work to create ✓ Can be difficult to explain to stakeholders who you need to invest time in creating with you

TYPICAL EVALUATION PROCESS

Stakeholder mapping

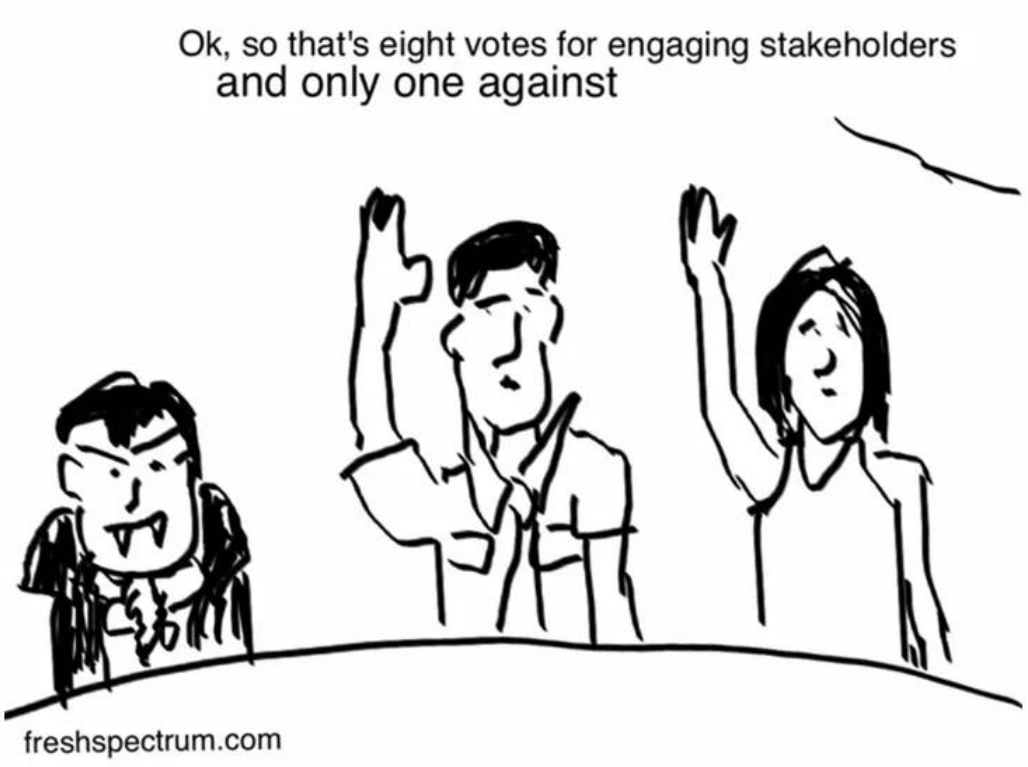


Stakeholder mapping

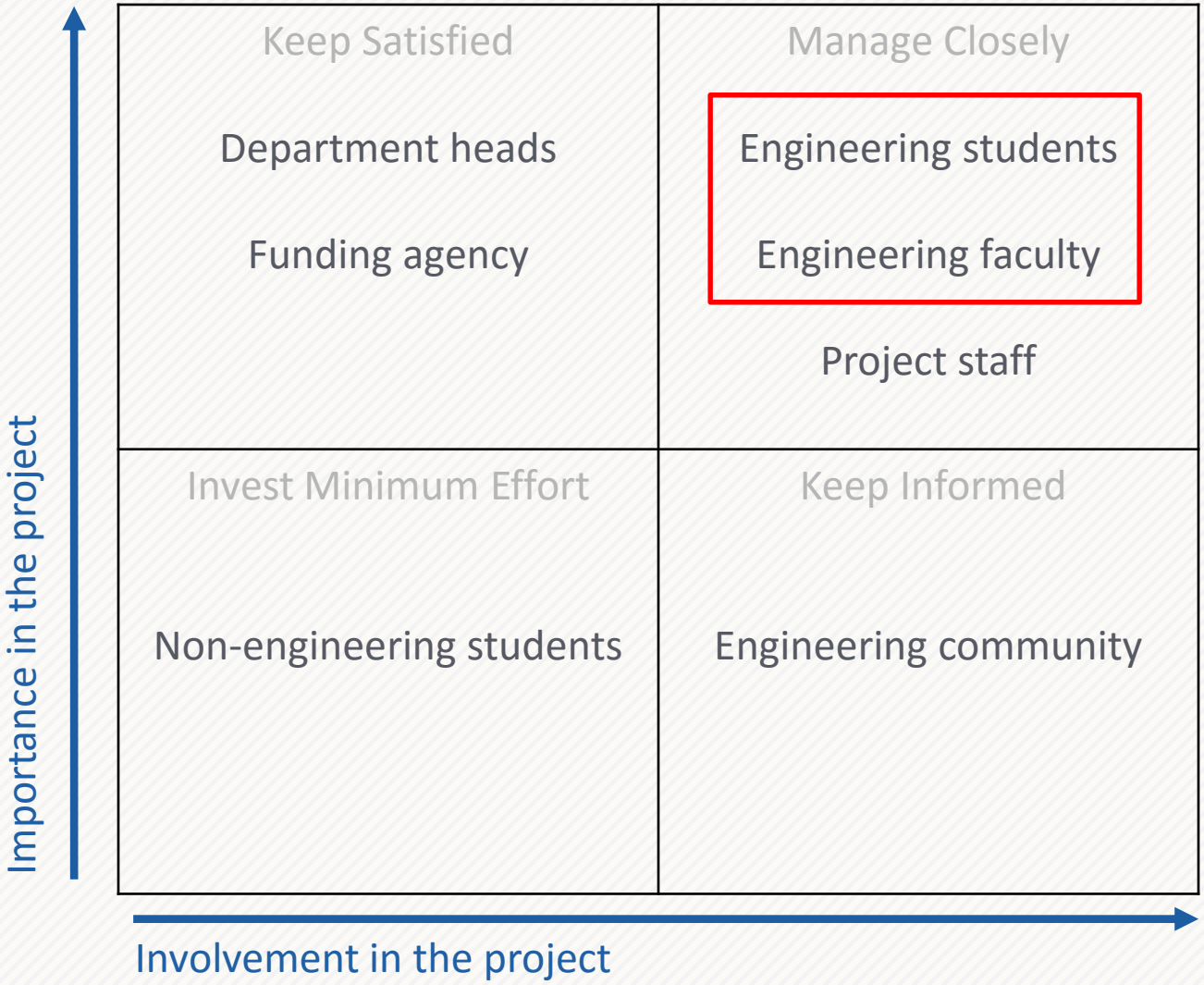


Stakeholder mapping

Engage your stakeholders



Stakeholder mapping



TYPICAL EVALUATION PROCESS

Develop evaluation questions

Use stakeholders from analysis

Stakeholders	Evaluation Questions
Engineering students	To what extent did students participate in the implicit bias training? Did they find it useful? In what ways did the training affect their awareness and understanding of implicit bias?
Engineering faculty	Did faculty receive appropriate information and training regarding their roles in the project? To what extent did female engineering faculty become involved with mentoring new students?

TYPICAL EVALUATION PROCESS

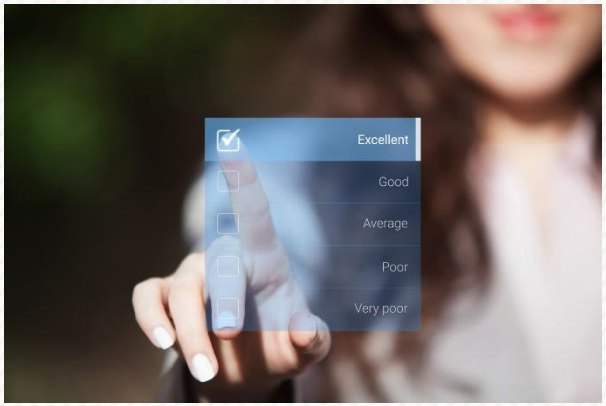
Determine data collection plan

Stakeholders	Evaluation Questions	Data Collection Plan
Engineering students	To what extent did students participate in the implicit bias training? Did they find it useful? In what ways did the training affect their awareness and understanding of implicit bias?	Student pre/post survey (before and after orientation, workshops, and intervention training) Student interviews (end of each semester) Student focus groups (annual)
Engineering faculty	Did faculty receive appropriate information and training regarding their roles in the project? To what extent did female engineering faculty become involved with mentoring new students?	Faculty Interviews (one month into the project, end of semester) Student interviews (end of each semester) Student focus groups (annual)

TYPICAL EVALUATION PROCESS

Collect and Analyze data

Quantitative data



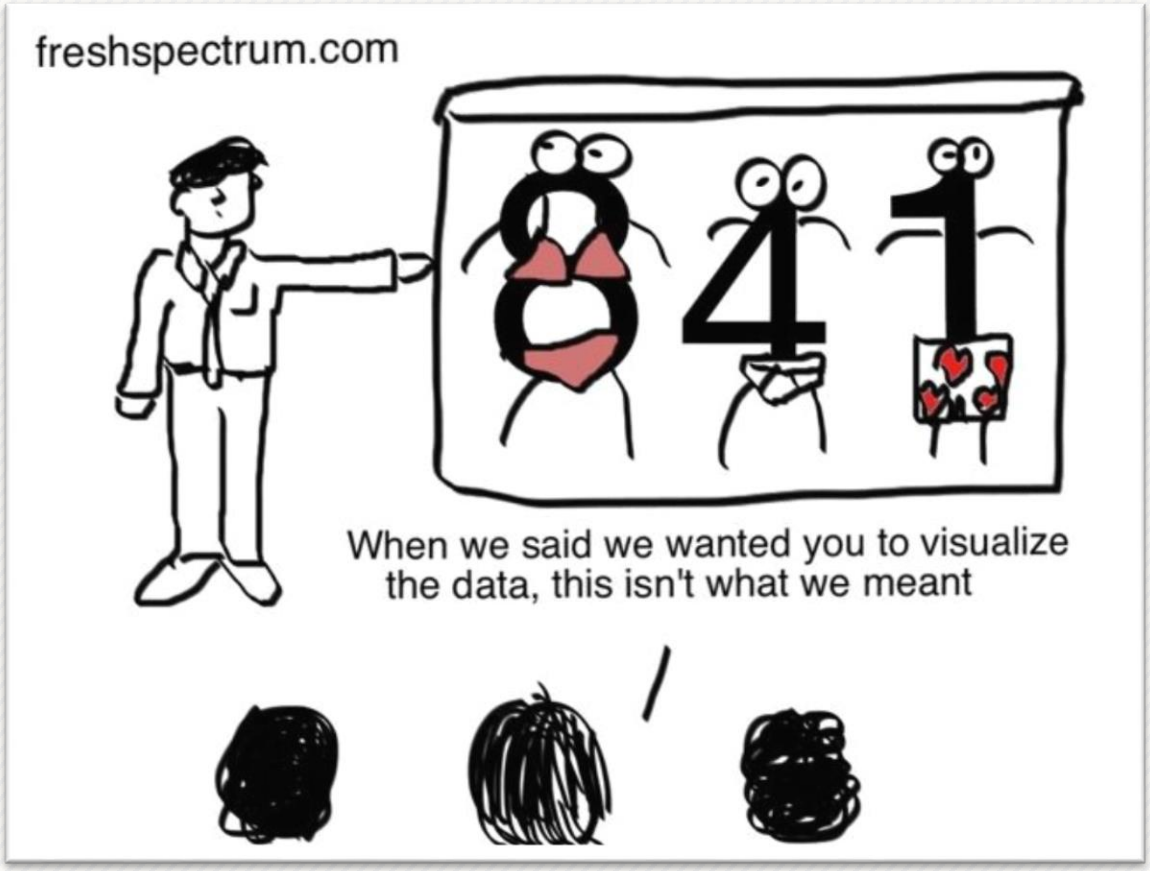
Qualitative data

Analyze Data

Interpret Results

TYPICAL EVALUATION WORKFLOW

Report data



Ways to report

- ✓ Formal reports
- ✓ “Data dumps”
- ✓ Informal conversations
- ✓ Formal presentations

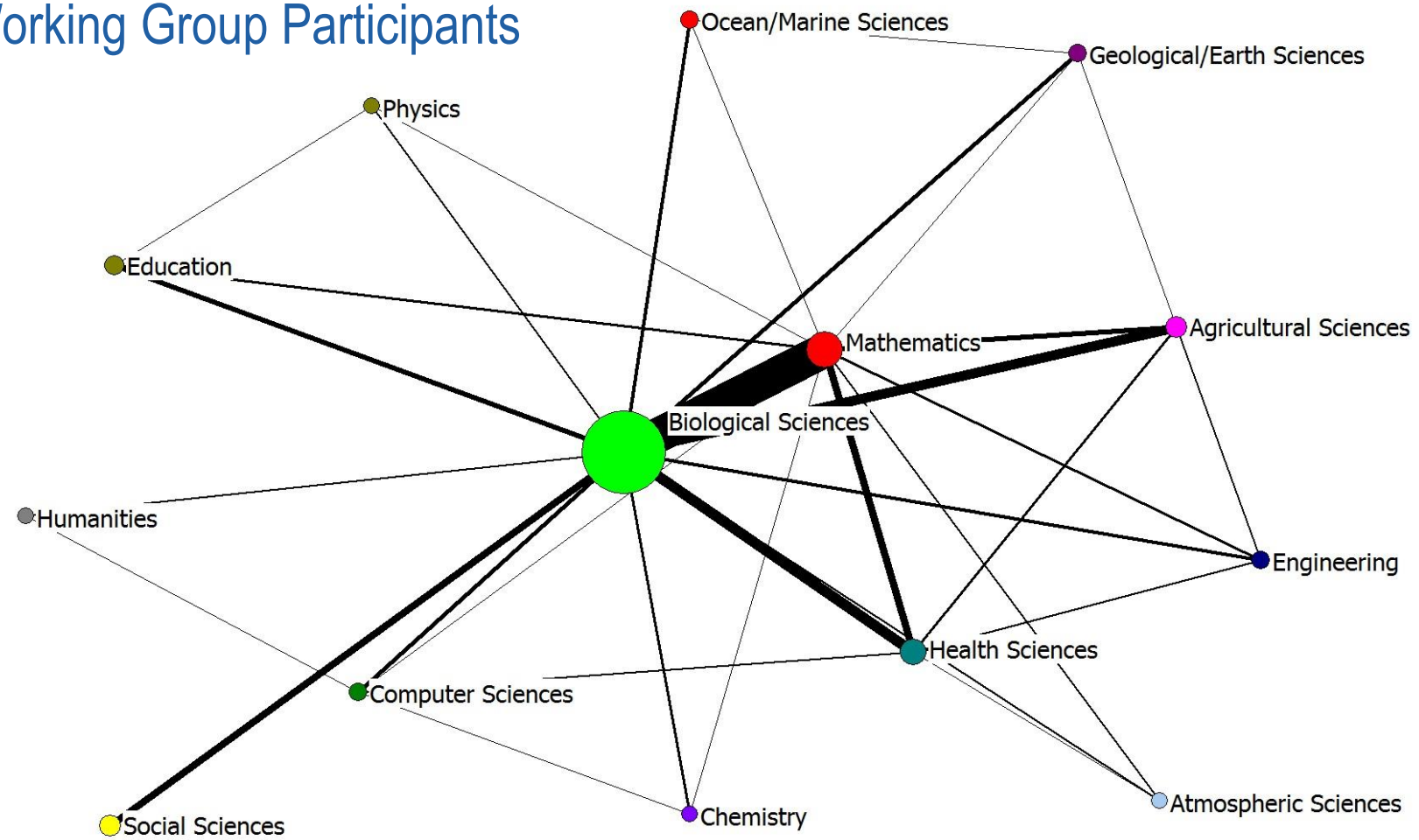
Report data

Working Group Participants

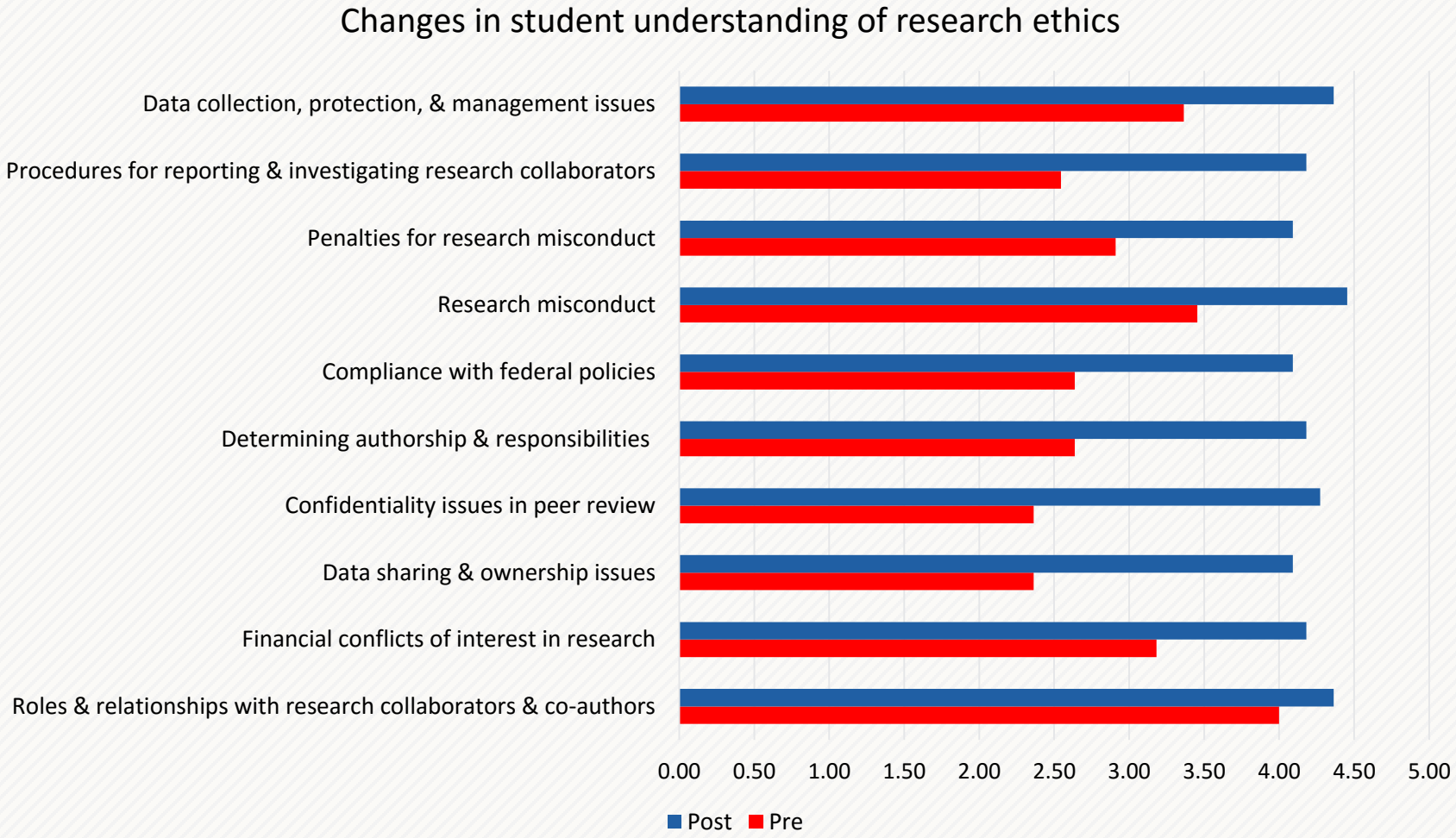
Group	Participant	Field of Study
Group 1	Participant 1	Biological Sciences
Group 1	Participant 2	Computer Sciences
Group 1…..	Participant 3…	Mathematics…
Group 2	Participant 1	Engineering
Group 2	Participant 2	Education
Group 2…..	Participant 3…	Biological Sciences…
Group 3	Participant 1	Humanities
Group 3	Participant 2	Health Sciences
Group 3…	Participant 3…	Agricultural Sciences…

Report data

Working Group Participants



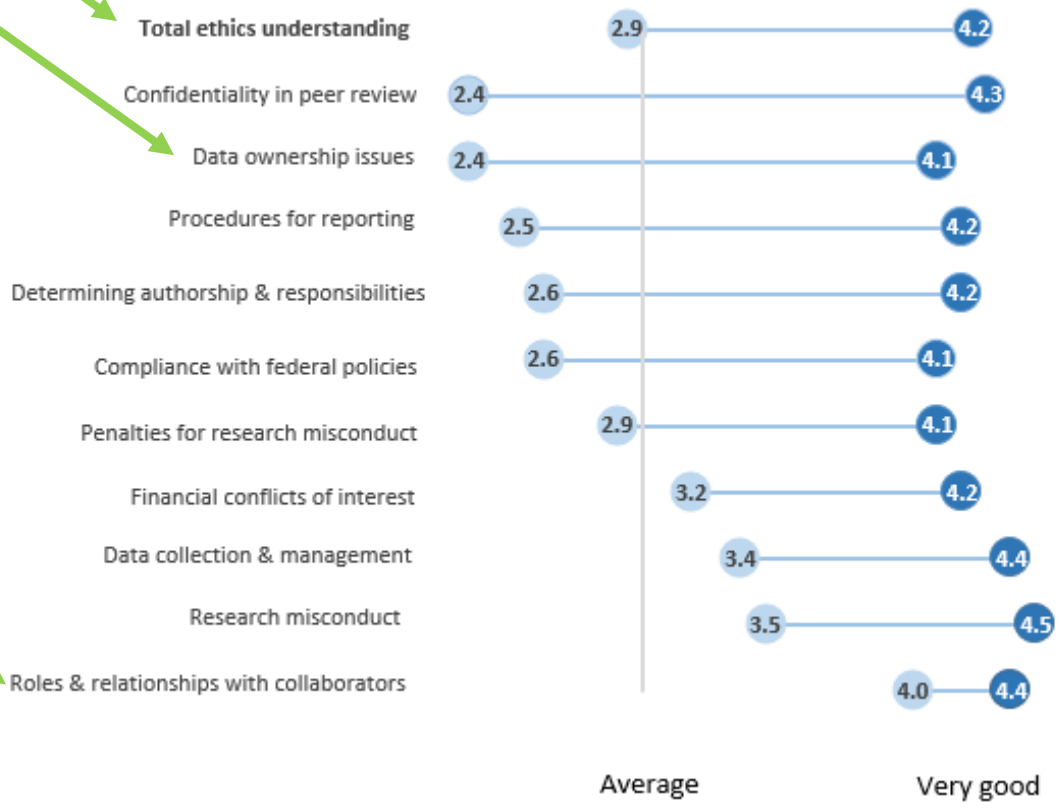
Report data


Changes in student understanding of research ethics
Data collection, protection, & management issues
Procedures for reporting & investigating research collaborators
Penalties for research misconduct
Research misconduct
Compliance with federal policies
Determining authorship & responsibilities
Confidentiality issues in peer review
Data sharing & ownership issues
Financial conflicts of interest in research
Roles & relationships with research collaborators & co-authors
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
Post
Pre

Report data

REU students felt they overall gained understanding across ten areas of ethics training from the beginning to the end of the REU program.

The greatest gain was in understanding confidentiality issues.



TYPICAL EVALUATION PROCESS

Revisit your project map

TYPICAL EVALUATION PROCESS

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Our NSF INCLUDES conference website: www.nimbios.org/IncludesConf

JOIN OUR LIVE STREAMS on Multi-Scale Evaluation in STEM Education

TUTORIAL
February 22nd

CONFERENCE
February 23rd and 24th

Register here for one or both here: https://tinyurl.com/includesconf

NISER Resources

stemeval.org

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twitter.com/NISERevaluation
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Contact us!

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These STEM evaluation activities are supported by the National Science Foundation through award HRD-1650390 to the University of Tennessee, Knoxville.