Facilitating Convergence Through Dialogue: The Toolbox Dialogue Method

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Toolbox Dialogue Initiative
http://tdi.msu.edu/
http://c4i.msu.edu/

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- Dept. of Philosophy, AgBioResearch
- Team science, communication, interdisciplinarity
- With TDI since 2005

Outline

- What are Convergence and Integration?
- A Communication Challenge for Convergence Teams
- The Toolbox Response
- The Toolbox Dialogue Method

Convergence

Convergence

Convergence @ NSF

Characteristics

I. Deep integration of different perspectives from inside and outside the academy

II. Use-inspired, solution-focused, and driven by a “specific and compelling problem”*

* NSF 19-056. (2019). Frequently asked questions (FAQ) for the NSF Convergence Accelerator (NSF 19-050). Online at https://www.nsf.gov/pubs/2019/nsf19056/nsf19056.jsp#q3

Convergence @ NSF

Convergence Culture

I. Conducive communication dynamic that supports relationship building and information transfer within teams

II. Common ground that supports integration

III. Common technical vocabulary

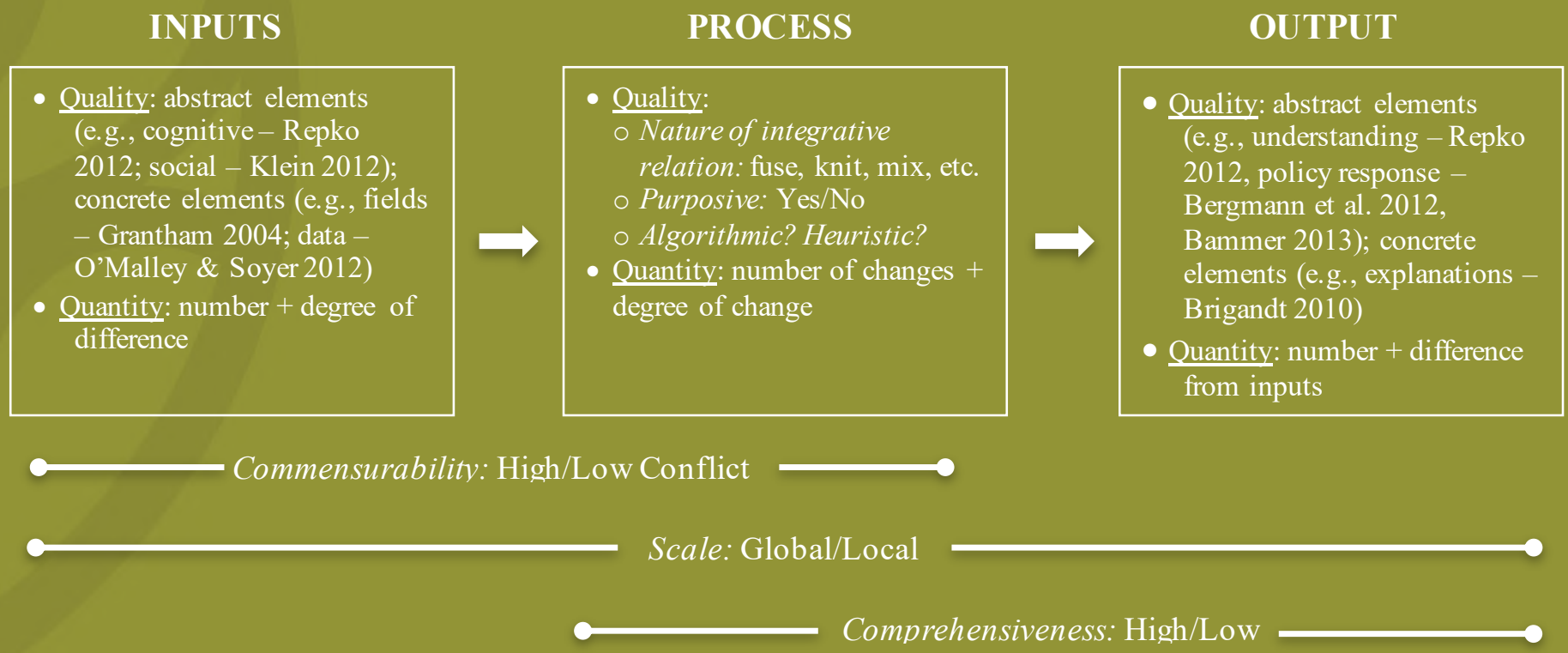
What Is Integration?

Integration involves:

- Combination of inputs in the production of an output
- It can be reflected in the reduction of the number or complexity of inputs
- It varies in degree according to the *mutual dependence* induced in the inputs

What Is Integration?

Our model:



* O'Rourke, M., Crowley, S., Gonnerman, C. (2016). On the nature of cross-disciplinary integration: A philosophical framework. *Studies in History and Philosophy of Biological and Biomedical Sciences* 56: 62–70.

What Is Integration?

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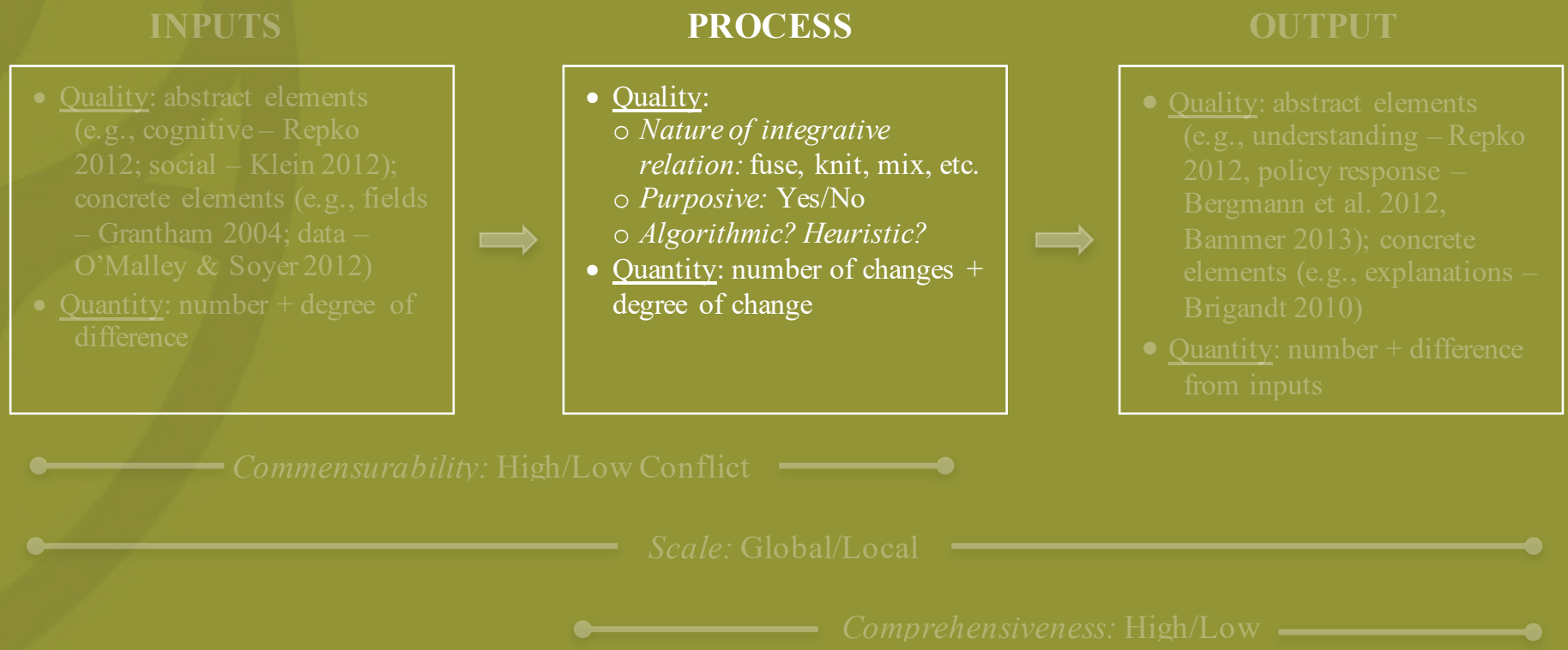
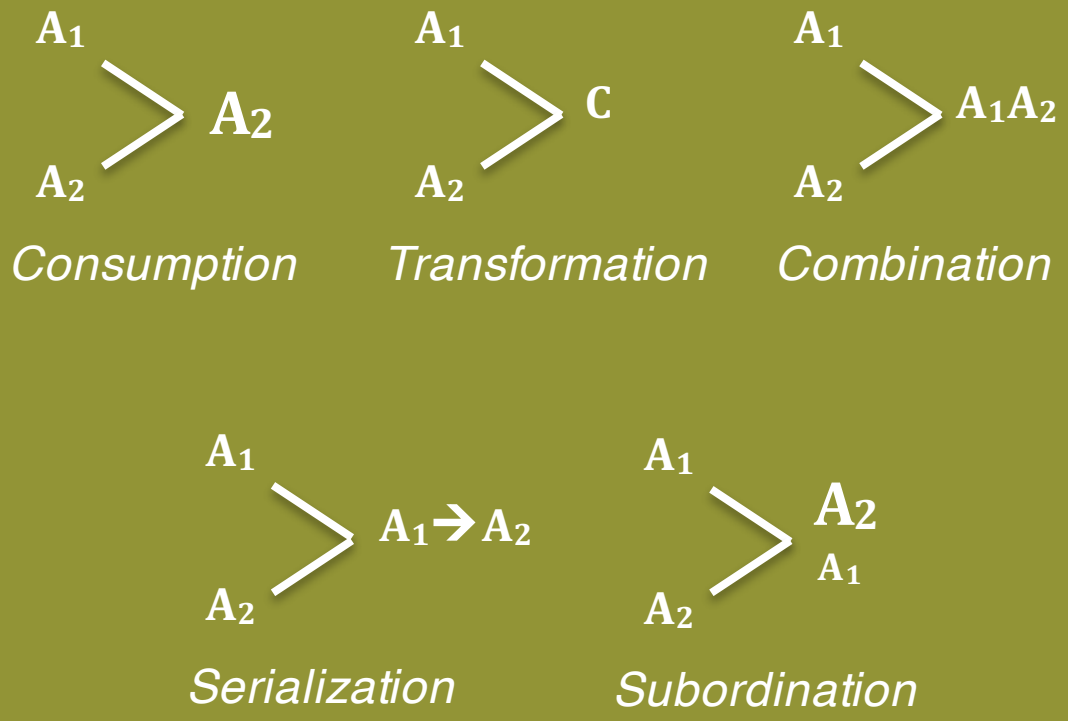


* O'Rourke, M., Crowley, S., Gonnerman, C. (2016). On the nature of cross-disciplinary integration: A philosophical framework. *Studies in History and Philosophy of Biological and Biomedical Sciences* 56: 62–70.

A Few Integrative Relations



Integrative Pathways & Mechanisms

I. Integrative pathway:

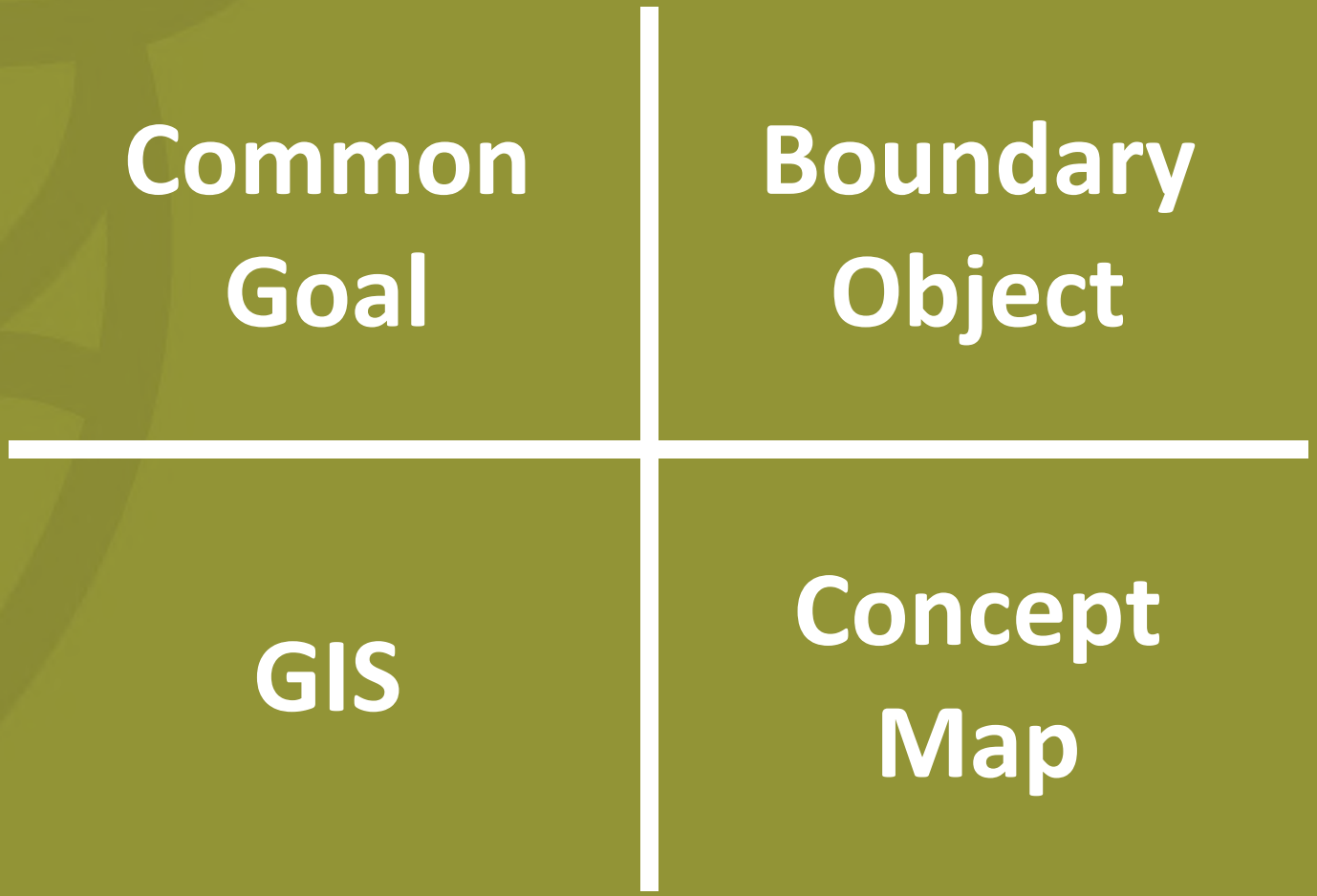
- A series of changes to inputs that results in the production of an integrated output – *or* –
- A process by which inputs are put into an integrative relation in the production of an output

Integrative Pathways & Mechanisms

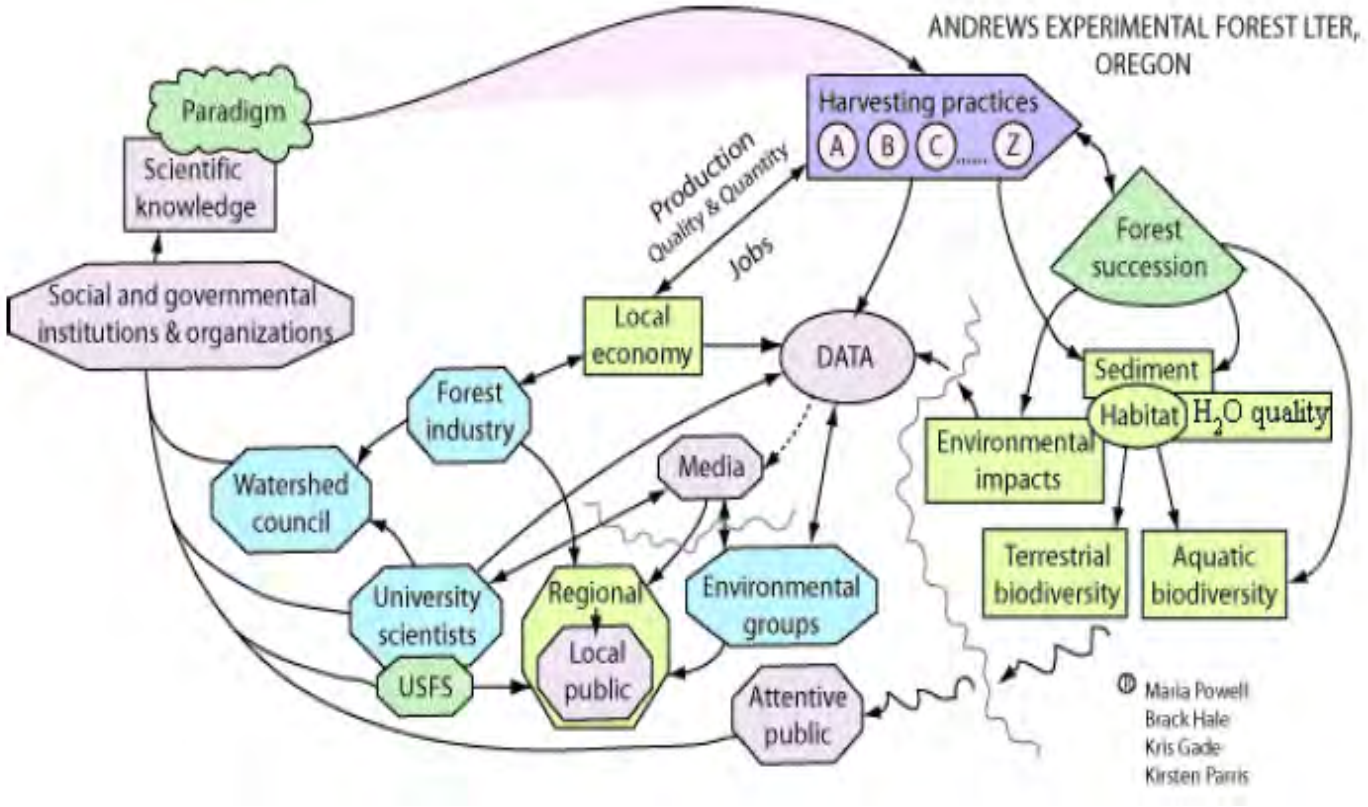
II. Integrative mechanism:

- a device, system, tool, or approach that facilitates the combination of inputs into an integrated output – *or* –
- what helps to put inputs into integrated relations in the production of outputs

Examples of Integrative Mechanisms

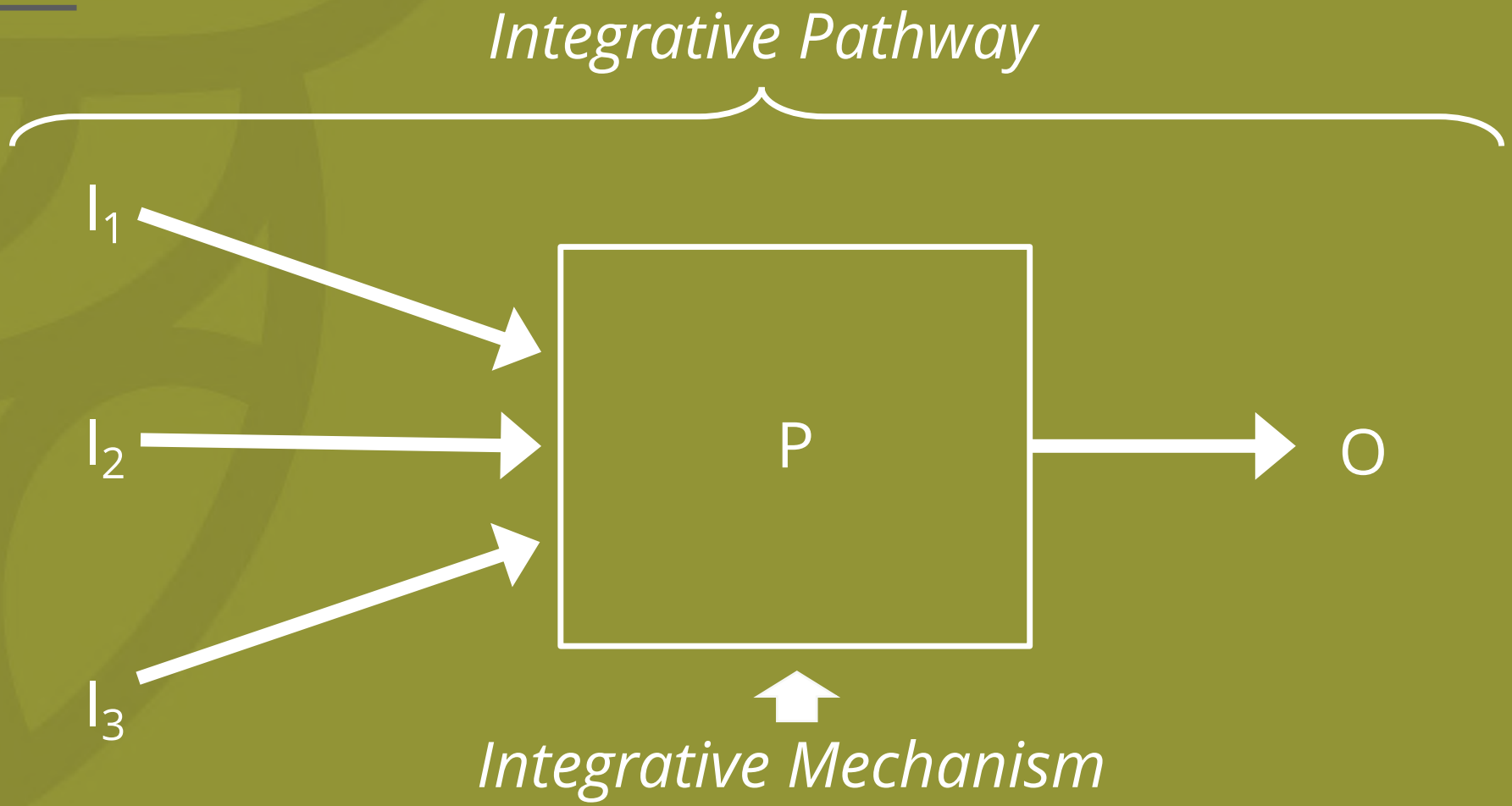


Concept Map Example



Heemskerk, M., Wilson, K., & Pavao- Zuckerman, M. (2003). Conceptual models as tools for communication across disciplines. *Conservation Ecology* 7 (3), 8. http:// www.consecol.org/vol7/ iss3/ art8

Integrative Pathways & Mechanisms



The Challenge Facing Convergence Teams

Collaborators from different cultures (e.g., disciplines, institutions) can struggle to communicate because they understand problems differently*

* National Academy of Sciences, Committee on Facilitating Interdisciplinary Research and Committee on Science Engineering and Public Policy (NAS). (2004). Facilitating interdisciplinary research. Washington, DC: National Academies Press.

TOOLBOX DIALOGUE INITIATIVE ™

Interdisciplinary Challenge

I. The goal of interdisciplinary research is to meet complex problems with complex responses

II. Diversity of expertise is key, but integrating it without washing out differences is a challenge

TOOLBOX DIALOGUE INITIATIVE ™

Interdisciplinary Challenge

Deep integration of different perspectives requires:

- Translating across different technical languages
- Coordinating different values
- Reconciling different beliefs about the world*

* O'Rourke, M., Crowley, S., Gonnerman, C. (2016). On the nature of cross-disciplinary integration: A philosophical framework. *Studies in History and Philosophy of Biological and Biomedical Sciences* 56: 62–70.

The Root of the Challenge

The Problem of Unacknowledged Differences:

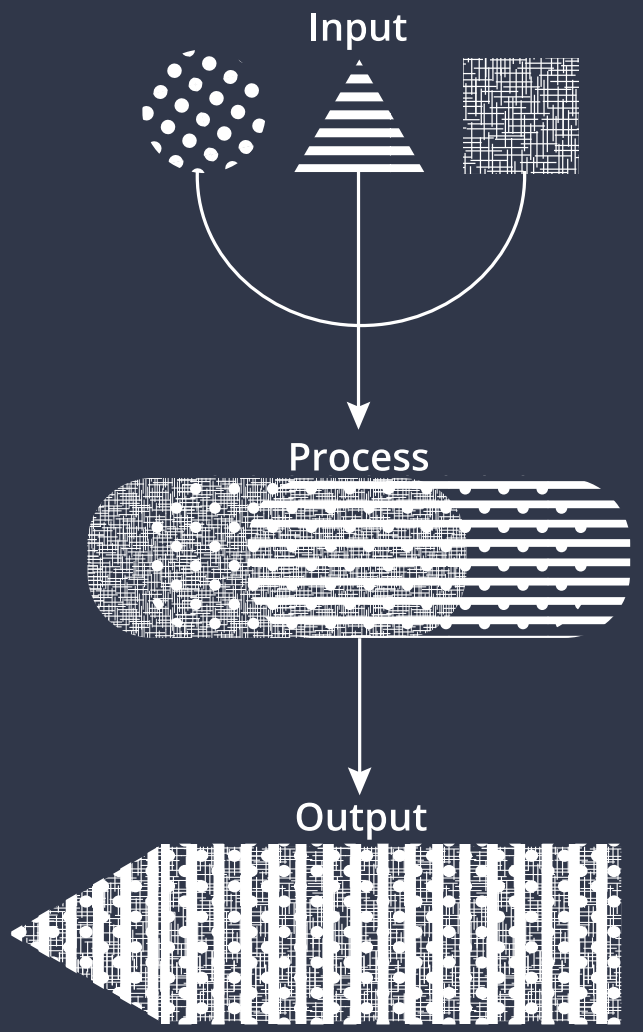
You are different from one another, but you don't necessarily know how, and we tend to assume we're more alike than we are*

* Ross, L., Greene, D., House, P. (1977). The "false consensus effect": An egocentric bias in social perception and attribution processes. Journal of Experimental Social Psychology 13(3): 279–301.

The Root of the Challenge

Difference is the point – we don't want to lose it

- Integration requires appreciation for similarities and differences among collaborators
- Managing differences give you control over the process of integrating research inputs into unified outputs



The TDI Response

IF

unacknowledged differences in language, belief and value compromise convergence research

THEN

acknowledging differences and coordinating them can enhance communication and project integration

Who We Are

The Toolbox Dialogue Initiative (TDI) is:

A research and outreach initiative based in the Center for Interdisciplinarity at Michigan State University

Who We Are

The Toolbox Dialogue Initiative (TDI) is:

- A diverse community of researchers from different universities in the US
- An idea that emerged from graduate students in an IGERT project at the University of Idaho in 2005
- Moved to MSU in 2012; funded by NSF, NASA, and others
- An example of integration involving biophysical science, social science, the humanities, and the arts

What We Do

The Toolbox Dialogue Initiative enhances communication and collaboration through dialogue-based workshops and related activities*

* Hubbs, G., O'Rourke, M., Orzack, S. H. (Eds.). (2020). *The Toolbox Dialogue Initiative: The Power of Cross-Disciplinary Practice*. Boca Raton, FL: CRC Press.

Main Idea

Enhance understanding → Enhance communication

Pursue this in dialogue about implicit commitments, *e.g., methodology, values, power dynamics, methods of communication*

Theoretical Background

Dialogue encourages integrative practices:*

- Reflexivity
- Perspective-taking
- Negotiation

* Salazar, M. R., K. Widmer, K. Doiron, and T. Lant. 2019: Leader integrative capabilities: A catalyst for effective interdisciplinary teams. In K. L. Hall, A. L. Vogel, and R. T. Croyle, eds. Advancing Social and Behavioral Health Research through Cross-Disciplinary Team Science: Principles for Success. Springer, New York.

Practical Benefit

Dialogue encourages effective collaboration

- Make *explicit* the implicit
- It is designed to uncover differences among collaborators and enhance communication
- Collaborations (*e.g.*, research teams, research centers) work better when they cultivate a culture that supports *reflection* and *perspective-taking**

* Salazar, M. R., K. Widmer, K. Doiron, and T. Lant. 2019: Leader integrative capabilities: A catalyst for effective interdisciplinary teams. In K. L. Hall, A. L. Vogel, and R. T. Croyle, eds. Advancing Social and Behavioral Health Research through Cross-Disciplinary Team Science: Principles for Success. Springer, New York.

The Toolbox Dialogue Method

Toolbox dialogue workshops have two parts:

1

Structured dialogue reveals views, values, and attitudes

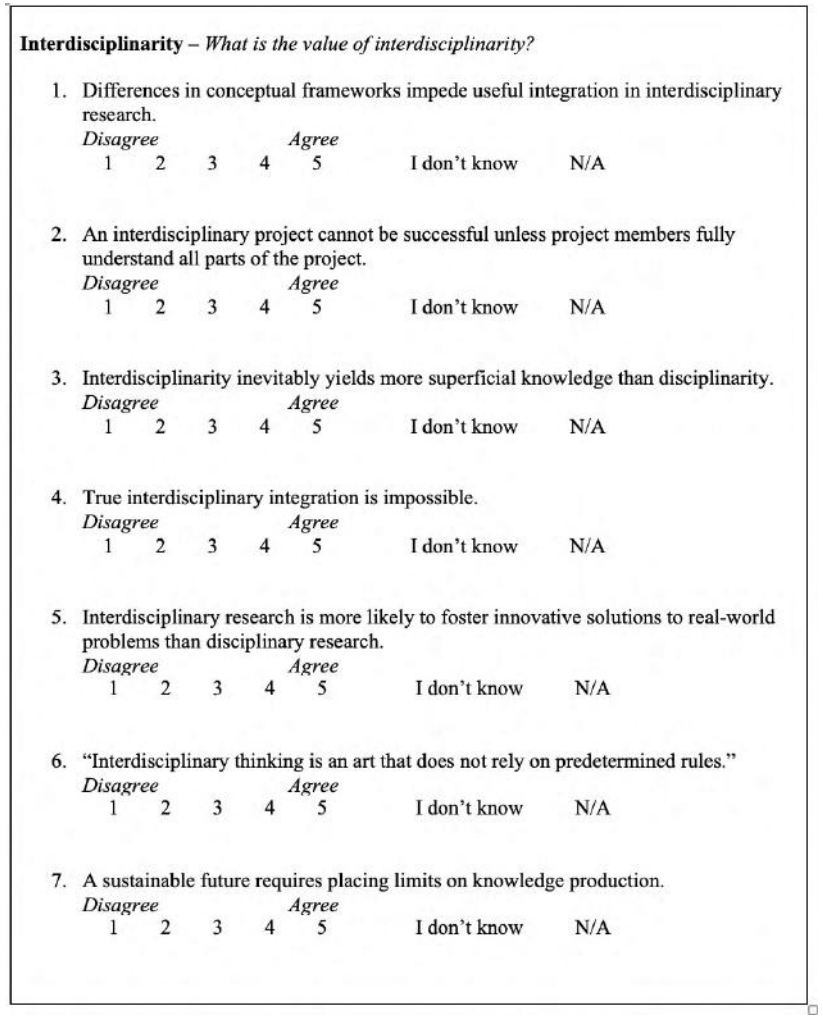
2

Co-creation activities that leverage what is learned in dialogue

Toolbox Instrument

Prompts focus dialogue & help unpack group views, values, and attitudes

- Sorted into thematic modules
- Topics: Convergence Research, Management and Communication, Values and Goals
- Rating-response items that encourage reflection and commitment
- Prompts suggest topics for discussion



Interdisciplinarity – *What is the value of interdisciplinarity?*

1. Differences in conceptual frameworks impede useful integration in interdisciplinary research.
   Disagree 1 2 3 4 5 *Agree* I don't know N/A
2. An interdisciplinary project cannot be successful unless project members fully understand all parts of the project.
   Disagree 1 2 3 4 5 *Agree* I don't know N/A
3. Interdisciplinarity inevitably yields more superficial knowledge than disciplinarity.
   Disagree 1 2 3 4 5 *Agree* I don't know N/A
4. True interdisciplinary integration is impossible.
   Disagree 1 2 3 4 5 *Agree* I don't know N/A
5. Interdisciplinary research is more likely to foster innovative solutions to real-world problems than disciplinary research.
   Disagree 1 2 3 4 5 *Agree* I don't know N/A
6. "Interdisciplinary thinking is an art that does not rely on predetermined rules."
   Disagree 1 2 3 4 5 *Agree* I don't know N/A
7. A sustainable future requires placing limits on knowledge production.
   Disagree 1 2 3 4 5 *Agree* I don't know N/A

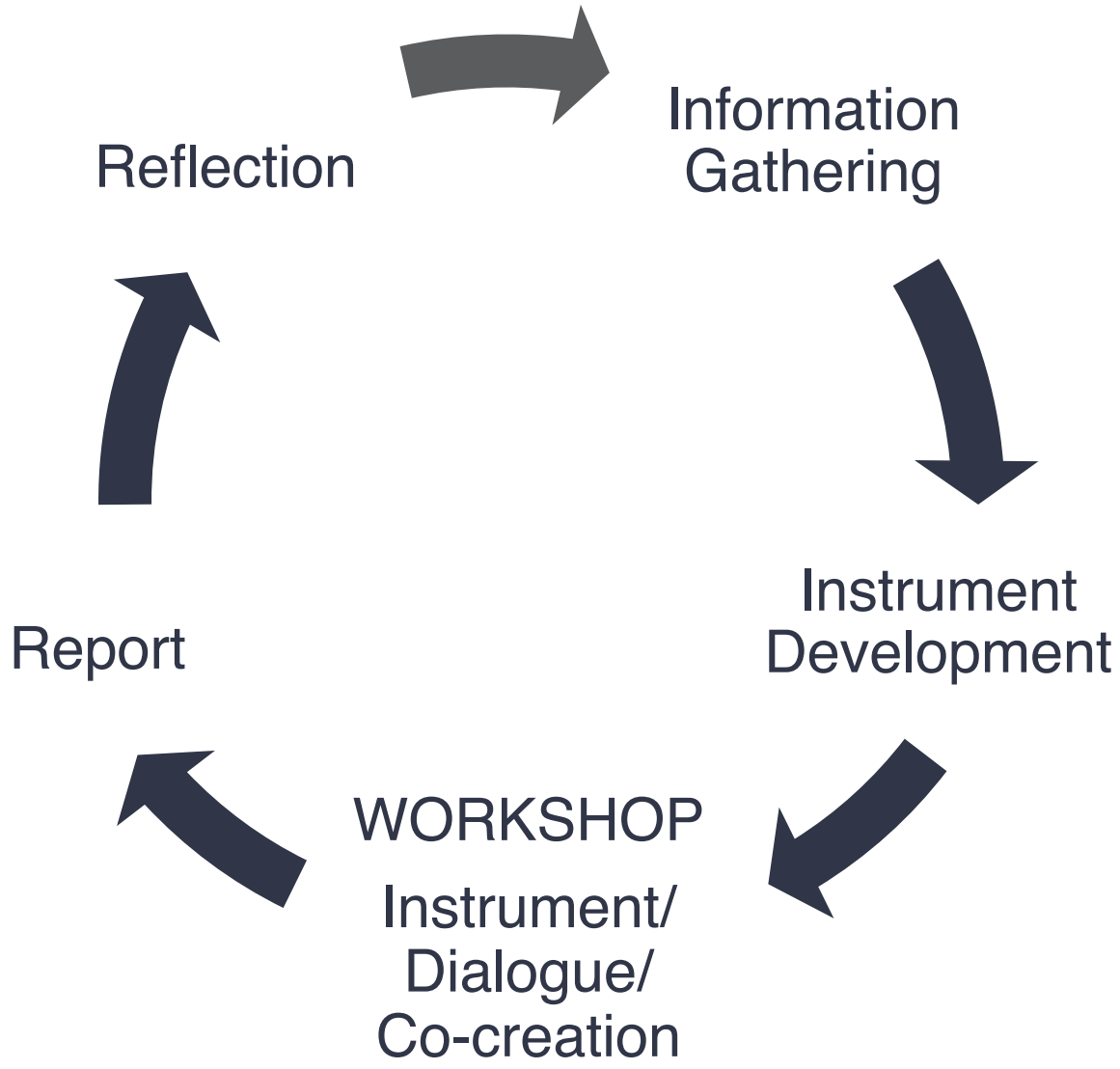
Toolbox Dialogue

The Toolbox workshop focuses on dialogue about the issues raised in the instrument

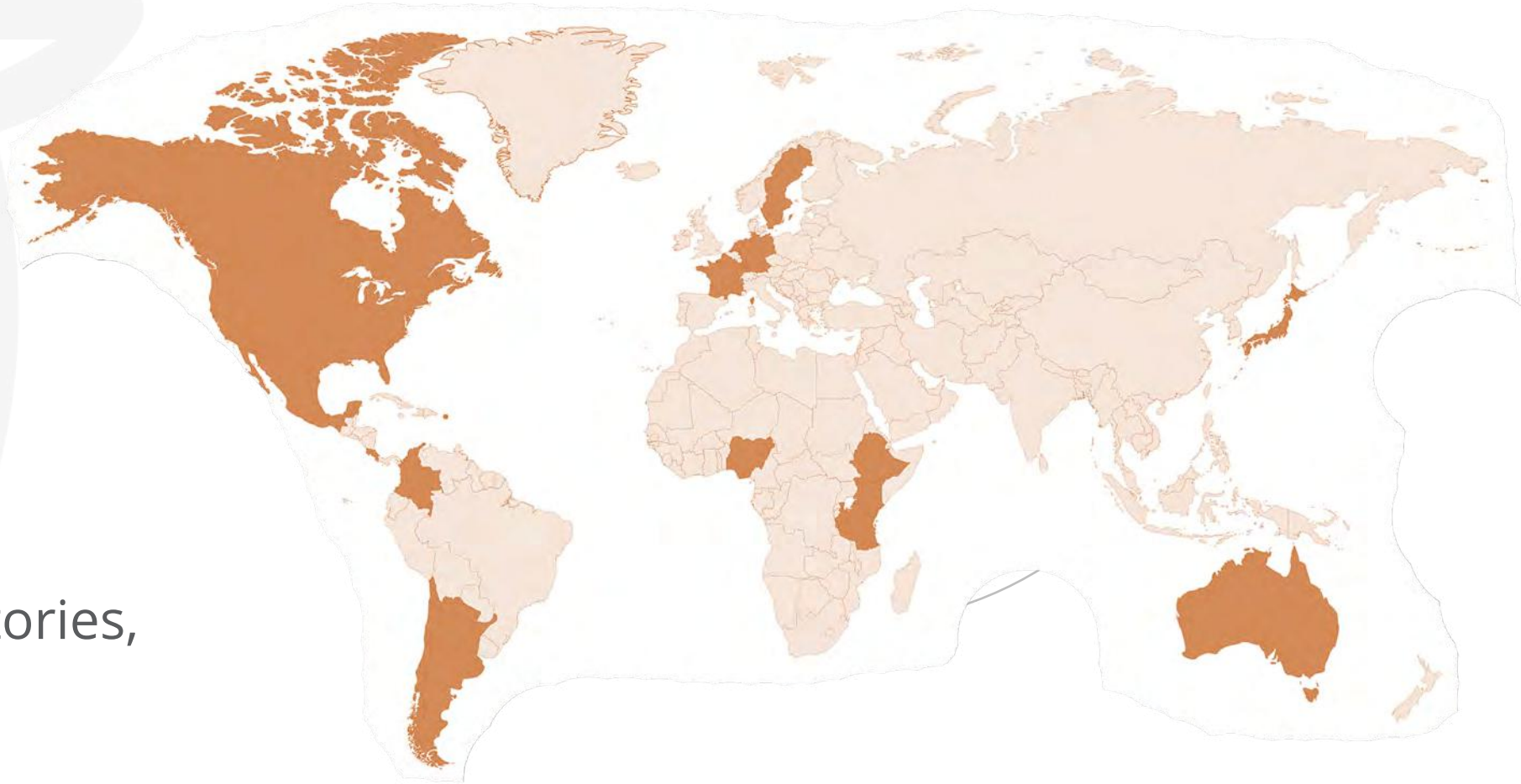
- By focusing dialogue on issues that really matter to a team, these workshops support the articulation, sharing, and coordination of research perspectives
- This enables collaborators to understand their common problem from each other's perspective*

* Looney, C., Donovan, S., O'Rourke, M., Crowley, S., Eigenbrode, S. D., Rotschy, L., Bosque-Pérez, N., Wulfhorst, J. D. (2014). Seeing through the eyes of collaborators: Using Toolbox workshops to enhance cross-disciplinary communication. In M. O'Rourke, S. Crowley, S. D. Eigenbrode, and J. D. Wulfhorst (Eds.), Enhancing Communication and Collaboration in Interdisciplinary Research (pp. 220–243). Thousand Oaks, CA: Sage Publications.

Toolbox Process



Workshop Experience

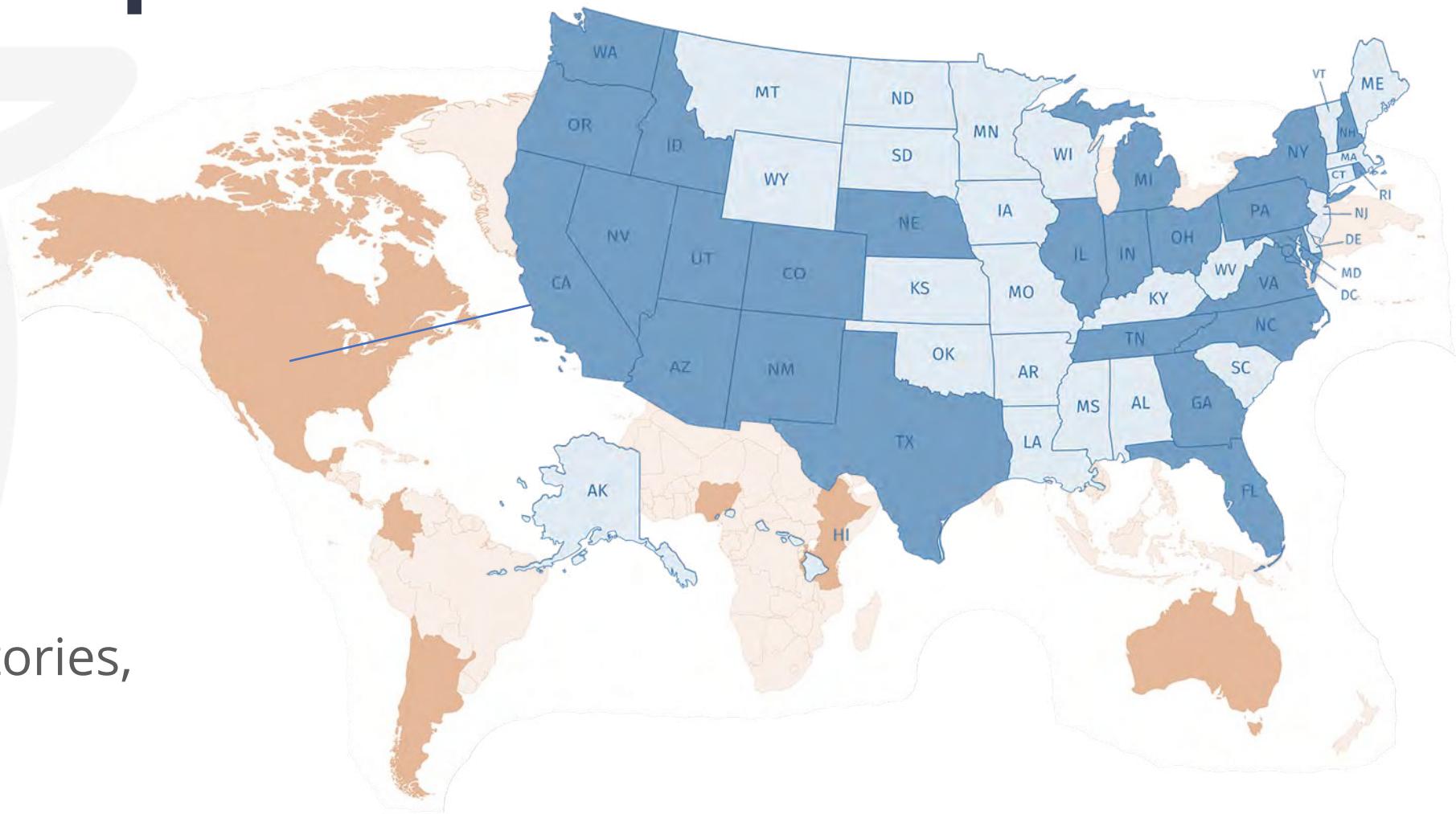


370+

workshops around the world

21 U.S. states and territories,
16 countries

Workshop Experience



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Workshop Experience

TOOLBOX DIALOGUE INITIATIVE ™

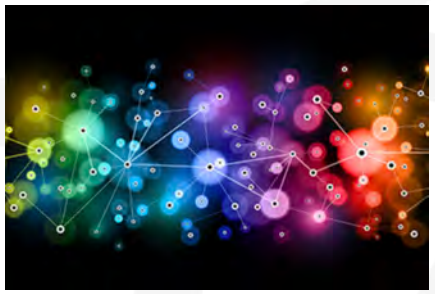
ITHS

NSF

NW CSC Northwest Climate Science Center

WEST MICHIGAN SUSTAINABLE BUSINESS FORUM

MICHIGAN STATE UNIVERSITY
AgBioResearch



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Evidence of Impact

TBM

PRACTICE TOOLS

How to talk to strangers: facilitating knowledge sharing within translational health teams with the Toolbox dialogue method

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Abstract
Translational behavioral medicine involves experts from different disciplines and professions interacting to solve complex problems. Coordinating this expertise can be frustrated by the partially tacit nature of expertise and by the various ways in which it manifests in different communities. We describe a method—the Toolbox dialogue method—for addressing these challenges by means of a structured dialogue among team members concerning their respective approaches to complex problems. The Toolbox dialogue method consists of a philosophically grounded questionnaire—the "Toolbox"—deployed in workshops by collaborators from different disciplines and professions. The Health Science Toolbox was modified from an extensively utilized questionnaire designed for Science–Technology–Engineering–Mathematics (STEM) research and has been piloted with translational medicine teams. Eighty-five percent of participants in STEM workshops indicated a positive impact on awareness of the knowledge, opinions, or scientific approach of teammates. In the Health Science Toolbox, 35 % of questionnaire responses changed substantially from pre- to post-workshop, demonstrating impact of the workshops. The Toolbox dialogue method is a relatively brief workshop encounter that can have a positive impact on mutual understanding within translational medicine teams.

KEYWORDS
Toolbox dialogue method, Science of team science, Philosophy, Teamwork, Interdisciplinary collaboration

Implications
Practice: Structured philosophical dialogue about fundamental assumptions concerning collaborative research and practice in translational behavioral medicine can facilitate negotiation of key conceptual challenges.

Policy: Methods for improving aspects of team science such as collective understanding should be made available to collaborative projects in the translational health sciences.

Research: The method described in this article supports the identification and analysis of a team's collaborative dynamic.

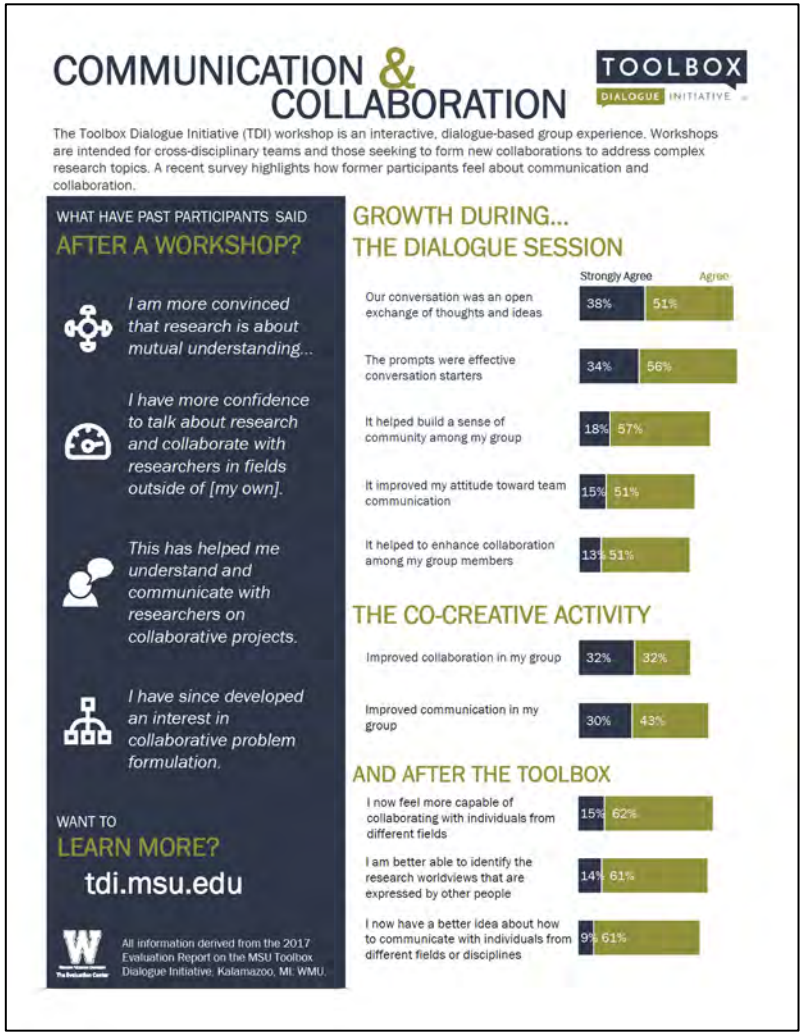
BACKGROUND
Addressing complex issues in translational medicine increasingly involves formation of cross-disciplinary teams. For example, development of strategies for smoking cessation may span cell/molecular-based research, epidemiology, and community implementation science. However, effective cross-disciplinary research confronts institutional, infrastructural, logistical, interpersonal, and conceptual challenges [1, 3, 5, 9, 10].

Often, *conceptual* challenges arise from differing and tacit classificatory schemes and value systems used by collaborators to approach research [6, 11]. If left unspoken, such differences can manifest as misunderstanding, disagreement, and ultimately, failure to achieve project objectives. We have developed the Toolbox method to identify and articulate these differences through structured dialogue about knowledge-generating aspects of research and practice [2]. A substantial body of research suggests that facilitated, constructive, open dialogue within teams can lead to positive outcomes [8, 13]. We provide evidence that the Toolbox approach has a positive impact on mutual understanding within collaborative research teams.

THE TOOLBOX DIALOGUE METHOD
The Toolbox method comprises three elements: first, the *questionnaire*, or "Toolbox", provides the initial topics that structure dialogue about research and practice; second, the *workshop* centers on the team's dialogue; and third, the *analysis* yields insights based on data collected from the participating team.

Questionnaire
The original Toolbox questionnaire, designed for collaborative teams in Science–Technology–Engineering–Mathematics (STEM) research [2], consists of six

TBM
Published online: 29 September 2012



COMMUNICATION & COLLABORATION

TOOLBOX DIALOGUE INITIATIVE

The Toolbox Dialogue Initiative (TDI) workshop is an interactive, dialogue-based group experience. Workshops are intended for cross-disciplinary teams and those seeking to form new collaborations to address complex research topics. A recent survey highlights how former participants feel about communication and collaboration.

WHAT HAVE PAST PARTICIPANTS SAID AFTER A WORKSHOP?

- *I am more convinced that research is about mutual understanding...*
- *I have more confidence to talk about research and collaborate with researchers in fields outside of [my own].*
- *This has helped me understand and communicate with researchers on collaborative projects.*
- *I have since developed an interest in collaborative problem formulation.*

WANT TO LEARN MORE?
tdi.msu.edu

All information derived from the 2017 Evaluation Report on the MSU Toolbox Dialogue Initiative. Kalamazoo, MI: WMU.

GROWTH DURING... THE DIALOGUE SESSION

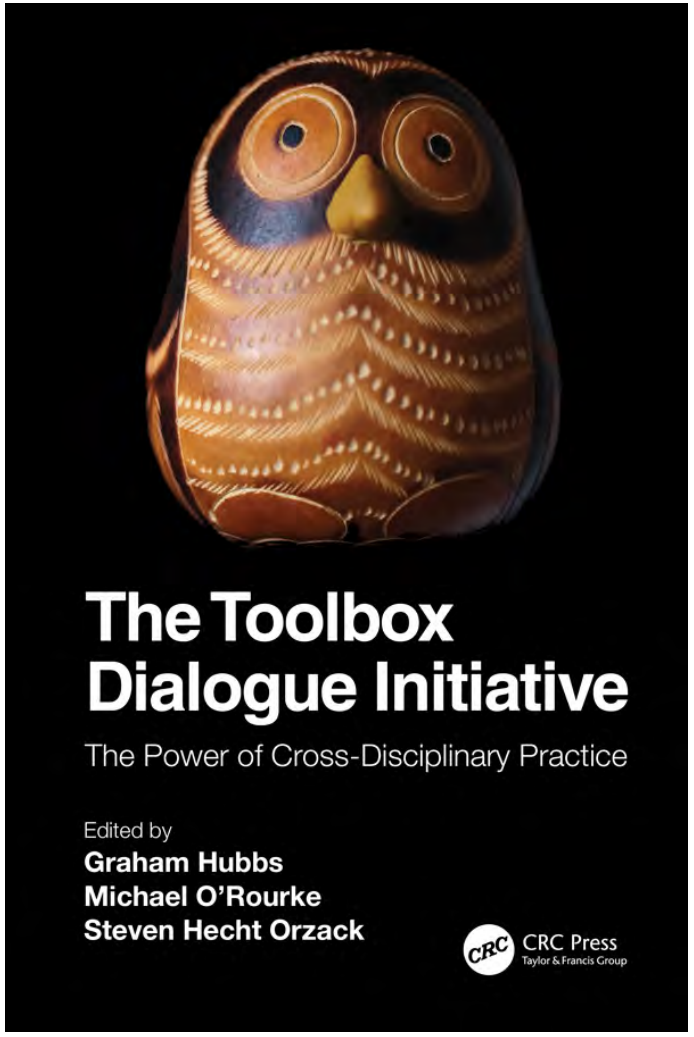
	Strongly Agree	Agree
Our conversation was an open exchange of thoughts and ideas	38%	51%
The prompts were effective conversation starters	34%	56%
It helped build a sense of community among my group	18%	57%
It improved my attitude toward team communication	15%	51%
It helped to enhance collaboration among my group members	13%	51%

THE CO-CREATIVE ACTIVITY

Improved collaboration in my group	32%	32%
Improved communication in my group	30%	43%

AND AFTER THE TOOLBOX

I now feel more capable of collaborating with individuals from different fields	15%	62%
I am better able to identify the research worldviews that are expressed by other people	14%	61%
I now have a better idea about how to communicate with individuals from different fields or disciplines	9%	61%



Thank you!

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