MICHIGAN STATE UNIVERSITY

TOOLBOX DIALOGUE INITIATIVE™

Integrating Interdisciplinarity with the Toolbox Dialogue Initiative

Michael O'Rourke
Toolbox Dialogue Initiative Center
Michigan State University
http://tdi.msu.edu/

Agenda

1. Executive summary
2. The Toolbox and professional development
3. The Toolbox dialogue method
4. The Toolbox Dialogue Initiative

Executive Summary

The Toolbox Dialogue Initiative (TDI) and its method

- TDI is a facilitation and research group that has spent 20 years working to enhance communicative and collaborative capacity in crossdisciplinary research teams, typically through professional development experiences
- We conduct dialogue-based workshops designed to enhance mutual understanding among collaborators about their research perspectives
- These workshops are built around a philosophical approach to structured dialogue known as the “Toolbox dialogue method”

The Toolbox and Professional Development

Professional Development

Distinguish professional development from education

- Think of *education* as a systematic program of learning designed to instill a breadth of knowledge and a range of skills and sensitivities
- Think of *professional development* as relatively brief, intense experiences that focus on skill development within specific professions

Interdisciplinary Development

Enhancing interdisciplinary professionals with the Toolbox

- Individual effect: increase what we call *interdisciplinary consciousness*,[1] which is associated with reflexivity and perspective taking and is marked by "cultivated sensitivities" that facilitate the production of interdisciplinary outputs from disciplinary inputs[2]

(1) Kjellberg, P. et al. (2018). Interdisciplinarity and the undisciplined student: Lessons from the Whittier Scholars Program. *Issues in Interdisciplinary Studies*. 36(1): 34–65.
(2) O'Rourke, M., et al. (2023). In Gosselin, D. C. (Ed.), *A practical guide for developing cross-disciplinary collaboration skills* (pp. 83-102). Cham: Springer.

Interdisciplinary Development

Enhancing interdisciplinary professionals with the Toolbox

- Team effect: increase *integrative capacity* understood as a characteristic of teams that enables them to "build effective communication practices, a shared identity, and a shared conceptualization of a problem space"[3]

(3) Salazar M.R., et al. (2012) Facilitating innovation in diverse science teams through integrative capacity. *Small Group Research.* 43(5): 527–58.

The Toolbox Dialogue Method

One Challenge Facing Interdisciplinary Teams

Collaborators from different cultures (e.g., disciplines, organizations) can struggle to communicate because they understand their common problem differently[4]

(4) 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.

The Root of the Challenge

The Problem of Unacknowledged Differences[5]

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[6]

(5) Hubbs, G., et al. (2020). *The Toolbox Dialogue Initiative: The Power of Cross-Disciplinary Practice*. Boca Raton, FL: CRC Press.
(6) Ross, L., et al. (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

A related difficulty: The "Captain Obvious" Problem

- It would help to know each other's core research beliefs and values, but these may seem obvious to us
- We are disincentivized from articu-lating things that seem obvious to us – no one wants to be Captain Obvious!

The TDI Response

IF

unacknowledged differences in language, belief and value compromise collaborative, interdisciplinary research

THEN

acknowledging differences and coordinating them can enhance communication and project integration

The Toolbox Dialogue Method

TOOLBOX DIALOGUE INITIATIVE ™

Structured dialogue in a workshop setting, with two parts:

1

Dialogue structured to make salient unacknowledged differences – specifically, core research beliefs and values

2

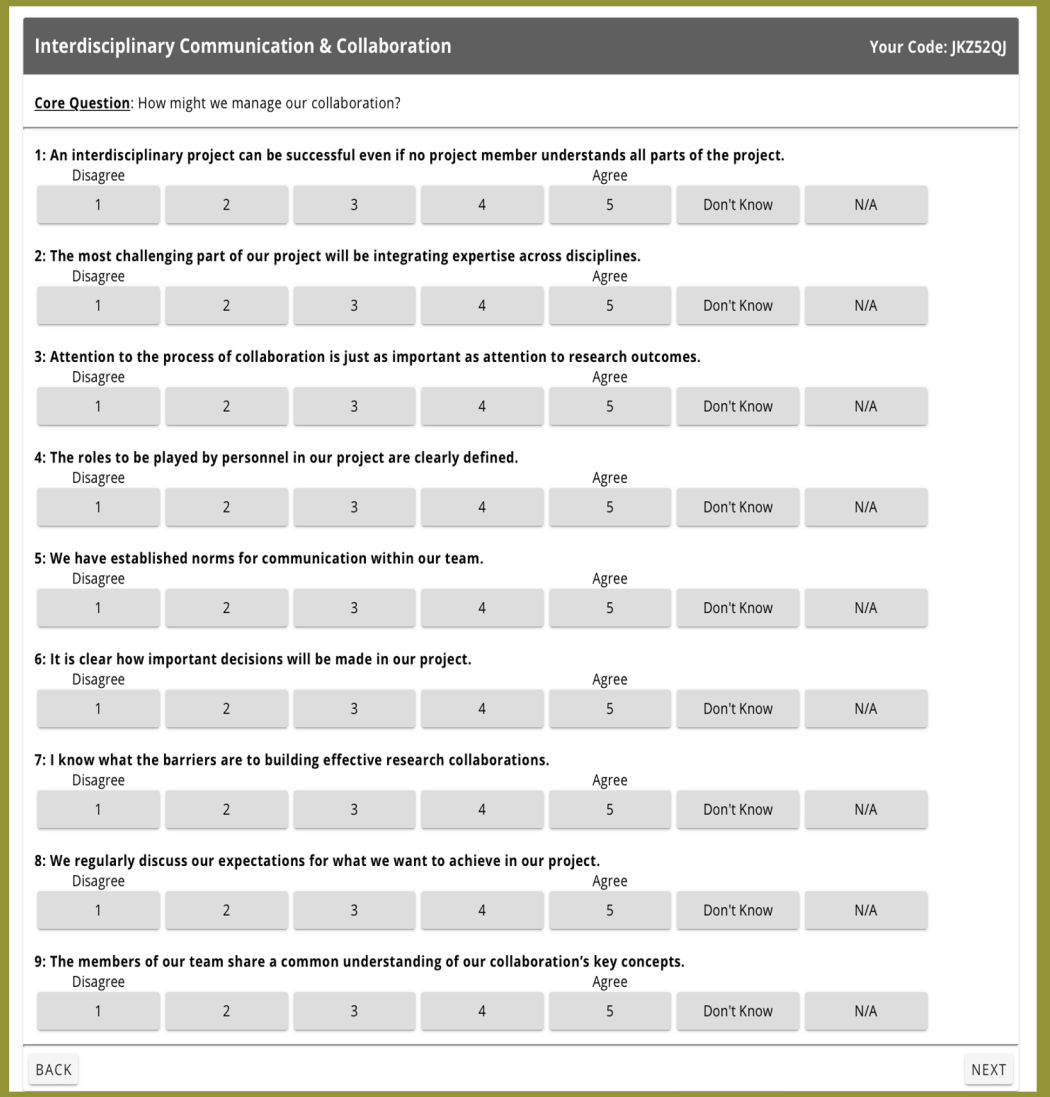
Co-creation activities leverage what is learned in dialogue

The Toolbox Dialogue Method

TOOLBOX DIALOGUE INITIATIVE ™

Structured dialogue

- Map the conceptual landscape of a project with dialogue prompts
- Encourage stance taking by using a rating response scale
- Collect prompts into a survey-style instrument divided into modules
- Discuss for 60-90 minutes



Interdisciplinary Communication & Collaboration — Your Code: JKZ52QJ

Core Question: How might we manage our collaboration?

1: An interdisciplinary project can be successful even if no project member understands all parts of the project.

Disagree — Agree

1	2	3	4	5	Don't Know	N/A

2: The most challenging part of our project will be integrating expertise across disciplines.

Disagree — Agree

1	2	3	4	5	Don't Know	N/A

3: Attention to the process of collaboration is just as important as attention to research outcomes.

Disagree — Agree

1	2	3	4	5	Don't Know	N/A

4: The roles to be played by personnel in our project are clearly defined.

Disagree — Agree

1	2	3	4	5	Don't Know	N/A

5: We have established norms for communication within our team.

Disagree — Agree

1	2	3	4	5	Don't Know	N/A

6: It is clear how important decisions will be made in our project.

Disagree — Agree

1	2	3	4	5	Don't Know	N/A

7: I know what the barriers are to building effective research collaborations.

Disagree — Agree

1	2	3	4	5	Don't Know	N/A

8: We regularly discuss our expectations for what we want to achieve in our project.

Disagree — Agree

1	2	3	4	5	Don't Know	N/A

9: The members of our team share a common understanding of our collaboration's key concepts.

Disagree — Agree

1	2	3	4	5	Don't Know	N/A

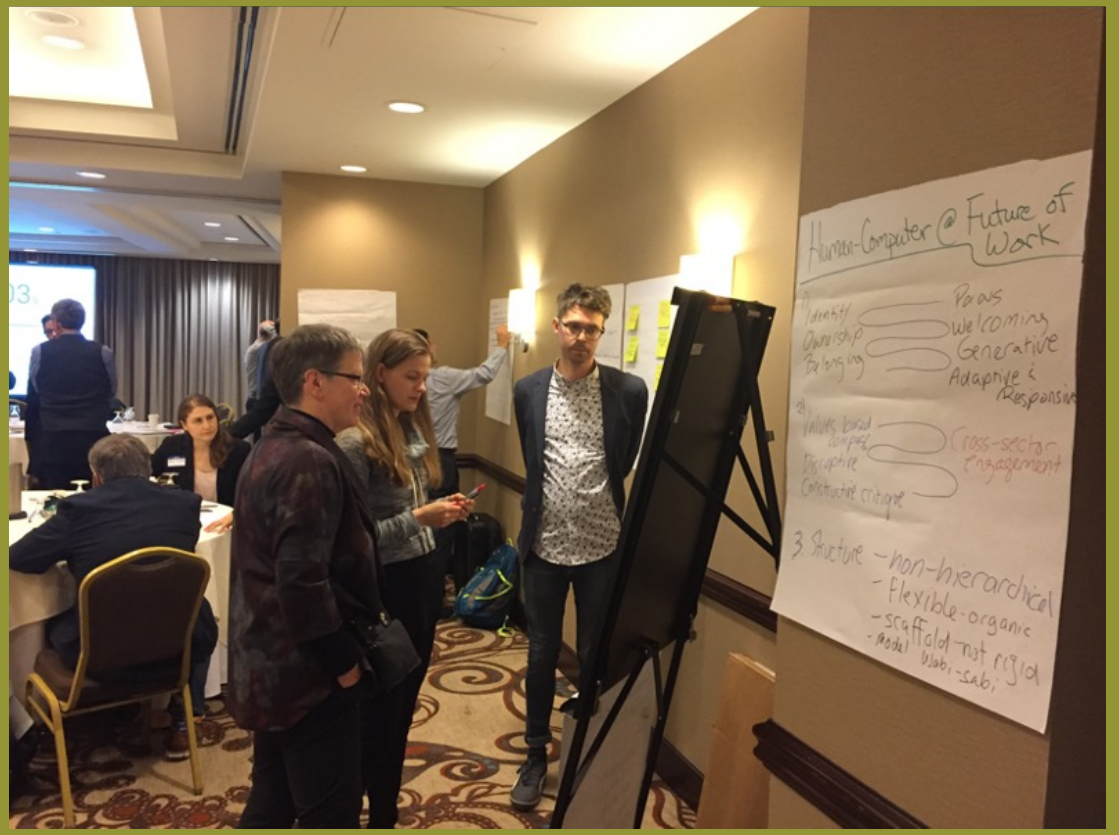
BACK NEXT

The Toolbox Workshop

TOOLBOX DIALOGUE INITIATIVE ™

Co-creation activity

- The dialogue should sensitize participants to differences in their research worldviews
- The co-creation activity captures these insights in a deliverable that can be used going forward (e.g., concept map, collaboration agreement, project glossary)



TDI Process: Facilitation

Philosophical Background

TOOLBOX DIALOGUE INITIATIVE ™

Grounded in philosophical concepts and methods

- *Concepts* from epistemology and philosophy of science identify core dimensions of scientific practice
- *Methods* abstract away from project details to common ground shared as scientists

Philosophical Background

TOOLBOX DIALOGUE INITIATIVE ™

Grounded in philosophical concepts and methods

- The philosophical framing supports reflexivity and perspective taking, which are correlated with effective teamwork

Learning Objectives

Individual learning objectives

Reflect on one's own norms, values, and core beliefs as they pertain to one's collaborative project

Recognize that things one takes to be obvious aren't – they may even be points of disagreement among collaborators

Learning Objectives

Team learning objectives

Identify and consider previously unacknowledged differences

Learn to take collaborators' perspectives to appreciate how the common project looks to them

Enhance mutual understanding to leverage differences in expertise and improve communication

The Toolbox Dialogue Initiative

TDI: Who We Are

TDI is a consulting and research group based TDI Center at Michigan State University

We facilitate collaborative capacity with partners around the world and investigate the practice of collaborative, crossdisciplinary research

A History of TDI

TDI Past to Present[7]

- An idea that emerged from graduate students in an IGERT project at the University of Idaho in 2005
- Received NSF funding in 2008 to develop the method
- Moved to MSU in 2012; funded by NSF, NASA, and others
- A diverse community of researchers from different universities in the US

(7) Hubbs, G. (2020). A narrative history of the Toolbox Dialogue Initiative. In G. Hubbs, et al. (Eds.), *The Toolbox Dialogue Initiative: The Power of Cross-Disciplinary Practice* (pp. 37–47). Boca Raton, FL: CRC Press.

A History of TDI

TDI Center – Co-Founders and Associate Directors

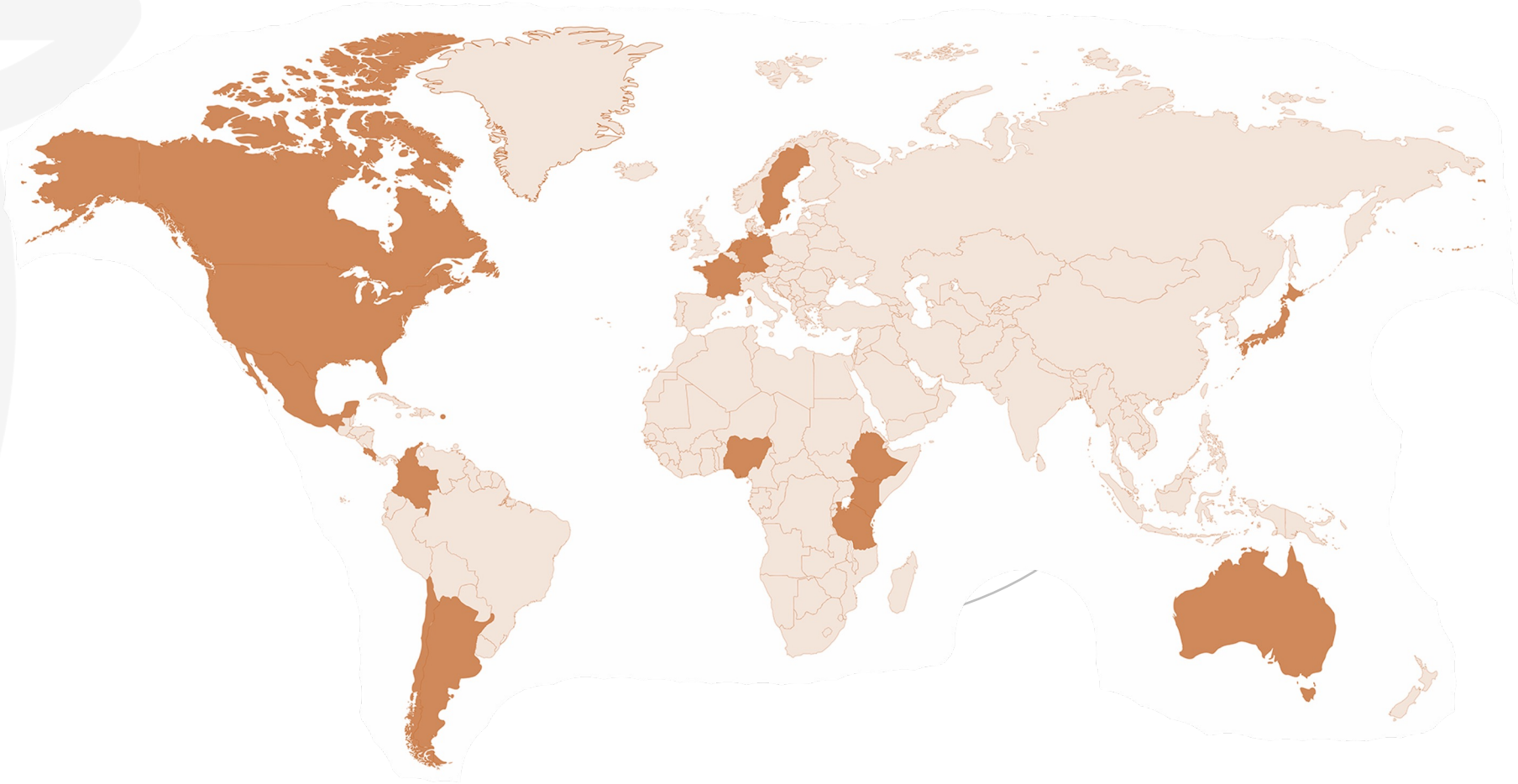
Edgar Cardenas, Ph.D.

Chet McLeskey, Ph.D.

Marisa A. Rinkus, Ph.D.

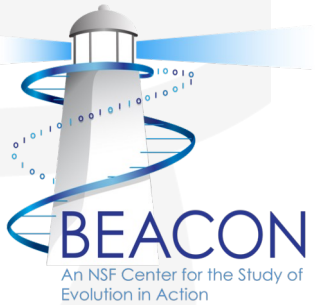
Workshop Experience

550+
workshops



TOOLBOX DIALOGUE INITIATIVE ™

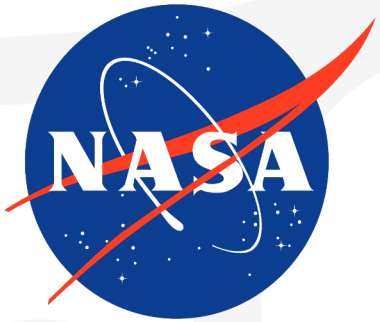
Many Partners



WOODS HOLE OCEANOGRAPHIC INSTITUTION

U.S. DEPARTMENT OF ENERGY

Pacific Northwest NATIONAL LABORATORY



PURDUE UNIVERSITY

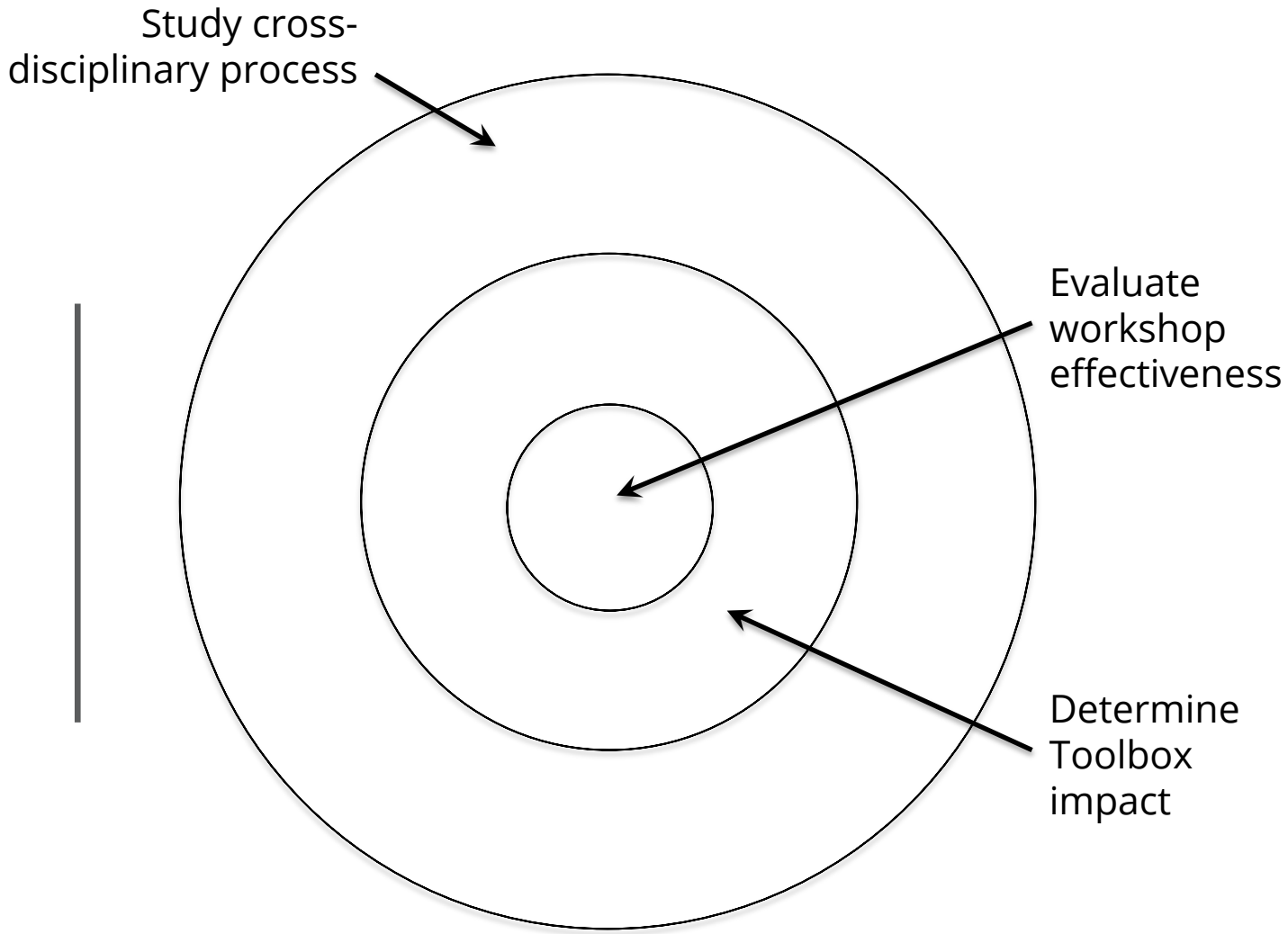
MICHIGAN STATE UNIVERSITY
AgBioResearch

Founding Partners

- Accelerating Research through International Network-to-Network Collaborations (AccelNet)
- Convergence Accelerator
- Growing Convergence Research
- Global Centers

- Heliophysics DRIVE Science Centers

TDI Process: Research



Evidence of Impact

TBM

PRACTICE TOOLS

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

Lynn M Schnapp, MD,[1] Liela Rotschy, MA,[2] Troy E Hall, PhD,[3] Stephen Crowley, PhD,[4] Michael O'Rourke, PhD[5]

[1]Division of Pulmonary and Critical Care, University of Washington, Box 358052, 850 Republican Street, Seattle, WA 98109, USA
[2]Department of Linguistics, The Ohio State University, Oxley 222, 1712 Neil Avenue, Columbus, OH 43210, USA
[3]Conservation Social Sciences, University of Idaho, PO Box 441139, Moscow, ID 83844-1139, USA
[4]Department of Philosophy, College of Arts and Sciences, Boise State University, 1910 University Drive, Boise, ID 83725-1550, USA
[5]Department of Philosophy, Michigan State University, 368 Farm Lane, Room 503, East Lansing, MI 48824-1032, USA
Correspondence to: M O'Rourke
orourk51@msu.edu

doi: 10.1007/s13142-012-0171-2

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.

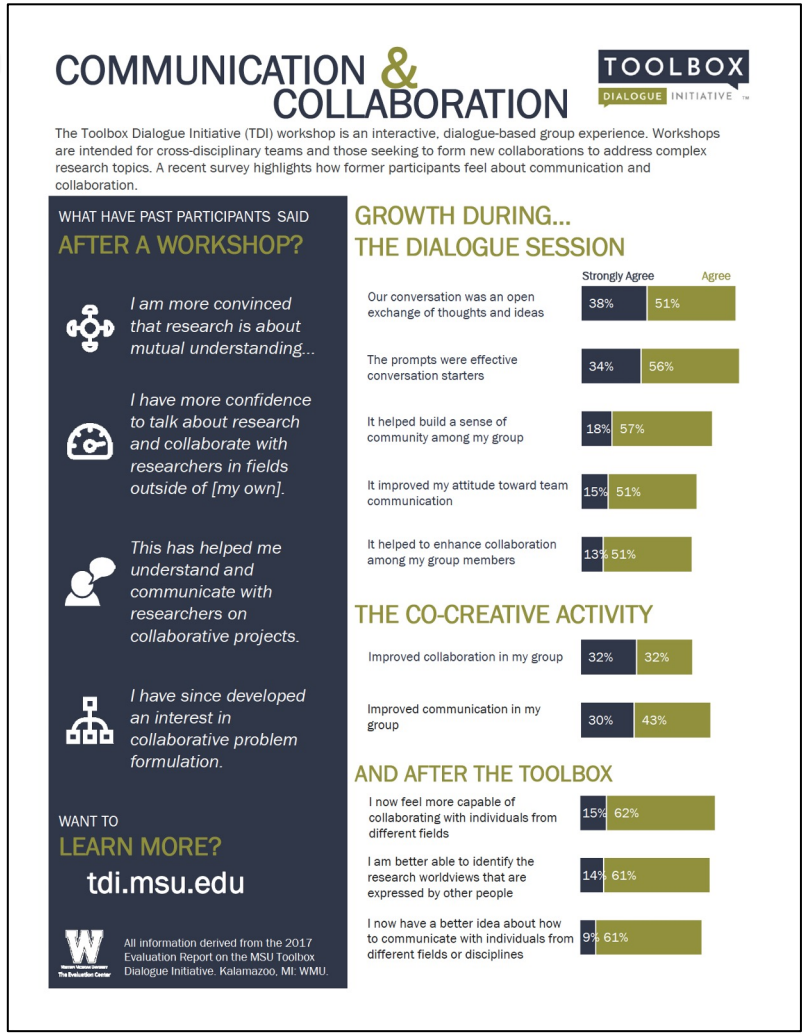
BACKGROUND
Addressing complex issues in translational medicine increasingly involves formation of cross-disciplinary teams. For example, development of strategies for smoking cessation may span cell/molecular-based research, epidemiology, and community implementation science. However, effective cross-disciplinary 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

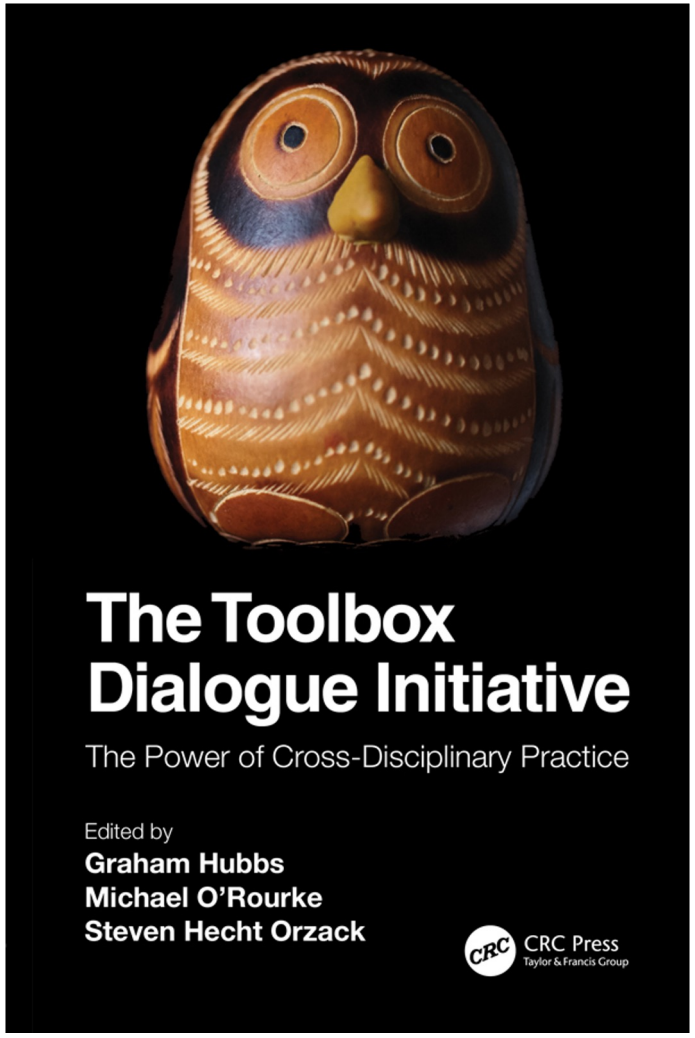
	Strongly Agree	Agree
Our conversation was an open exchange of thoughts and ideas	38%	51%
The prompts were effective conversation starters	34%	56%
It helped build a sense of community among my group	18%	57%
It improved my attitude toward team communication	15%	51%
It helped to enhance collaboration among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



MICHIGAN STATE UNIVERSITY

TOOLBOX DIALOGUE INITIATIVE™

Thank you!

orourk51@msu.edu
toolbox@msu.edu

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

MICHIGAN STATE UNIVERSITY

TOOLBOX DIALOGUE INITIATIVE™

Image Credits

- Slide 3: https://www.chronicle.com/article/the-case-for-requiring-professional-development
- Slide 4: https://www.chronicle.com/article/the-case-for-requiring-professional-development
- Slide 10: https://www.simplysv.com/blog/be-captain-obvious
- Slides 13-16: Toolbox Dialogue Initiative, Michigan State University, East Lansing, MI 48824