

Trans-Disciplinary Communication for Policy Making: A Reflective Activity Study

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Abstract¹

This paper reports on a workshop conducted at the NSF's 2023 Eddie Bernice Johnson, INCLUDES National Network Convening: Sustaining Equity-Driven Systems Change, held in Washington, DC, from August 2-4, 2023. Titled "Enhancing Inclusivity through Expertise Sharing: A Reflective Group Activity on Effective Policy Development," the workshop employed Trans-Disciplinary Communication (TDC) as a methodological framework. Participants represented a cross-section of academia, nonprofits, federal agencies, and the general public, focusing on STEM Education, diversity, equity, and inclusion (DEI), and traditionally underrepresented groups (TUG). The paper delineates the protocol for eliciting robust participation and facilitating knowledge sharing. Subsequently, it scrutinizes the outcomes of these interactive discussions, culminating in an analysis of the broader implications of the activity. A significant finding emphasizes the pressing need for greater dissemination and divulgation by successful programs. A pivotal question underpinning this study is: How can Trans-Disciplinary Communication (TDC) be operationalized to foster equitable and innovative policy development in STEM fields? This inquiry fosters actionable steps and constructive dialogue toward achieving equity-driven systems change.

Keywords: *Trans-Disciplinary Communication (TDC), Policy Making, Inclusivity, Knowledge Sharing, Reflective Activity, Qualitative Document Analysis, Constructivist Grounded Theory (CGT)*

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1. Introduction and methodology

1.1 Context and Rationale

Transdisciplinary Communication (TDC) is a pivotal strategy for counteracting the compartmentalization commonly observed in academic and policy-making spheres. This paper emanates from a workshop entitled "Enhancing Inclusivity Through Expertise Sharing," a segment of the NSF Eddie Bernice Johnson INCLUDES National Network Convening held in Washington, D.C., from August 2 to 4. This high-impact forum was designed to tackle issues of equity and inclusivity within STEM disciplines. Our workshop endeavored to further these objectives by fostering an inclusive culture by applying Transdisciplinary Communication (TDC). The TDC approach aspires to dismantle disciplinary silos, enriching dialogue and ensuring that a multitude of perspectives is considered in policy development.

1.2 Workshop Objectives

The precise goals of our workshop were carefully formulated to align with the broader objectives of the NSF INCLUDES conference. The central aim was to foster an environment promoting knowledge exchange among attendees, such as NSF INCLUDES award winners, federal agency delegates, and individuals from nonprofit sectors. Transdisciplinary Communication (TDC) was employed as the underlying approach to encourage constructive discussions about policy formulation to realize this goal.

1.3 Methodological Approach for Active Participation

To actively engage our participants, we adopted a series of protocols to foster an environment conducive to meaningful dialogue. A cornerstone of our methodological approach was utilizing a co-design framework informed by Dr. Jim Lipuma's contributions. This co-design methodology was vital to nurturing an inclusive and knowledge-rich environment. The unique aspect of this approach was

the embracement of inherent uncertainties associated with collaborative work. Cárdenas-Claros recommends: 'Recognizing that each participant brings a unique perspective allows for a more inclusive dialogue' (2015). Therefore, the co-design approach sidesteps the pitfalls of traditional methodologies that often impose predefined answers to complex problems.

1.4 Operationalizing TDC for Equitable Policy Development in STEM

A pivotal question for the paper was: How can Trans-Disciplinary Communication (TDC) be operationalized to foster equitable and innovative policy development in STEM fields?

Transdisciplinary Communication (TDC) can be operationalized to advance equitable and innovative policy development in STEM fields by examining the elements of communication, language, and collaboration. TDC delves into language and coding as essential to effective communication, engendering novel innovation models (León & Lipuma, 2022). Understanding the primary objective of TDC—to promote cross-disciplinary collaboration and knowledge creation—is crucial (Callaos, 2022). Within university language policies aimed at equity in STEM education, TDC can be employed to scrutinize and formulate policies that tackle power imbalances, diversity issues, and access to STEM knowledge (Le Roux et al., 2021). Moreover, the professional doctorate can be a learning avenue for STEM professionals to enrich their practice through TDC, encouraging trans-professional engagement and evolving an authentic professional voice (Dikilitaş, 2016). By integrating TDC into policy formulation, STEM fields can promote equitable access, educational attainment, and innovation.

2. Theoretical frameworks and tools

2.1 Four Pillars of Expertise

In crafting the workshop, we segmented expertise into four main pillars: formal education (certifications, degrees, and training), practical experience in real-world settings, discipline-specific technical skills, and transdisciplinary skills such as communication. This categorization served as a theoretical framework for participants to articulate their domain of expertise and thus facilitated a more nuanced exchange of knowledge.

2.2 Didactic Sequence and Structuring Dialogue

We employed a didactic sequence model as a pedagogical strategy to structure the workshop. By focusing on the concept of expertise, we tapped into the inherent wisdom of the diverse attendee pool. This methodological choice aligned well with ongoing research in areas beyond Transdisciplinary Communication (TDC), enriching discussions around various forms of expertise. To guide the dialogue without stifling its organic flow, we provided participants with 'buckets,' or categories of expertise, as a framework. Furthermore, we incorporated a "Show and Tell ESL Activity for Adults" (Bolen, 2023) as an innovative way to elicit participant engagement and enrich the workshop's collaborative dialogue. This structural approach offered the necessary guidance to keep conversations both directed and open. The success of this approach served as a proof of concept for future iterations of this workshop that will integrate the 'World Café' method. According to Brown et al. (2005), the World Café is a flexible, easy-to-use process for fostering collaborative dialogue, sharing mutual knowledge, and discovering new opportunities for action.

2.3 Tools and Techniques for Engagement and Visualization

To further catalyze engagement, we deployed tools and techniques designed to visualize complex relationships and encourage active participation. Mind-mapping exercises, facilitated through color-coded post-it notes, proved especially effective. These techniques helped elucidate the intricate network of alliances and stakeholders and identified systemic challenges that required collective attention.

It is imperative to note that our objective extended beyond the immediate generation of solutions. We aimed to cultivate an intellectual landscape where the seeds of collaborative ideas could be sown. This approach aligns with the understanding that the fruition of impactful solutions often requires iterative discussions, allowing stakeholders to reconvene and refine their strategies based on the collective wisdom garnered.

3. Activity design and implementation

3.1 Encouraging Active Participation

We designed a 'didactic sequence' of group activities in collaboration with Dr. James Lipuma, Director of the Collaborative for Leadership, Education, and Assessment Research (CLEAR) at the New Jersey Institute of Technology. This strategy was explicitly crafted to foster an environment conducive to expertise sharing. It aimed to stimulate discussion and encourage participants to draw upon their unique skills and knowledge. In this way, active participation was not merely encouraged but was structurally integrated into the framework of the workshop activities.

3.2 Co-Design Approach and Embracing Uncertainty

The methodological linchpin of our workshop was the Collaborative Co-Design approach. Using easily accessible tools like Post-it notes, we were able to scaffold a participatory environment where each attendee could contribute their perspectives. It should be noted that the co-design process inherently accommodates uncertainty, a necessary ingredient for fostering genuine dialogue and emergent strategies. The outcome was a unified approach to problem-solving that was collectively developed and adapted to the multifaceted expertise present.

3.3 Visualization and Collaborative Problem-Solving

We implemented various visualization techniques to augment our co-design approach to facilitate collaborative problem-solving. These mechanisms served as cognitive aids and discussion triggers, enabling a more nuanced understanding of the challenges and opportunities. Visual representations created a shared point of reference for participants, thus paving the way for actionable solutions born from collective wisdom.

4. Analysis and outcomes

4.1 Activity Outcome and Encouraging Participation

Our workshop activities successfully engaged participants in meaningful dialogues. We ensured the participants could freely express their viewpoints by employing anonymous mechanisms. This created an atmosphere conducive to uninhibited dialogue, aligning with our goal of fostering an inclusive and participatory environment.

4.2 Unanticipated Outcomes and Fluidity

Despite the structured approach we provided, the dialogues took an organic trajectory that deviated from our intended path. The participants' choices underscored the inherent unpredictability associated with co-design methods, a facet we interpret as both a challenge and an opportunity to foster authentic engagement.

4.3 Impact of TDC on Workshop Activities

Transdisciplinary Communication (TDC) played an instrumental role in enabling the workshop to harness a broad spectrum of expertise. With participants ranging from federal agents to representatives from nonprofit organizations, TDC served as an effective medium for facilitating a multifaceted dialogue. This contributed significantly to enriching the quality and scope of the discussions.

4.4 Classifying Resources and Fostering Critical Discussion

During the post-activity phase, we prompted participants to classify resources as either internal or external and to specify which among them they would be willing to share. This exercise, followed by critical discussions, encouraged attendees to question their assumptions and biases. The resultant presentations from various groups highlighted a range of diverse approaches to solving similar challenges.

4.5 Internal vs. External Resource Allocation

We observed two predominant strategies concerning resource allocation. One set of groups opted to leverage internal resources, such as institutional expertise and pre-existing programs. In contrast, others prioritized external resources like community partnerships and federal grants.

5. Policy and institutional implications

5.1 Policy Development and Complexities

The workshop was a revealing platform for unpacking the complexities inherent in policy development to achieve equity-driven systemic change. It offered a deep dive into the multifaceted decision-making processes at the National Science Foundation (NSF), particularly those relevant to solicitation 22-622 and the Bernice Anderson 'Includes Initiative.' The workshop illuminated the internal mechanisms within NSF and participant organizations, emphasizing the challenges of translating policy objectives into actionable steps. This complexity underscores the necessity for a transdisciplinary approach that actively engages stakeholders across disciplines from the conceptualization phase to the execution stage. It further highlighted the occasional disparity between the intent of a policy and its real-world implementation, emphasizing the critical importance of formulating sound policy directives that are both equitable and effectively executed.

5.2 Organizational and Resource Challenges

A prominent observation during the workshop concerned the participating organizations' unilateral focus on internal or external resources. This narrow approach highlights a deficiency in current policies and advocates for a more balanced strategy incorporating both types of resources. Jim noted a pronounced disconnect between policymakers and stakeholders. To bridge this gap, a proactive, two-way dialogue is essential for authentic policy co-creation, going beyond simply uploading reports to platforms such as those offered by the NSF.

5.3 Cultural and Social Considerations in Policy Change

The workshop also brought to light the imperative of understanding heterogeneity in policy-making. A one-size-fits-all approach is infeasible when dealing with diverse equity groups, thus necessitating the development of tailored policies.

Additionally, the ongoing efforts to translate our work into Spanish aim to extend its reach beyond linguistic and cultural boundaries. This endeavor serves as an exercise in semantic nuance and highlights the role of Trans-Disciplinary Communication (TDC) in overcoming such barriers.

6. Case Studies and Special Topics

6.1 Real-world Implications and Challenges

Navigating the complexities of equity and inclusion presents dual challenges. As the adage in Spanish cautions—akin to its English counterpart, "The road to hell is paved with good intentions"—organizations like the NSF, despite their earnest objectives, may inadvertently perpetuate disparities. The paradox of systemic change further complicates matters, as existing policies may be both the problem and functional for particular stakeholder groups. The evaluation of a system's effectiveness thus becomes a multifaceted exercise, requiring the consideration of diverse perspectives, such as the criminal justice system, which, while criticized by some, serves essential societal functions.

6.2 DEI Missteps and Varying Circumstances

The Harvard case is a compelling illustration of the challenges inherent in implementing Diversity, Equity, and Inclusion (DEI) initiatives. Recent legal challenges to the university's race-conscious admissions policies have raised serious concerns about the future of affirmative action in higher education (Liptak, 2021; Liptak & Hartocollis, 2022). Such diversifying efforts have led to reported injustices against specific communities, thereby inviting a thorough examination of the methodologies underlying DEI initiatives. Beyond elite academic institutions, public and state universities face their own set of unique challenges, cautioning against the application of a one-size-fits-all approach. Additionally, the influx of undisclosed funding, commonly called "dark money," in public universities

complicates DEI efforts by raising questions about the sincerity and potential exacerbation of existing inequalities.

The imperative of implementing a diversity strategy extends to various organizations aiming to achieve their objectives in equity, inclusion, and accessibility. Scholarly publishers and information organizations increasingly incorporate Diversity, Equity, Inclusion, and Accessibility (DEIA) initiatives into their strategic goals, though progress tends to be slow and incremental (Krulatz & Christison, 2023). In the realm of multinational companies (MNCs), advancing the Equality, Diversity, and Inclusion (EDI) agenda necessitates a two-step framework that involves rethinking notions of diversity and differences, as well as promoting a mutual effort to leverage diversity (Wells Ajinkya et al., 2023). Utilizing quality management principles in a Diversity, Equity, Inclusion, and Belonging (DEIB) strategy can enhance an organization's competitive standing and generate stakeholder value (Ciuk et al., 2022). Teachers' perceptions of DEI significantly influence their pedagogical and curricular approaches within music education, underscoring the need for more comprehensive DEI practices and policies in music classrooms (El-Amin, 2022).

6.3 Storytelling in Trans-Disciplinary Communication

In trans-disciplinary communication (TDC), storytelling is a potent tool for fostering broader engagement. For example, California's emergent role in responsible AI governance illustrates well-intentioned policies' potential and unintended consequences (Nonnecke, 2022). Stories like these offer a more accessible form of discourse, enabling stakeholders, ranging from policymakers to the general public, to comprehend complex policy issues. Furthermore, initiatives such as the UC Berkeley Center for Long-Term Cybersecurity's briefing on AI governance provide compelling narratives that articulate the intricacies of technology policy. These stories create an accessible framework for understanding high-stakes, complex issues, serving as cautionary tales or aspirational models. It is particularly noteworthy that states often act more swiftly than federal bodies,

highlighting the efficacy of local governance stories in shaping broader policy directions.

7. Leveraging TDC for policy-making

The preceding discussion on storytelling in TDC lays the groundwork for understanding its utility in broader policy-making contexts. It is crucial to articulate how TDC can explicitly connect to more significant policy issues, such as those surrounding AI governance. For instance, the narratives from California can serve as instructive case studies that guide federal policy, mainly because states often have more agile regulatory processes. By disseminating these localized stories, TDC can play a significant role in knowledge-sharing and expertise distribution, thus influencing both local and global policy dialogues. This creates a fertile ground for implementing more equitable and effective policies that can adapt to the rapid developments in fields like AI.

8. Conclusion and future directions

8.1 Reconceptualizing Policy Approaches

This study elucidates organizations' critical challenges when integrating individual diversity, equity, and inclusion (DEI) initiatives into a broader systemic framework. Traditional policy paradigms and isolated DEI initiatives fail to provide a comprehensive solution for harmonizing internal and external resources equitably. In this context, Trans-Disciplinary Communication (TDC) emerges as an indispensable tool. To directly answer the question, TDC can be operationalized to foster equitable and innovative policy development in STEM fields by adopting a multi-stakeholder approach. This involves assembling interdisciplinary teams composed of policymakers, educators, STEM professionals, and community members to engage in dialogue, collaboratively develop policies, and ensure that

varying perspectives and expertise are integrated. Moreover, TDC can be augmented by digital platforms that enable broader participation and real-time feedback, thus making the policy development process more dynamic and responsive to emerging challenges and opportunities. This strategy facilitates knowledge sharing and engenders a sense of shared ownership and accountability among all stakeholders, thereby driving equitable and innovative outcomes.

For instance, when developing a policy to improve representation in STEM, a TDC approach could ensure that social scientists, ethicists, and community organizers' perspectives are integrated with those of scientists, engineers, and policymakers. Each stakeholder brings a unique lens—be it the understanding of systemic biases, ethical considerations, or grassroots-level challenges—that can enrich the policy's effectiveness and inclusivity.

Moreover, technology can amplify the impact of TDC. Digital platforms can serve as virtual town halls, facilitating contributions from stakeholders who might not otherwise have a seat at the table, thus democratizing the policy formulation process. They can also provide analytics and real-time feedback mechanisms, making refining policy measures based on evidence and community input iteratively easier. Operationalizing TDC in policy-making is not merely about interspersing different areas of expertise. It's about creating a cohesive, iterative, and inclusive framework that leverages each discipline's strengths to develop equitable and innovative policies. This approach fosters a culture of collaborative problem-solving, which is essential for tackling complex issues in STEM education and beyond.

8.2 The Value of Diverse Networks and Future Directions

Our findings emphasize the considerable value of diversifying networks beyond specialized circles like NSF Includes. Presenting these insights at the inaugural meeting of the International Association for TDC creates a platform for future scholarly contributions. Viewed through a business administration lens, the absence

of 'policy persons' within many organizational contexts reveals a critical gap, calling for new initiatives, studies, or articles focused on strategic communication, leadership, and resource optimization.

8.3 Acknowledgments and Future Prospects

The contributions of this interdisciplinary team, bolstered by the NSF Includes Network and mentors such as Dr. Nagib Callaos, establish a solid foundation for research aimed at broader societal impact. As the dialogues draw close, participants express their emotional and moral investment in confronting systemic inequities. Crafting universally beneficial policies—especially in institutionally diverse settings like New Jersey—reinforces the need for sustained engagement and dialogue among various stakeholders.

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10. Resources

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