

“What we see in the In-Between”: navigating ethics and equity in the role of leading research projects with Alaska Native communities

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Abstract

As 13 leaders in research with Alaska Native communities, we came together in a workshop to self-define the role of boundary spanners within our cross-cultural contexts. We utilized convergence methods and participatory decision-making facilitation. Reflecting on chronic challenges and current issues of trying to do co-production of knowledge, our group discussed the boundary spanner role and how to create systemic change. We represented different career stages, gender identities, Indigenous and non-Indigenous peoples, ages, backgrounds, and job positions. We wrote this paper to illustrate positive and negative aspects of this role as framed in a typical career journey. The role is often not sustainable, includes a degree of conflict, and lacks support. We recognize that boundary spanners can act as enablers of boundaries. Healing is often interwoven with Indigenous and individual self-determination. Our workshop ended with the development of strategies to create systemic change through mentoring the next generation and addressing funding inequity and the cultural divide between communities and science/policy. A key concept from the workshop is the rejection of the term “boundary spanner”, because ideally, there should not be one individual doing the spanning duties, but everyone within the science/policy sphere working to dismantle boundaries.

Key words: boundary spanner, boundary spanning, Arctic Indigenous peoples, Alaska Native, Arctic research, equity, science-policy

Introduction

This research presents outcomes from a boundary spanners workshop in Anchorage, AK, 3–4 November 2022. As 13 workshop participants representing leaders in working with Arctic Indigenous communities, our co-author team gathered and recognized our shared motivations and experiences. In discussing the multilevel issues, our research question quickly shifted from “What are the roles of boundary spanners?” to “How do we achieve systemic change for a better Arctic research space?” While this research does touch on defining roles of boundary spanners, the expansion to envisioning an equitable, ethical Arctic research ecosystem highlights our roles as leaders in the field.

Boundary spanner literature defines the role as being between science-policy boundaries to support “evidence-informed decision-making” (Bednarek et al. 2018). Co-production of knowledge (CPK) also has roots in policy with

the concept of co-producing public services. CPK blends with participatory research approaches to create a sense of shared ownership with the users through shared decision-making, resulting in outcomes more likely to be used (Bremer and Meisch 2017; Djenontin and Meadow 2018; Norström et al. 2020). The CPK literature cites utilizing boundary spanners and boundary organizations that have already established relationships (Lemos et al. 2018). CPK and boundary spanners are still emerging fields with evolving definitions (Goodrich et al. 2020; Chambers et al. 2021; Yua et al. 2022), both of which are susceptible to being co-opted and used in ways that were not originally intended (i.e., not “walking the walk”). With CPK being a trending research topic in Arctic research (National Science Foundation 2018; Yua et al. 2022), this research starts to fill a gap in understanding the role of boundary spanners in the context of working with Alaska Native communities.

CPK and boundary spanning with Indigenous peoples differ from the bulk of mainstream scientific literature because of the context of colonization and systemic inequity (Kovach 2009; Smith 2012). Yua et al. (2022) present a CPK conceptual model for working with Alaska Native communities. Instead of focusing on utilization (Dilling and Lemos 2011; Wall et al. 2017), the Yua et al. model focuses on equity. The model layers the CPK approach with Indigenous and critical methodology elements, including decolonization, sovereignty, trust and respect, relationships, empowerment, means and ability, capacity, deliberate and intentional, and ethical. These elements must be part of a project with Alaska Native communities to achieve CPK. Tensions have arisen around these elements within the National Science Foundation's (NSF) Navigating the New Arctic (NNA) program (National Science Foundation 2019), with formal criticism from Indigenous leaders of western Alaska (through two letters sent to NSF; Bahnke et al. 2020, 2021). Tensions within NNA offer a point of reflection on how to do CPK equitably and effectively with Alaska Native communities, and we describe additional points in this article.

I, Rudolf, hosted and facilitated a 2-day workshop for 13 participants (including myself as a participant researcher (Wilson 2008)) to support self-definition of the "boundary spanner" role. In recognizing purposeful self-definition, this article is written in first person with "I" for the lead author, Rudolf, and "we" instead of the participants (co-authors). To support self-expression and not a comparison, I did not share boundary spanner literature prior to the workshop. Instead, I simply included some key concepts from the literature in meeting materials, so participants could incorporate them into our discussion if they fit. Our results here present workshop outcomes, while the analysis section compares the outcomes to the boundary spanner literature.

Authorship

Margaret Rudolf led this article's research and writing as part of her doctoral dissertation research. The work represents a CPK project and the collective knowledge of the co-authors listed below. The "Contributors" listed below provided meeting materials with their perspectives on the boundary spanner role but did not participate in the workshop.

Contributors—The following provided meeting materials: (1) Sarah Trainor, University of Alaska Fairbanks, Alaska Center for Climate Assessment and Policy (ACCAP); (2) Roberta Glenn, University of Alaska Fairbanks, Alaska Arctic Observatory & Knowledge Hub; (3) Julie Raymond-Yakoubian, Kaverak, Inc.; (4) the late Craig George, retired, North Slope Borough Department of Wildlife Management; (5) Alex Whiting, Native Village of Kotzebue; and (6) Matthew Druckenmiller, University of Colorado Boulder.

Positionality

Below are the positionality statements of the co-authors including their background relevant to boundary spanning.

Eva Dawn Burk is Den'a Athabascan from Nenana and Manley Hot Springs in Interior Alaska. She grew up commercial fishing, is a subsistence fisherwoman, and leads her community's annual fish camp in Nenana. Eva Dawn has a background in engineering and environmental studies and is about to complete a Master of Science in Natural Resources and Environment at the University of Alaska Fairbanks, focusing largely on how to build community resilience by strengthening human and social capital through education, outreach, and engagement. She works for her tribes and communities, serving on multiple boards that create policy and regulations that affect Alaska Native subsistence rights. In partnership with Native Movement, she founded Tlaa Deneldel Community Group to build an Indigenous learning and healing center focused on land stewardship, food sovereignty, and community wellness through cultural revitalization. Eva Dawn is a mother of four and leads her family's work of hosting traditional gatherings to strengthen community relationships, connect to place, and revitalize local food systems.

Craig Chythlook is originally from the Bristol Bay region in southwest Alaska. His parents are Joe and Molly Chythlook from Dillingham, AK. Craig has spent his life fishing for salmon on the waters of Bristol Bay and his current work is looking at what evaluation criteria are used to measure success in fisheries policy, salmon management, and to utilize Indigenous values and place-based knowledge into resource management decision-making. Craig graduated from the University of Alaska Fairbanks with a business administration degree and a minor in rural development and is now finishing up an MS degree in Indigenous fisheries governance in the Tamamta program, housed in the College of Fisheries and Ocean Science at the University of Alaska Fairbanks. Craig's research interests include how Western fisheries policy and management can better include Indigenous and place-based knowledge into state and federal decision-making spaces, regarding salmon/resource management.

Lauren Divine identifies as a white, middle class, American academic woman from Tybee Island, Georgia, the ancestral homelands of the Mvskoke (Muscogee), Yamasee, and Gule. Her ancestry is Irish and German Swiss. She has had the privilege to live and work as a guest on Unanga, Dënëndeh, Tanana, and Dena'ina lands and waters since 2011, longer than she has lived anywhere else in her lifetime. At the time of the project, she worked for the Tribal Government Aleut Community of St. Paul Island. She recognizes her role as an "in-between," neither wholly within nor external to the community of St. Paul Island, and acknowledges her own identity and positionality can influence all aspects of research, including the questions, study design, data collection, and data analysis. She strives to respectfully operate through an Indigenous lens to realize positive benefits to the Indigenous communities she works with.

Kaare Sikuaq Erickson was fortunate to be raised in several communities on the west coast of Alaska. Learning how to provide for family and community under the guidance of family and community members is a special gift that is central to Sikuaq's identity. While earning degrees in Anthropology, Sikuaq started a family with his wife Roxanne leading to Kaia, Chanel, and Keok. Sikuaq worked dozens of jobs, many

for his Native corporations (Arctic Slope Regional Corporation and Ukpeaġvik Iñupiat Corporation), including a job providing logistical support to Arctic scientists. Sikuaq jumped on this opportunity to utilize his upbringing and education to develop outreach and engagement programs in northern Alaska. In 2021, Sikuaq founded Ikaagun Engagement. Ikaagun means “bridge” or “someone that brings you across an impassable divide” in Inupiaq. The central focus of Ikaagun is to be a cultural bridge between parties outside rural Alaska, with parties in rural Alaska, when it is necessary. This means working with a complicated web of entities, researchers, organizations, local leaders, and community members to help them see eye-to-eye and foster good relations. Sikuaq takes his work very seriously and focuses on meaningful, impactful, efficient, and effective results.

Janessa Esquible is Anishinaabe (Bkejwanong—Walpole Island First Nation, Crane Clan) and Mexican-American and resides in Waawiyatanong (nearby Detroit, Michigan). She has a background in fisheries with expertise in fisheries governance, Tribal harvest monitoring programs, Indigenous youth engagement in fisheries research, Indigenous research methodologies, and community-engaged research. In her various roles working for Tribes, Nations, and Tribal Consortia, with the university and international commissions, she has served as a bridge, facilitating and strengthening connections between Indigenous communities, Indigenous and non-Indigenous governments, agencies, and organizations.

Elizabeth Figus is a white American social scientist of Polish ancestry born in Minneapolis, Minnesota, the ancestral homelands of the *Očhéthi ŠakówiK and Wahpekute peoples*. She is a settler in Southeast Alaska, where she has lived and worked on *Lingít Aaní (Tlingit lands)* since 2012. Figus conducts community-based projects and research focused on natural resource management, climate adaptation, and workforce development. She has a background in fisheries management and also fishes commercially in Southeast Alaska.

Karli Tyance Hassell is Anishinaabe from Kiashke Zaaging Anishinaabek and humbly resides in Dena’ina Ełnena. She has a background in environmental science, with expertise in fisheries/policy, and often serves as a conduit between people, places, and worldviews. She centers traditional values and community-based priorities in work related to Indigenous data sovereignty and management, and the science-policy interface for long-term sustainability, strengthened tribal decision-making, and equitable advocacy.

Krista Heeringa is non-Native with mixed European ancestry. Her lifelong home is Fairbanks on the ancestral homelands of the Lower Tana Dene people. Her educational and professional background is in community development and planning with a specific focus on Tribal climate adaptation. In this role, she focuses on creating and supporting spaces where Indigenous voices can share and learn from one another and benefit from relevant climate science and research.

Adelheid Herrmann is of Dena’ina Athabascan and German descent. She was born and raised in the Bristol Bay area in southwestern Alaska. In the 1990s, she worked on a Liberal Arts degree completion program at Antioch University in Seattle, Washington and received her bachelor’s degree in Public Policy, Fisheries, and Native Studies in 1999. In May

of 2013, she received her Doctor of Education degree in Organizational Leadership with an emphasis in Fisheries and Oceans from the University of La Verne in La Verne, California. In 2019, she began postdoc work for the ACCAP and has now transitioned to a Senior Research Professional position working on climate adaptation and resilience issues for ACCAP. She is a member of the National Academies of Science Polar Research Board. Her life’s work has been a continuous journey of advocacy for Alaska Native and rural Alaskan people.

Henry P. Huntington is a non-Native social scientist, from the Northeast of the USA, and has over 35 years’ experience working in and with Alaska Native and other Arctic Indigenous communities, particularly concerning aspects of human–environment interactions. He lives in Eagle River, Alaska. Much of his work has involved connecting Indigenous and academic ways of knowing and presenting information, to foster better mutual understanding.

Mellisa Johnson, an Indigenous Independent Contractor, grounds her work in the values, knowledge systems, and lived experiences of her community while bridging across scientific, policy, and governance spaces. She strives to ensure that Indigenous voices and priorities are centered in decision-making processes that shape fisheries, ecosystems, and community well-being. Her past work as a boundary spanner has required her to build trust, foster dialogue, and carry perspectives between Tribal, state, federal, and academic partners. Moving forward, she wants to continue leveraging these skills to create more inclusive and equitable frameworks for governance, while advancing pathways for Tribal sovereignty, youth leadership, and climate resilience.

Margaret Rudolf’s Inupiaq name is Anamaq. Her family originally comes from King Island, but she grew up in Fairbanks and Anchorage. Her educational background is in permafrost and engineering, with her interdisciplinary Ph.D. obtained in 2023 in CPK. Her previous relevant professional activities included serving as an Indigenous liaison and providing permafrost science communication and education. She researches Arctic research, including research prioritization, merit review and evaluation metrics, research processes, funding systems, and research culture changes. Her work is driven to support Indigenous self-determination and supporting Indigenous-led research, as well as improving academia to be more inclusive, open to multiways of knowing and doing research, and actionable.

Harmony Wayner is a tribal member of Naknek Native Village in Bristol Bay and of mixed Nordic and Indigenous descent. She was raised in some of the largest fishing ports in the United States and the world, and continues to fish commercially for salmon while also being trained as a fisheries scientist and resource manager. Having spent many years studying, working, and reconnecting with her roots across both the Nordic region and Alaska, her work focuses on communication across worldviews, jurisdictions, and political structures. She has previously worked in Arctic youth mentorship and research, and currently serves as the network coordinator for the Western Alaska Landscape Initiative with Northern Latitudes Partnerships at the Alaska Conservation Foundation.

Literature review

Boundary spanners work with different actors, e.g., researchers, policymakers, practitioners, and information users, to “generate, exchange, evaluate, and use knowledge to frame societal problems, pose potential solutions, and decide on the courses of action, thus supporting evidence-informed decision-making” (Posner and Cvitanovic 2019, p. 142). Related terminology includes “boundary organizations” that do the boundary spanning (Meadow et al. 2015), “boundary objects” that become the foci topic (Robards et al. 2018), “knowledge brokers” (or “cultural brokers”), which are occasionally used interchangeably with boundary spanner (Meyer 2010; Posner and Cvitanovic 2019), and “climate science integrators” who are climate scientists that perform some aspects of boundary spanning (Brugger et al. 2016). From the literature, boundary spanners perform the building and maintaining of relationships and networks, facilitate knowledge exchange and trust-building processes, conduct project and cross-boundary coordination, represent groups, and manage information and knowledge (Brugger et al. 2016; Bednarek et al. 2018; Jesiek et al. 2018; Colavito et al. 2019; Goodrich et al. 2020).

Individuals in a boundary spanning role may include scientists, planners, managers, science communicators, program directors, and liaisons (if they perform boundary spanning duties; Brugger et al. 2016; Bednarek et al. 2018; Goodrich et al. 2020). “Boundary spanners” is a concept that facilitates discussing the role in the context of functions, competencies, impacts, and barriers. The role could be a formal liaison-like position, but it is often an informal role someone picks up as part of or on top of their formal position (Jesiek et al. 2018). Boundary spanners can work within academia, NGOs, community-based organizations, agencies, or as part of a liaison/coordination consulting business (Jesiek et al. 2018; Goodrich et al. 2020). In personality traits, boundary spanners are described as humble, patient, empathic, and with high emotional intelligence (Brugger et al. 2016; Jesiek et al. 2018; Goodrich et al. 2020). Boundary spanners have core competencies with communication, coordination, networking, and cross-cultural communication skills, and often hold contextual knowledge from past experiences and education (i.e., a background in policy decision-making or Indigenous heritage; Jesiek et al. 2018; Goodrich et al. 2020).

Recent CPK literature discussing challenges of implementing “the aspirational approach” advocates using boundary spanners and boundary organizations as a panacea (Dilling and Lemos 2011; Bremer and Meisch 2017; Lemos et al. 2018). But challenges and barriers of the boundary spanner role itself are also an important topic within the literature. There is a lack of educational and training programs, academic and organizational incentives, and evaluation metrics for those performing the role (Brugger et al. 2016; Goodrich et al. 2020). Role conflict is often inherent with the individual being situated between two groups (Crosno et al. 2009). Boundary spanners fulfill many functions, often beyond their training and in addition to official job duties, creating role ambiguity (Crosno et al. 2009; Colavito et al. 2019; Goodrich et al. 2020). These challenges often lead to burnout and lower job satisfaction and performance (Crosno et al. 2009). Boundary spanning challenges compound with the contextual challenges of colonization and systemic inequity when working with Alaska Native communities.

Methods

This project is part of my (Rudolf) doctoral dissertation on CPK, focused on understanding how to work better with Alaska Native communities on climate change research. Following CPK principles (Norström et al. 2020; Yua et al. 2022) to spend time understanding the context and goals of the research community, I informally met with numerous researchers and Indigenous leaders who have written and spoken on improving research processes. Initially, the research goal of hosting a workshop was to understand how to do CPK from those who have already successfully led collaborative projects with Alaska Native communities. This idea aligned well with the concept of boundary spanners as a label for those leaders in working with Alaska Native communities. I used the snowball or chain referral method (Naderifar et al. 2017) to build research partners for the project. The only criteria were individuals who had written or spoken about improving research processes and self-identified with the concept of boundary spanners, such as the quote below. To allow for self-definition without bias, being well-versed in the boundary spanner literature was not a requirement for participation. The goal of exploring the role with a CPK approach meant that I sought partners who already speak and write on research processes rather than doing surveys and interviews with people who do not actively present self-reflections. To create diversity, I focused on gaining research partners at different career stages, gender identities, Indigenous/non-Indigenous, ages, educational backgrounds, and job positions. The 13 co-authors (including myself, Rudolf) participated in the workshop, with six additional people contributing to the meeting materials as presented in the authorship section.

Quote: “I understand boundary spanners as someone (Indigenous or non-Indigenous) working between two or more worlds that brings together resources, networks and capacity in a way that makes effective change for a community (I guess I consider the “community” to be one that is underserved, minority, disenfranchised, excluded, etc). I know the term means different things across disciplines, but for our work, the community on one side of the expanse that needs to be spanned is Indigenous community or communities, the other community is the research community/agency/state and federal government/ environmental orgs, etc.” - Lauren Divine

In designing this research project to follow CPK, asking people to commit to co-analyzing typical data collection was a barrier (e.g., surveys, observations, interviews, etc.; National Science Foundation 2019; Yua et al. 2022). In reflecting on Indigenous critical methodologies (Nadasdy 2003; Kovach 2009; Smith 2012), I decided that the participant-partners in the workshop did not need to validate their expertise, knowledge, and experiences. The workshop participants were instead treated as equal co-researcher partners, trusted as experts who could decide what should be included and pre-

sented about the role. A 2-day in-person workshop using participatory decision-making facilitation methods (Kaner 2014) allowed us to use CPK in creating an initial self-definition of the role. Ethics approval was granted by the University of Alaska Fairbanks Institutional Review Board (IRB) (UAF IRB #1784073-2). Approval was preceded by several discussions with IRB staff and members on how CPK fits within the standard forms and protocols. My adviser and I were the named researchers on the IRB research protocol and were responsible for the ethical conduct of the research. All participants, co-authors, and contributors signed the IRB consent form prior to participating in the study, which included consent for publication of this article. The IRB consent form emphasized the research was not anonymous, and consent included permission to name participants in the article. Research conduct principles for the project emphasized that ownership of intellectual contributions remains with each contributor.

To facilitate convergence, I employed the EMBERS (Employing Model-Based Reasoning in Socio-environmental Synthesis) approach (Pennington et al. 2015). In the EMBERS approach, researchers work on an interdisciplinary synthesis project and create an external representation of their mental model of the topic, which is presented as a mind map. The process facilitates self-reflection and awareness of one's own mental model, and presenting them to the group facilitates learning. Researchers iterate these external representations until a shared mental model is achieved. In adapting this method to the boundary spanner project, narratives seemed more appropriate as they expressed personal experiences. I asked participants to complete a pre-workshop activity of creating a mind map, 1-pager, or sharing a story based on what they think is important to share about the role of a boundary spanner. It was open-ended, without providing the boundary spanner literature as a reference, to support self-expression not in comparison to the literature. I did include some key figures and concepts from the literature to see whether the group related to them with their experiences.

Using Kaner's (2014) participatory decision-making techniques, I developed a flexible facilitation plan and workshop agenda. I do want to reiterate that while I hosted, facilitated, and led writing of the article, the results presented are the collective knowledge of the co-authors through contributing and actively participating to define the results. There are three phases within a facilitated discussion: (1) divergent and everyone sharing, (2) integration and discussing contributions, and (3) convergence and coming to decisions. The study was reviewed and approved by the institutional ethics committee. I explained the theory of the three phases to the participant-partners and the need to come to write down decisions to report out. Day 1 of the workshop started with sharing the external representations of their mental model from the pre-workshop activity, which supported divergent discussions along with relationship and trust building (Yua et al. 2022). The initial divergent sharing was rich, with everyone eager to share and relate with each other. I facilitated shifting everyone into the convergence part of the discussion, asking people to write on sticky notes themes and concepts they thought were important from the discussions. We grouped the sticky notes into themes, iteratively rearranged them,

and eventually put them onto wall pads and labeled them with theme names. These themes were (1) Setting Boundaries, (2) Community-Indigenous Values, (3) Thick Skin/Grit, (4) Not Alone, (5) Inequity, (6) Characteristics of Boundary Spanners, (7) Makes It Worth It, and (8) Aspects of End Goal. Huntington and Erickson created alternative themes they saw across the concepts. Huntington saw different levels of the (1) System—systemic level, (2) Structure—project level, (3) Role—interpersonal level, and (4) Attitude—individual level (utilized in the results overview; Fig. 1). Erickson saw patterns in regard to the characteristics of boundaries that were being spanned, which included (1) Root Causes of Boundaries, (2) Attributes of Boundaries, (3) Consequences of Boundaries, and (4) Solutions to Overcome Boundaries (utilized in the “Results” section: *envisioning a better future: “what we see in the In-Between”*; Fig 4). These themes and corresponding sticky notes are recorded within a workshop report.

Day 2 started with a presentation on Two-Eyed Seeing (Bartlett et al. 2012; Tyance Hassell 2019), an Indigenous research process with numerous similarities to boundary spanning. We then reviewed and contributed to the groups of themes developed on Day 1, as well as developing new concepts and frameworks. The new themes were (1) Inequity, (2) Metrics of Success, (3) How to Better Support, and (4) Role—More Than Boundary Spanning. Kaner's approach not only structured each discussion into the three phases, but also the whole workshop, so the morning of Day 2 was the middle integration phase of the workshop. I scheduled flexible time for participants to direct the topic of discussions, which resulted in focusing on actionable steps in (1) Mentorship (Results: *envisioning a better future: mentorship*; Fig. 5) and (2) Equity within Arctic Research (Results: *envisioning a better future: “what we see in the In-Between”*; Fig 4). We split into two groups to discuss with note-takers. After lunch, the groups presented their key points, followed by more discussion. I then shifted the workshop into the convergence part of the 2-day workshop in facilitating a discussion on what should be presented in a publication. The concept of boundary spanners as enabling boundaries (Results: *boundary spanners act as enablers*; Fig. 3) was developed as a key concept. The decision to organize the themes into following a typical career journey was decided as a best way to write the journal article.

Results

The workshop was a space to discuss and develop key concepts to share with specified audiences, including the scientific audience intended for this article. As the concepts developed during the workshop were themed together, we decided the best way to present them was by following a typical career journey. The journey starts with the many reasons for *coming to the role*, which are usually positive and wishing to follow best practices in community engagement. However, in the long term, the *boundary spanner role is not sustainable*, with burnout of doing the boundary work that is often on top of many other job or student duties. We recognized that often *boundary spanners act as enablers of boundaries*, and many of us reject the term “boundary spanner” altogether. This turning point in our career journeys was

Fig. 1. Overview of key concepts from the results framed with the stages of boundary spanners career journey horizontally and the multilevel dimensions vertically.

	Coming to the role	Boundary spanner role is not sustainable	Boundary spanners act as enablers	Healing & self-determination	Envisioning a better future
Systemic	Co-production of knowledge	Academic norms	Racism creates boundaries	Supporting Indigenous self-determination	Equitable funding for local capacity
Structural	Spanning necessary	Conflict between groups	Outsourcing spanning duties	Career outside of academia	Institutionalizing everyone spanning
Interpersonal	Working with/ for communities	5 jobs in 1	Being exploited as bridge to communities	Setting boundaries	Indigenous mentorship
Individual	Seeking empathy, connection, & relationships	Burnout	Individual spanning enables boundaries	Healing through culture	Prioritizing community benefit

recognizing that boundary work is important, but the focus should be on bringing the boundaries together. Then there is a phase of *healing and self-determination, in charting our own career paths that do not conform to the typical research roles*. Here, the results shift into how to create systemic change with *envisioning a better future* through two parts. The first is “*what we see in the In-Between*” in regard to the cultural divide and funding inequity between science/policy and communities. The second is *mentorship* of the next generation with centering Indigenous values and methodologies. In developing a framework to present the results, Huntington recognized the pattern within structural levels from individual—attitude level, interpersonal—role level, structural—project level, and systemic—system level. **Figure 1** displays an overview of the results through each phase of the career journey and key concepts within each structural level. The presentation of results below follows the column headings in **Fig. 1**.

Coming to the role

The boundary spanning role initially calls to individuals for the positive aspects. It involves direct work with communities and the potential to impact communities in a positive way. It is a relational approach that inherently follows Indigenous methodologies, including TallBear's (2016) “standing with” approach. It has aspects of humility, unity, support, culture, trust, respect, connectivity, and love. We are connectors because we want to be connected. We are creating situations where elders feel valued and cherished, and the next generation feels empowered. There is growth in relationships, growth in understanding each other, and growth

in capacity within the community rather than only individual career growth. Often, we are hidden leaders, uplifting the voices of local Indigenous leaders. We, both Indigenous and non-Indigenous practitioners, often bring our full selves to the spaces we enter. A “traditional” resume is a way to recognize our full selves using our traditional introductions of our family and language, sharing our caretaking and stewardship of the lands and waters, and/or our relationality to the community and the research. We lead projects grounded in Indigenous values, which often include respect, reciprocity, and responsibility, where relational accountability is a key practice (Kirkness and Barnhardt 1991). We also center Indigenous knowledge systems and methodologies. Empathy, connection, and relationships were concepts that resurfaced throughout the workshop, first as a methodological approach, then as a key concept to share about the role, and lastly with wanting to share our discussions with a broader audience to foster connection among the broader boundary spanner community.

We agreed that coming to the role through formal versus informal/emergent paths can translate to different lived experiences, as described in Jesiek et al. (2018). We were all unaware of the concept of boundary spanners when we started our careers. Those formally in a liaison role expressed it as tokenizing, and that they want to be recognized as more than the “hat they wear.” Where we feel personally responsible or are called to educate or explain history, culture, and protocols to others, there is superficiality created in filling these roles. It removes responsibility from managers, agencies, or entire systems and institutions to “do the work”.

Some of us ended up in the role by employing CPK methodologies, which requires boundary spanning. Others began working for and with Tribes and Indigenous organizations and found aspects of boundary spanning emerging naturally. Our boundary spanning roles become “Agent”, “Interpreter”, “Explainer”, “Connector”, and “Partner” whether we came to the role formally or informally. Those of us informally in the role had formal roles as a researcher, practitioner, teacher, advocate, communicator, coordinator, and evaluator, where boundary spanning roles are required but commonly go unrecognized. Our role is undervalued monetarily and socially, without recognition that our skills make us well-suited for leadership positions.

The boundary spanner role is not sustainable

Feeling undervalued fuels shared negative experiences within the role of boundary spanning, and often leads us to burnout and to recognition that the role is designed to not be sustainable. Role ambiguity and conflict (Crosno et al. 2009) were concepts relatable to our experiences. With role ambiguity, for those of us who came to boundary spanning in informal/emergent roles, we experienced a lack of recognition of the need for and importance of boundary spanning activities. Role conflict (also Crosno et al. 2009) happens between groups with different goals, which is compounded by systemic inequity for Indigenous peoples.

Within academia, the role and related activities of boundary spanners are not recognized within academic evaluation and work advancement metrics. Those of us in academia described going through an identity crisis because we did not fit into the typical researcher box. The lack of academic evaluation metrics also impacts funding, creating situations where boundary spanners are undersupported and overextended.

Those of us formally in liaison roles find it tokenized, with an immense amount of responsibility and unrealistic expectations that can be at odds with Indigenous value systems. Boundary spanners often “pick up the pieces” and “clean up other peoples’ messes” to make projects functional, as expressed in the quote below. As described in the previous section, there is a revolving door of demands from all sides and the expectation to perform two to five job roles and duties. Boundary spanners are often asked to provide feedback or be on committees without resources, time, or funding to understand the context well enough to provide effective feedback. There is typically no mentorship or roadmap within these contextual situations, nor any such mentorship or roadmap for how to do the boundary spanning role in general.

Quote: “I recently sat down with a colleague to chat about our positions within separate organizations. What we came to bond over was the fact that we often feel limited in our capacity to serve our communities with the resources we are given. As a boundary spanner or liaison, you are often expected to get things done, i.e., create an inclusive environment, conduct outreach or assist in formalizing collaborations or partnership -regardless of how it may disagree with your own values as an Indigenous person who has great responsibility to community and to the lands and waters.” - Karli Tyance Hassell

Boundary spanners act as enablers

In the existing boundary spanner literature, the role is often dichotomized between the boundaries of science and policy. When working with Indigenous communities, this does not necessarily switch to science-community boundaries but often involves spanning three or more boundaries. Policy is the link to making science relevant to Indigenous communities because it is commonly policy decision-making that impacts the community most directly. Policy decision-making could be international or regional, including land and natural resource management and community planning. Each policy context is a distinct boundary that requires time to understand. Each community can be its own boundary as each has its own priorities and governance structures. Those boundary spanners who are also Indigenous knowledge-holders need to practice their culture, be in community, and steward their community’s lands and waters, which requires significant time and resources. Boundary spanning Indigenous people to western academic and policy structures is fundamentally about bringing together two knowledge systems and the power dynamics related to recognizing Indigenous knowledges. An example of the boundaries for an Indigenous boundary spanner is depicted in Fig. 2, where the boundary spanner is in the center and is being pulled from the numerous boundaries. Boundaries depicted include being a fisherman, community leader, member of co-management committees, participating in science projects, advocating to federal agencies, providing input on international policies, and maintaining relationships to the land and water as part of practicing traditional harvesting. The lines behind the boundaries show the tangled inter-relationships between them. The boundary spanner could be acting as a community representative advocating to federal agencies, participating in science projects as a knowledge-holder, and so on for numerous combinations. Semantically, the term “boundary spanner” creates unproductive attention on defining the boundaries instead of the underlying reason for the activity. We rejected the term boundary spanner in representing a concept of being in the “In-Between”. We did not develop a single replacement term, as we each approach the role differently. The names we brainstormed were “pathfinder”, “changemaker”, “engagement expert/specialist”, “connector”, “in-betweenner”, and “leader” or “PI of projects”. We also explored Indigenous terms and concepts, concluding that through that lens each Indigenous person would approach the role differently because there is no pan-Indigenous culture. More broadly, each person would approach the role differently depending on their personality and background, in addition to the political and cultural contexts of the specific situation.

Further discussion about boundaries led to the acknowledgment that boundary spanners can often enable boundaries to keep existing. The continued movement between the boundaries allows them to stay separated. Often, the boundary spanner is exploited as a bridge to Indigenous communities. In this situation, the boundary spanning duties are outsourced to the boundary spanner, allowing the people within each boundary to stay separate. Figure 3 represents

Fig. 2. Concept of the different boundaries and interactions with the boundary spanner in the center. Graphic artist Heather McFarland from drawing by Henry P. Huntington.

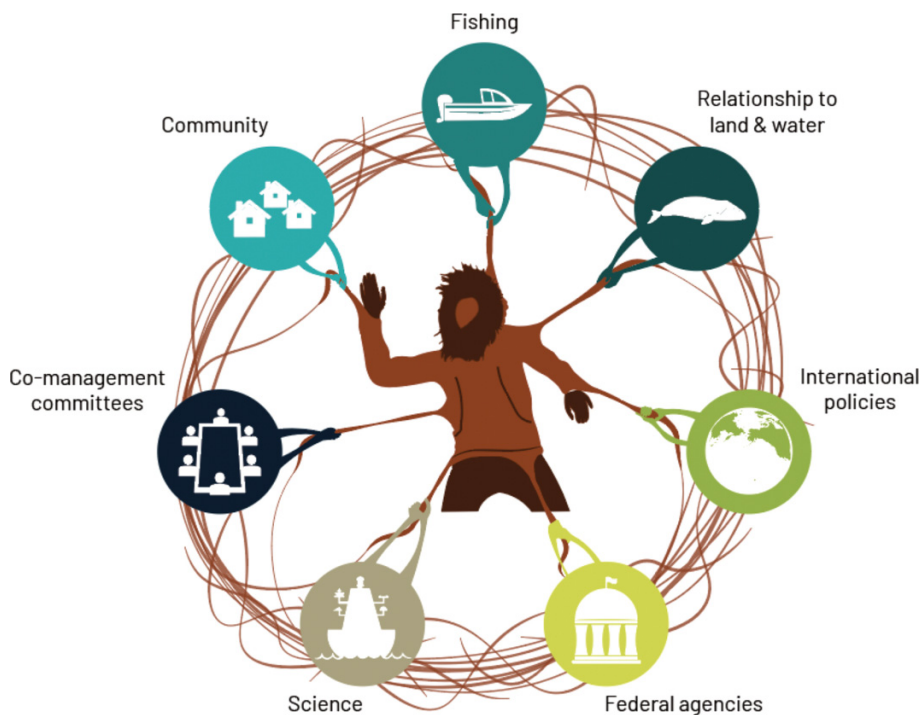
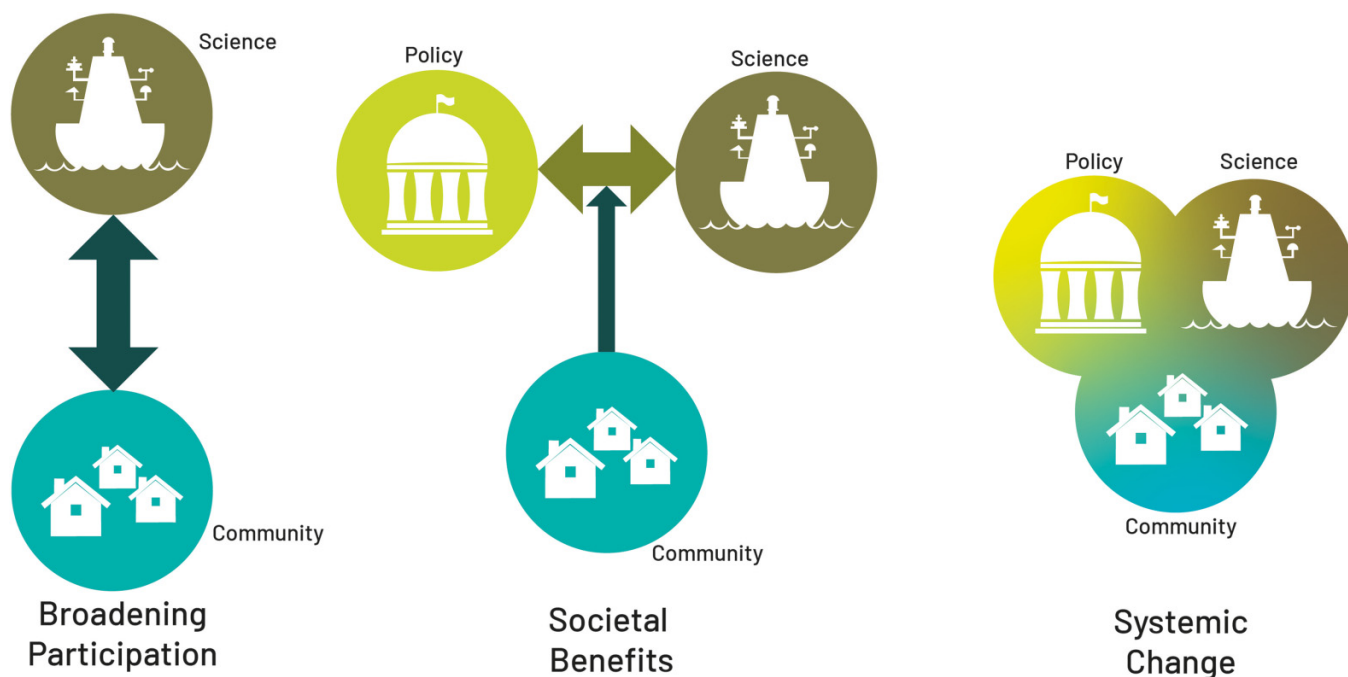


Fig. 3. The conceptual difference between a boundary spanner enabling boundaries on the left compared to systemic change where there are no boundaries between community, science, and policy. Icons from graphic artist Heather McFarland.



different scenarios of boundary spanning. The left scenario represents science-community projects with the objective of broadening participation in the sciences. In the middle scenario, the science and policy boundaries often have similar worldviews creating more established connections, while Indigenous communities remain more separated, perpetuating

systemic inequalities. Community leaders recognize the relationship between science and policy as a means to create societal benefits in attempts to change policies. Often, boundary spanners end up advocating on behalf of the Indigenous community due to this separation and lack of representation. Advocating is generally disapproved of within academia

(Brugger et al. 2016) by those who believe science should be separate from society. The ideal scenario would be one where there are no boundaries between science, policy, and community, a result of systemic change that is described below.

Instead of imposing the boundary spanning duties solely on a designated boundary spanner, we agreed that everyone on a research or policy team should share this responsibility and participate in boundary spanning duties. Once that becomes internalized as part of the typical professional duties and responsibility of science and policy, there can be more collaboration and synergy across the boundaries and a deepening and expansion of the connections to be made (Fig. 3). Boundary spanning need not be limited to broadening participation in research (the left side of Fig. 3). Indeed, much attention to boundary spanning in general emphasizes a need to connect science and policy, and this pathway is relatively well traveled, especially compared with connecting communities with either science or policy (middle of Fig. 3). Ideally, however, the boundaries would then merge, creating stronger relationships, relational accountability, and shared vision and goals (the right side of Fig. 3), a situation in which the boundaries dissolve even if the various realms of activity retain their own identities. To overcome being enablers, boundary spanners need to allow themselves to be vulnerable including being constructively criticized, honest with individual capabilities, and asking for support. With vulnerability comes not only relational accountability, but also the positive aspects of empathy, connectivity, trust, respect, and love. Another way to overcome being an enabler, is to create new ethical spaces rather than being forced into nonculturally responsive norms of these separated boundaries, e.g., CPK and co-management governance.

Healing and self-determination

With burnout acknowledged as a common experience, we also discussed our healing journeys. Healing commonly occurs through making time to rest, practicing culture and living traditional lifeways, and participating in traditional harvesting. We ground ourselves in the reasons described in *coming to the role*, which “makes it worth it”. We prioritize empathy, connection, and relationships in the work rather than fixating only on innovation and productivity. It is also learning to set boundaries and saying “no” to additional work tasks to protect ourselves, our relationships, and personal energy. Self-determination is conceptually important, both individually and for Indigenous peoples. Individual self-determination involves defining our roles and creating our own spaces, which for some of us leads to the decision to become independent consultants rather than conform to working in larger institutions (e.g., universities or agencies). We recommend focusing on supporting Indigenous self-determination rather than focusing on the needs of scientists and policymakers. An example of Indigenous self-determination is self-defined evaluation metrics rather than applying outside-defined metrics.

We developed a set of recommendations on how to better support those of us doing boundary spanning. Many recommendations address the issues described in the above sec-

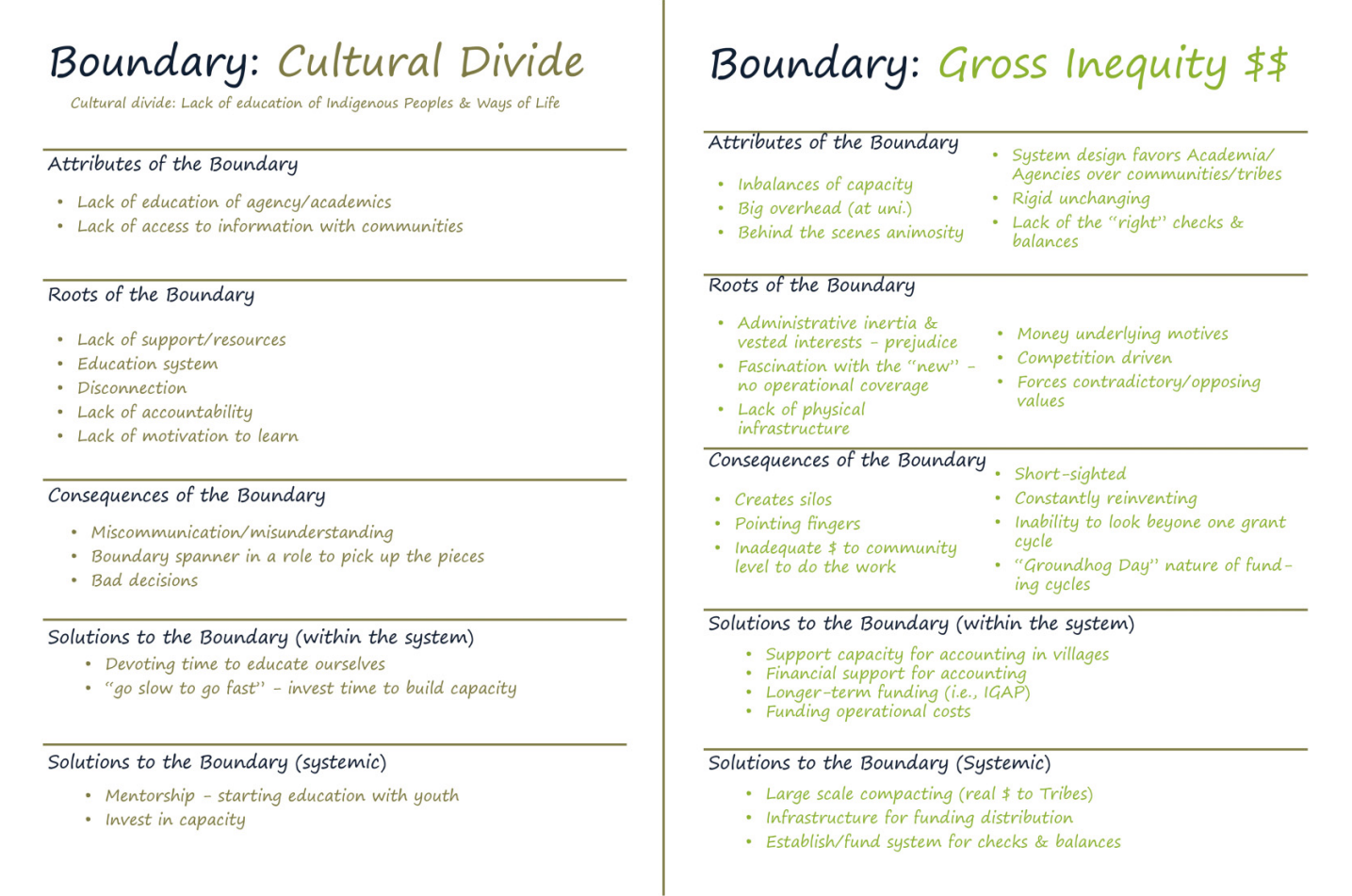
tions, e.g., each side committing to reduce conflict, providing a fair wage, providing training, recognizing accomplishments, and showing gratitude. Institutions should stop outsourcing boundary spanning duties and instead institutionalize the duties into career paths and evaluation metrics. This workshop was the first time many of us were able to connect with others in the role to share our excitement and frustrations. Having informal and formal networks is important in providing those in the role with emotional, professional, and mentoring support. We recommend providing time and a roadmap to orientate to each new project and context, such as establishing a shared understanding, and co-learning history, names, roles, relationships, jargon, acronyms, legacy, purpose, and goals. Lastly, we recommend providing resources and funding to build capacity at the local level rather than the institutional level, as described in the next section.

Envisioning a better future: “what we see in the In-Between”

Indigenous communities have and still experience colonization, racism, and systemic inequity, which are at the root of and continue to perpetuate boundaries. During a small-group breakout session on the second day of the workshop, one group decided to work with a framework developed by co-author Erickson. The approach involved identifying specific boundaries in the context of Arctic research. Step one of the framework includes *identifying the boundary and describing the attributes* of the boundary (understanding in coming to the role). Step two includes *identifying the roots* of the boundary (naming why the role is not sustainable). The third step challenges teams to *identify the consequences* of the said boundary (being enablers of boundaries). The fourth step includes *brainstorming for solutions* to overcome the boundary (healing and envisioning a better future). The solutions in the final step should be categorized as in-system solutions and systemic solutions. Returning to the overview chart in Fig. 1, the boundary spanner’s career journey follows this framework.

The first boundary we discussed was the cultural divide between communities and agencies/academics, as seen in Fig. 4. This cultural divide is rooted in a general lack of knowledge and education by researchers and policymakers about Indigenous peoples and their ways of life. This boundary is an example of boundary spanners acting as enablers of the separation within the roots of the boundary. The consequences of the boundary are miscommunication, bad decisions, poor relationships, and boundary spanners needing to “pick up the pieces” to make projects functional. As discussed in the previous section, the solutions are academics/policymakers educating themselves and taking the time to build relationships themselves. A systemic solution would be mentorship and education for the next generation and investing in the capacity to do the boundary spanning work. The second boundary we discussed was funding and the gross inequity of funding. The attributes of this boundary are funding structures that favor universities and research institutions over Indigenous organizations, upholding the inequality where communities lack the capacity and infrastructure to compete.

Fig. 4. Addressing the boundaries of the cultural divide (left) and gross inequity of funding (right) within working with Alaska Native communities. The boundary framework was developed by Kaare Sikuaq Erickson.



Competitive grant cycles create a situation where innovation is prioritized over community needs, silos are created, animosity reigns, and short-sightedness results in constant reinvention of successful project aspects. To overcome the inequity of funding, we recommend supporting local capacity and operational costs with long-term funding. For a systemic change, we brainstormed Tribal compacting, where a consortium would administer research and observing funds.

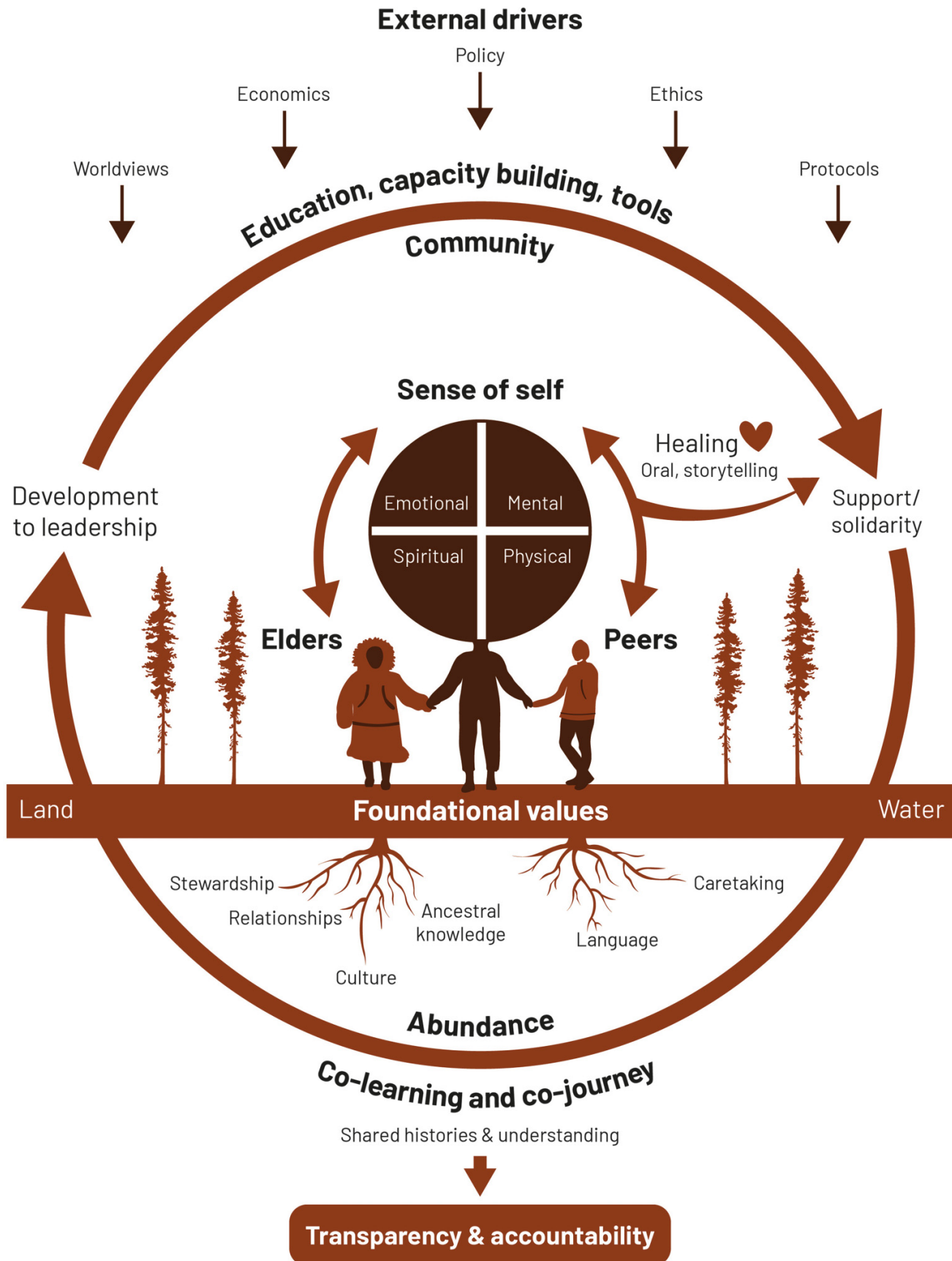
Envisioning a better future: mentorship

Mentorship was central to the participants in making the role worth it. It was also identified as an actionable step to create systemic change. Empowering our youth, facilitating intergenerational learning, and fostering trust, respect, connectivity, and compassion were all related to mentorship. A breakout group dived deeper into mentorship key concepts and actions. Mentorship is not just one-way, but an interactive mentor/mentee co-learning experience. Programs need to support the whole person and help create a sense of identity that goes beyond the academic path to include space for personal, spiritual, and emotional support through talking circles and sharing stories. Mentorship is essential to shifting power to communities for community-driven/led

research, such as community-based monitoring (e.g., fisheries monitoring and research). University and agency mentorship programs typically conform to competitive Western mentorship and research approaches, which can unintentionally harm, alienate, and exclude Indigenous students. Community-based and Indigenous-led research and mentorship programs would also facilitate education in Indigenous methodologies and show holistic approaches to mentoring.

Figure 5 depicts a mentorship program rooted in the Indigenous worldview. The students would be taught about the external drivers previously discussed as what creates separated boundaries and tokenized expectations on boundary spanners. Teaching would be grounded in Indigenous values and the aspects described above when *coming to the role*. Teaching would also build in education, capacity building, and tools to support and develop leadership skills in students, which we agreed is in contrast to a current lack of education and support for Indigenous students. This vision for a mentorship program recognizes the need to understand the many demands placed on those in a boundary-spanning role and to cultivate the skills and personal traits needed to carry out that role over time. In other words, mentorship

Fig. 5. Envisioning mentorship to support those going into the role of boundary spanning. Graphic artist Heather McFarland with original drawing by Karli Tyance Hassell.



cannot and should not be limited to the transfer of technical expertise, but should also include attention to the whole person.

Discussion—comparison to the literature

During the workshop, we rejected the term “boundary spanner” due to its semantic meaning focusing on boundaries. Besides Rudolf, most other co-authors were not well-versed in existing boundary spanner literature. Reading the literature was not a requirement for participation in the project, as it allowed for self-definition of the role without bias. Rudolf therefore led this discussion section comparing the workshop results to the broader boundary spanner literature. The common description of boundary spanning is to support evidence-informed decision-making (Bednarek et al. 2018; Posner and Cvitanovic 2019), which is not wording used in the workshop. Nor was the concept of matching knowledge producers to knowledge users (Bednarek et al. 2018; Goodrich et al. 2020) brought up during the workshop. Most of the workshop participants’ motivations were to work with Alaska Native communities, where the communities pushed for work related to policy decision-making. With the connection to policy decision-making within the community or at the regional, federal, or international levels, there is an implicit aspect of supporting evidence-informed decision-making. However, supporting evidence-informed decision-making was not the topic people focused on during the workshop. Instead, our discussions were on the tensions between boundaries, specifically the tension between Indigenous and scientist knowledge systems and associated inequity in recognition of Indigenous knowledges in academia and policy, a more familiar topic for the participants.

We agreed that there is a strong connection to two-eyed seeing (Bartlett et al. 2012; Tyance Hassell 2019) in creating an ethical space to work with both scientific and Indigenous knowledge systems. The boundary spanner concept of facilitating interactive iterative knowledge exchanges (Bednarek et al. 2018) is more aligned with our workshop discussions, and the following are the related concepts from the literature.

The co-authors were more familiar with the CPK literature and discourse related to the NSF NNA programming. The selection criteria for participation in the workshop was writing or speaking about improving research processes, which is often in the form of talking about tensions between the Western scientific worldviews and methodologies with the Indigenous worldviews (Huntington et al. 2006; Heeringa et al. 2019; Tyance Hassell 2019; Bahnke et al. 2020; Erickson 2020; Figus et al. 2022). Therefore, the participants were biased toward discussing methodological tensions and systemic research issues.

Facilitating a process that builds trust and legitimacy through transparent communication aligns with the workshop in overcoming the cultural divide boundary (Brugger et al. 2016; Bednarek et al. 2018; Goodrich et al. 2020). “Fostering mutual understanding among different interests while representing the interests of all (i.e., a stabilizing role at the science–policy interface)” (Goodrich et al. 2020, p. 47) is im-

plied in the role conflict discussions. Boundary spanners being aware of the “broader context of actors, perspectives, values, contested evidence, decision-making history, and power dynamics” (Bednarek et al. 2018, p. 1177) was expanded upon to include colonization and systemic inequity in the discussions. Lastly, boundary spanners “providing services, training, and complementary expertise to enhance the production of actionable knowledge” (Goodrich et al. 2020, p. 47) could be associated with boundary spanners being often researchers and teachers on top of doing their boundary spanning duties.

From the boundary spanner literature, there is the rejection of being an advocate or doing advocacy (Brugger et al. 2016; Bednarek et al. 2018), which was identified as a characteristic of the role from the workshop. Also from the literature is the concept of being an “honest broker” (Pielke, Jr. 2007; Bednarek et al. 2018; Goodrich et al. 2020) in using scientific knowledge to present alternative methods and broaden choices for decision-making. As explained within the *boundary spanners act as enablers* section, Alaska Native communities are separate from the science–policy interface. Often, boundary spanners are asked to or put in situations where they have to advocate due to the lack of Indigenous representation, which creates mixed feelings from the participants. Those who work for Tribes and Indigenous organizations have advocacy within policymaking as part of their job duties, which is a mixture of speaking from an official capacity or being a hidden leader in coordinating Indigenous leaders to participate at key moments, applying for grants, or achieving influence in scientific research and policy arenas. Also, representing a Tribe requires individuals to obtain Tribal Council approvals over decision-making that impacts the Tribe. So, individuals being asked to represent the Indigenous voice, especially over a region or community, without being the official representative is an inappropriate request rooted in tokenization. Being asked to or put in a situation to advocate without being an official representative is part of the tokenization discussion from the workshop, especially for those who are Indigenous.

There are overlaps in the personality traits and core competencies in the literature to the workshop discussions. The literature describes boundary spanners as needing to be proactive, self-monitoring, good listeners, respectful, humble, and empathetic (Brugger et al. 2016; Jesiek et al. 2018; Goodrich et al. 2020), which aligns with our description of *coming to the role*. The difference in personality traits in the workshop outcomes emphasized needing a thick skin and grit to overcome the role conflict. The literature describes needing competencies in communication skills, coordination skills, existing networks, ability to maintain relationships, contextual knowledge related to the situation, and cross-cultural competencies (Jesiek et al. 2018; Goodrich et al. 2020) that relate well to the discussion within our *coming to the role* section. Cvitanovic et al. (2017) used network analysis to evaluate a boundary spanner in their capacity to increase and strengthen relationships over time, which relates well to our point that boundary spanners should not enable boundaries but bring those on either side of the putative boundary closer together.

There is a substantial overlap with the literature in the challenges and barriers with lack of education/training, no academic rewards, no well-defined career path, lack of recognition of the importance of the role, and role ambiguity and conflict (Crosno et al. 2009; Brugger et al. 2016; Bednarek et al. 2018; Goodrich et al. 2020). The difficulties faced by those in the standard boundary-spanning role all exist in the context we are describing, and these issues are compounded with equity and ethics considerations, as described in section *boundary spanners act as enablers*. Rather than leave it as just identifying the problems for others to solve, we brainstormed action items to overcome boundaries presented in the results section *envisioning a better future*. These action items were the key takeaway from the workshop, which included creating an Indigenous-led research grant program, increasing long-term funding for local capacity, and developing a mentorship program rooted in the Indigenous worldview.

The concepts that diverge from the boundary spanning literature include advocacy (discussed above), equity, the cultural divide, and doing the role from Indigenous values. Critical and decolonial methodologies (Smith 2012) are foundational to working with Indigenous communities, which is increasingly being recognized in CPK literature (Turnhout et al. 2020; Chambers et al. 2021; Yua et al. 2022). These literature describe the colonial processes that developed the boundaries of structural racism that we are trying to overcome. Having numerous participants that work in the fisheries field and management spaces was the community/policy/science context influenced the concepts discussed and specifically Fig. 2. Within the Arctic and Alaska, the past couple of decades has been extracting Indigenous knowledges through traditional ecological knowledge research without giving Indigenous people decision-making power or stewardship over their lands (Nadasy 2003). This history influenced the concept of advocacy, equity, and bringing the boundaries together, i.e., putting Indigenous leaders into sciences and policy spaces and not just their knowledge. Indigenous values were pointed out in our discussions, where concepts were spread across the results rather than concentrated into one. All of the Indigenous participants have publicly spoken about Indigenous methodologies (Wilson 2008) and values (Kirkness and Barnhardt 1991), and two have published works on Indigenous-led research (Tyance Hassell 2019; Esquible et al. 2024). This influenced the concepts of relationality, trust, respect, healing, self-determination, and Indigenous mentorship.

Conclusion

The key takeaway we want to express to you, the reader, is the need to take action to create equity and ethical inclusion of Indigenous peoples within science and policy, which we present in Fig. 4. The current situation puts an unreasonable responsibility onto boundary spanners to solve equity and ethical issues for the broader Arctic research community, as depicted in the results overview in Fig. 1. This creates unrealistic expectations and an unsustainable role for boundary spanners, often leading to burnout. The burden of responsibility must shift within institutions and agencies where everyone involved is expected and rewarded for performing

boundary spanning duties. Boundary spanning is central to work, but everyone needs to be doing it hence the rejection of the term “boundary spanner” by workshop participants. Systemic change comes from overcoming these boundaries through understanding while building capacity and relationships at local levels to participate. In envisioning a better future for Arctic research, having adequate representation within policymaking and funding structures will be key to improving the system while at the same time creating an Indigenous mentorship and education program to empower the next generation.

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Data availability

Data generated or analyzed during this study are available from the corresponding author upon reasonable request.

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