



Boundary spanning in the context of stakeholder engagement in collaborative water management

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Received: 8 December 2021 / Revised: 4 January 2023 / Accepted: 5 January 2023 / Published online: 25 January 2023
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Abstract

Boundary spanners are individuals able to reach across organizational borders to build relationships and interconnections to help better manage complex problems. What is not clear, however, are the skills that allow boundary spanners to cross diverse scales, sectors, and organizations. To address this gap, we use a qualitative case study approach to examine evidence for how boundary spanning skills are implemented in the context of stakeholder engagement for addressing water challenges in agricultural settings. We employ a hybrid deductive-inductive thematic analysis approach to examine interview data collected with 25 stakeholder participants as well as direct observation of engagement behavior. Interview instruments were designed to elicit responses related to six deductively derived skills of boundary spanning: relationship builder, authentic leadership, trustworthiness, autonomy, perspective-taking, and effective science communication. Our inductive analysis identified evidence for three additional boundary spanning skills. Our study finds that some boundary spanning skills were exhibited more than others, and their frequency of use varied throughout the engagement process, and certain skills were used interchangeably. This research provides guidance on what boundary spanning looks like in action, and thus provides guidance on identifying and enhancing these skills in stakeholder engagement for water resource management.

Keywords Boundary spanners · Stakeholder engagement · Collaborative water management

1 Introduction

Collaborative approaches to water resource management including stakeholder engagement are on the rise in response to the increasing complexity of water resource challenges and the pressing need for coordinated responses across diverse stakeholders, including agencies, organizations, and

individual land managers (Davis et al. 2021, p. 1; Pahl-Wostl 2009, p. 355). Effective collaborative resource management depends on high-quality stakeholder engagement. Stakeholder engagement is a process where stakeholders, that is, those directly or indirectly affected by and able to affect a decision, take active roles in research, planning, and policy decisions impacting their lives (Lockwood et al. 2010; Plummer et al. 2017). Stakeholder engagement provides opportunities for social interaction, relationship building, and learning that may foster innovative thinking and collective action in response to complex water resource challenges (Muro and Jeffrey 2012; Worosz et al. 2022 in review). However, in practice, building relationships, exchanging knowledge, and coordinating action require a unique set of skills and behaviors researchers term boundary spanning.

Often referred to as “inter-agency ambassadors” or “gate keepers,” boundary spanners are individuals who actively work toward collaboration by linking and facilitating knowledge exchange between diverse stakeholders, processes, and information (Ansett 2005; Coleman and Stern 2018; van Meerkerk and Edelenbos 2021; Weerts and Sandman 2010; Poblete and Bengston 2020). These individuals are

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needed to bring about an awareness of the idiosyncrasies of culture and associated language, its interpretation, and how it can frame an issue (Gagnon et al. 2021, p. 3). Boundary spanners accomplish this through interactive and regular communication aimed at understanding what knowledge would be most useful and why, and how other actors and sources of knowledge factor into the decision-making process. In doing so, boundary spanners help build relationships that are necessary to facilitate the uptake of knowledge (Bednarek et al. 2018; McGonigle et al. 2020) to influence the decision-making process. A growing body of scholarship demonstrates how boundary spanners can assist in information exchange, foster trust building conditions (Delozier and Burbach 2021), and span boundaries in a variety of contexts (Warner et al. 2010; Barner-Rasmussen et al. 2014; Birkinshaw et al. 2017; van den Brink et al. 2019). Goodrich et al. (2020, p. 46) argue that greater acknowledgment and professionalization of boundary spanning will improve the use of science in solving sustainability problems. We define boundary spanning as a collection of behaviors grounded in a set of skills that encourage cross-boundary collaboration, relationship building, and information sharing (Williams 2002, Söderberg and Romani 2017; van Meerkerk and Edelenbos 2021).

Not all individuals involved in stakeholder engagement need to be boundary spanners. Nonetheless, we believe those who possess boundary spanning skills can play an important role in improving stakeholder engagement as boundary spanning has been associated with positive outcomes in many settings (Gasson 2005; Marrone 2010; Long et al. 2013; Wallace et al. 2018). However, little research has examined boundary spanning in the context of stakeholder engagement in the water-agriculture sector (Eaton et al. 2021). Given the immense task of improving freshwater contamination and managing water resource use in an age of climate change, our understanding for boundary spanning in the context of stakeholder engagement for water resource management—what it looks like, accomplishes, and how it can be supported—is critical.

To address this gap, we examine boundary spanning skills evident among participants in stakeholder engagement processes that aimed to identify water resource challenges and solutions through two parallel stakeholder engagement processes in the North Platte and Central Platte River Valleys in Nebraska, USA, throughout 2019–2021. While each basin has unique challenges, lessons here are relevant for researchers and practitioners elsewhere who aim to identify and enhance boundary spanning among water resource stakeholders.

Two central questions guide our study: (1) Do stakeholder engagement participants in the context of water resource management exhibit boundary spanning skills? (2) What qualities of boundary spanning were exhibited, and how

were they applied in practice? Answering these questions can improve understanding of what boundary spanning skills looks like—what forms it takes—and how it can be supported. We review the growing boundary spanning literature to identify established boundary spanning skills that inform our deductive analysis. We then use a qualitative case study approach to examine evidence for boundary spanning among participants in the two engagement processes.

1.1 Boundary spanning literature

Boundary spanning describes a range of skills to build connections that transcend institutional, professional, organizational, or related boundaries. Ancona and Caldwell (1990, p. 640) provide a typology outlining four boundary spanning role types—ambassador, scout, task coordinator, and guard—which are advantageous to organizations that rely on the flow of information among and between internal and external networks. Palus et al. (2014, p. 211) deliver a framework incorporating the multiple boundary spanning functions into three strategies: managing boundaries, forging common ground, and discovering new frontiers. Others highlight personal attributes required for cross-boundary communication, transfer, and translation of information (Williams 2002; Coleman and Stern 2018; van Meerkerk and Edelenbos 2021). For Williams (2002, p. 109), boundary spanners must be familiar with the various professional vernacular and routines of different organizations (interpreter/communicator), have the ability to seek out windows of opportunity (entrepreneurs), link different agendas and issues across boundaries, and build coalitions (negotiator). In this way, boundary spanners can serve a strategic role by gathering critical information, obtaining feedback from others, and disseminating information to enhance the decision-making process.

To meet our research objectives, we first consolidate literature from a diverse body of previous research to develop an initial multi-faceted conceptualization of boundary spanning. This includes six skills that together begin to reflect the complexity involved with being a boundary spanner in the context of stakeholder engaged water resource management. These initial skills include relationship builder, authentic leadership, trustworthiness, autonomy, perspective-taking, and effective science communication.

1.1.1 Relationship builder

Developing, maintaining, and enhancing relationships across internal and external borders are a hallmark of boundary spanning skills (Tushman and Scanlan 1981; Miller 2008; Schotter et al. 2017; van Meerkerk and Edelenbos 2021). Boundary spanners are skilled in bringing together unlikely partnerships (Williams 2002, p. 113), often leading to

windows of opportunity inside and outside organizational boundaries (Birkinshaw et al. 2017; Cvitanovic et al. 2017). Moreover, a boundary spanner's personal network may influence their ability to perform and aid them in moving through various organizational and disciplinary domains (Brion et al. 2012; Edelenbos and van Meerkerk 2015; Coleman and Stern 2018).

1.1.2 Authentic leadership

Authentic leadership is a key boundary spanning skill because having a deep sense of self, valuing openness and truthfulness in relationships, demonstrating beliefs that are consistent with actions, soliciting opposing viewpoints, and considering all options before choosing a course of action can improve collaboration (Gardner et al. 2005; Walumbwa et al. 2008). Authentic leaders encourage and motivate others to work together, remain open-minded versus closed off to new ways of understanding, seek a shared group identity or common goal, and commit to the process even when the topic is difficult, and in doing so, demonstrate leadership and gain respect from their peers (Williams 2002; Miller 2008; Ernst and Yip 2009; Goodrich et al. 2020). Through authentic leadership skills, our research is also an initial attempt to describe the role leadership played in successful socio-ecological practice, “the human action and social process that take place in specific socio-ecological context to bring about a secure, harmonious, and sustainable socio-ecological condition” (Xiang 2019, p. 8).

1.1.3 Trustworthiness

Trustworthiness is a key boundary spanning skill because being perceived as trustworthy by others is critical to all collaborative endeavors (Williams 2002; Miller 2008; Coleman and Stern 2018). Individuals deemed as trustworthy are often considered competent, benevolent, and possessing high integrity (Mayer et al. 1995; van Meerkerk and Edelenbos 2021). Trustworthiness is especially important in water resource management, where decision-making requires consideration of diverse sources of knowledge, including complex technical and scientific information that may be daunting for some stakeholders and lead to doubt and refusal by some to support courses of action others see as supported by available data (Toman et al. 2021, p. 3). The trustworthiness of the messenger not only influences the understanding of complex information but its perceived validity (Malka et al. 2009).

1.1.4 Autonomy

Role autonomy refers to flexibility to act on behalf of both one's home organization while still working toward a

common goal with others outside that organization (Tushman 1977; Williams 2002; Miller 2008; Schotter et al. 2017), thereby providing a degree of freedom to question and challenge prevailing assumptions both within and beyond the organization (Birkinshaw et al. 2017). Thus, autonomy is a key boundary spanning skill because it can increase the likelihood of uncovering roots of interests and concerns as well as broaden solution choices. Demonstrating autonomy provides opportunities to “display discretionary and competent behavior” (Perrone et al. 2003, p. 425), which can cultivate trust. As relationships become more complex, this flexibility allows individuals to challenge the status quo while remaining loyal to their home organization (Williams 2002, p. 110).

1.1.5 Perspective-taking

Boundary spanning literature demonstrates the importance of acknowledging and respecting diverse perspectives, particularly when working across multi-disciplinary boundaries (Dabrowski 2018; Goodrich et al. 2020). Moreover, cultural and language skills, for example, sensitivity to cultural differences, allow individuals to improve knowledge exchange and foster intergroup respect (Barner-Rasmussen et al. 2014). The ability to reframe an issue or explain the unique behavior or position of others is the cornerstone of perspective-taking.

1.1.6 Science communication

Effectively communicating highly scientific, technical, or complex information in a relatable or clear manner can help others appreciate an issue and encourage informed decision-making or policy choices (Fischhoff and Scheufele 2013). Someone who can simplify or reframe a message so that others view the information as relevant and legitimate creates a welcoming environment and encourages stakeholders to remain engaged in the process (Cash et al. 2003; Bednarek et al. 2016; Nel et al. 2016; van Enst et al. 2017). Boundary spanners can aid in the scientific salience, credibility, and legitimacy of ecological knowledge (Safford et al. 2017).

2 Methodological approach

2.1 The central Platte and north Platte river valleys of Nebraska

The Central Platte and North Platte River Valleys of Nebraska, USA, have experienced water quality and quantity challenges for many decades (Exner et al. 2014; NDNR 2016; NDEE 2019). While the Nebraska Department of Natural Resources (NDNR) regulates surface water resources

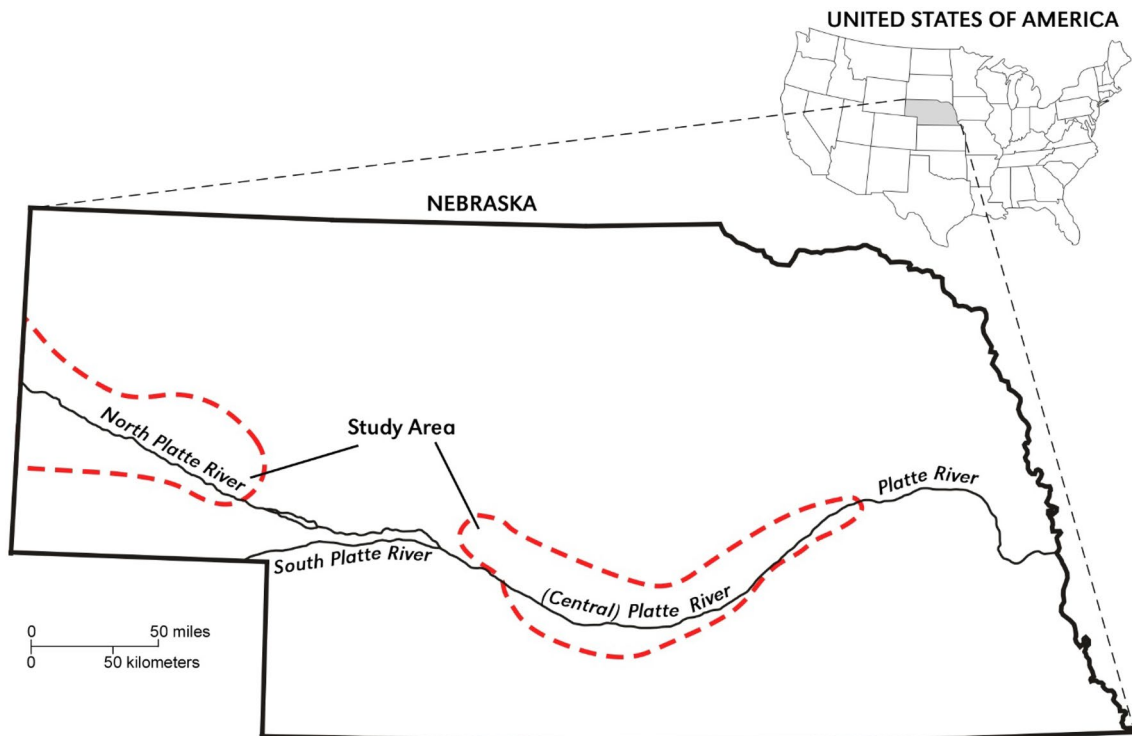


Fig. 1 The study areas in Nebraska, USA

in Nebraska, Natural Resources Districts (NRDs) organized around watersheds with locally elected boards with taxing powers, regulate groundwater. This local control of natural resource management combined with a statutory requirement that water management planning in the fully and over appropriated Central and North Platte Valley regions include consultation and collaboration with stakeholders has resulted in a long history of stakeholder involvement in water management in our study area (Bleed and Babbitt 2015; NDNR 2016). The study area is shown in Fig. 1.

2.2 Designing the research

Our analysis draws from semi-structured interviews conducted with participants at the conclusion of stakeholder engagement activities in the North Platte (NP) and Central Platte (CP) River regions (IRB # STUDY00007073:Water for Ag).¹ The stakeholder engagement activities entailed a process that involved forming new diverse stakeholder groups for approximately two years of facilitated activities designed to support developing stakeholder-identified strategies for solving agriculture-water challenges. CP participants met a total of 12 times from February 2019 through November 2020. NP participants met 18 times between

February 2019 and April 2021. Participants include agricultural producers, technical experts, extension personnel, natural resources professionals, municipal stakeholders, and researchers. NP participants focused on creating a conference to inform the community about water issues with a central focus on infrastructure, water quality, and water quantity concerns. CP participants sought to establish an endowment to receive and distribute funds to benefit the conveyance of water in the Platte River system. Participants met in person up through March 2020, when virtual meetings began in response to COVID-19. To achieve our study goals, we examine these study sites as a single case study, and in doing so, highlight similarities in both the engagement processes undertaken and the contextual settings of each place (Paulson 2004, p. 243). Thus, participants in our study were stakeholders who participated in facilitated activities to solve stakeholder-identified problems in the North Platte and Central Platte regions of Nebraska.

Our primary data source consists of 25 (CP, $n = 12$; NP, $n = 13$) semi-structured, in-depth participant interviews conducted between December 2020 and March 2021. Those interviewed represented all participants in the CP and more than two-thirds of those in the NP and were not necessarily chosen by exhibiting boundary spanning skills. The interview instrument included several prompts specifically intended to elicit reflection on and description of the six initial boundary spanning skills identified in the literature

¹ <https://sites.psu.edu/engagementuide/>.

Table 1 Boundary spanner skills descriptors and interview prompts from our codebook

Deductive codes

Relationship builder: participant's ability to develop new or enhance existing relationships or partnerships both internally and externally

Interview prompt: Describe any new or improved relationships you developed with individuals or groups (either directly or indirectly) through your participation with your stakeholder engagement project. What role did you play? How have you sustained these relationships?

Perspective-taking: participant's ability to acknowledge and encourage diversity in opinion, bridge or connect across diverse groups, and reframe an issue so that others have a better understanding

Interview prompt: In what ways—if any—did you encourage others on your stakeholder engagement project to share thoughts and opinions rather than stay quiet?

Authentic leadership: the ability to motivate and lead others, seek a shared group identity or common goals and commit to the process

Interview prompt: In what ways might you have encouraged others on your stakeholder engagement project to work together even when the topic was challenging or difficult?

Trustworthiness: participant's demonstration of competency, benevolence, and integrity as well as those actions showing authenticity, honesty, and transparency

Interview prompt: Describe how—if at all—you encouraged people on your stakeholder engagement project to trust one another—even when there were differences in opinion or perspective

Autonomy: participant's ability to think independently and share thoughts contrary to others while remaining loyal to one's home organization

Interview prompt: How did you handle sharing thoughts or ideas that were contrary to what others on the stakeholder engagement project were suggesting?

Effective science communication: demonstration of skills or behaviors used to provide effective feedback and communicate scientific, local, or professional knowledge to others

Interview prompt: Describe how you communicated or translated scientific information and provided technical feedback to others. How did you consider the social or cultural climate when communicating technical information?

Inductive codes

Identification/interpretation of body language: participant's ability to interpret others' gestures, facial expressions, and/or emotions

Managing power differentials: participant's ability to recognize power inequities between stakeholders and manage the imbalance

Support/creation of a neutral third space: participant's ability to assist in the development of or support for an environment free from criticism

reviewed above. See Table 1 below. Interviews were conducted through Zoom or phone, due to health concerns regarding in-person meetings, and averaged 40 min. All interviews were audio recorded and transcribed verbatim. To cross-validate data obtained from interviews, we also collected data from all CP site and several NP site meetings using an observation guide designed to track social interaction among participants (see Eaton et al. 2023 in review).

2.3 Analytical approach

We used a three-phase hybrid deductive-inductive thematic analysis approach (Fereday and Muir-Cochrane 2006). The lead coder conducted a deductive analysis reading all 25 interview transcripts and coding for the six boundary spanning skills prompted by the interview guide. Two additional rounds of coding were completed by the lead coder to further confirm the presence of these six skills. A second coder repeated the entire process and independently coded the same 25 interview transcripts in an effort to validate earlier findings. The second coder's coding was compared with the lead coder to determine consistency and was followed by a

joint discussion of findings and revision of the codebook. Inter-coder reliability was greater than 80% as determined by Cohen's kappa coefficient (Miles and Huberman 1994; Creswell 2002). The lead coder then applied the revised codes once more to the transcripts. This process provided an external check of the research process (Lincoln and Guba 1985; Merriam 1988; Church et al. 2019).

The second phase involved an inductive analysis approach to allow study of exhibited skills not purposely analyzed in the initial deductive coding process. The two coders followed an iterative process involving multiple rounds of coding of interview data to classify emergent themes, following a constructivist approach, related to boundary spanning skills (Lincoln and Guba 2000), resulting in three additional boundary spanning skills that complement the initial six identified in the literature reviewed above: identification/interpretation of body language, management of power differentials, and support/creation of a neutral third space.

The final phase involved identifying clear boundary spanning examples identified through both the deductive and inductive analysis and reviewing observation data to situate those examples in the context of the engagement process. In

collecting observation data, the lead coder noted the meeting when the boundary spanning skill was exhibited to ascertain whether the skill was exhibited early, mid, or late in the engagement process. This allowed us to determine whether the skills were exhibited uniformly over the course of the stakeholder engagement activities or whether there were times when they were exhibited more frequently.

Table 1 describes the six codes investigated using a deductive analysis and three additional codes found with the inductive analysis. The codebook included the codename, description, and specific examples. All interview transcripts and observational meeting notes were coded using Taguette (<https://www.taguette.org/>) qualitative software. We used observation data to check consistency of interview responses and triangulate our findings (Lincoln and Guba 1985; Merriam 1988). Next, we share our deductive and then inductive findings in order of prevalence.

3 Findings and reflection

All six targeted boundary spanning skills were exhibited by stakeholder engagement participants and were exhibited by all participants to varying degrees. That is, some participants were more skilled at boundary spanning than others. We also identified three additional boundary spanning skills exhibited by participants. The following sections elaborate on our findings.

3.1 Relationship builder

The most frequently exhibited boundary spanning skill by interviewees was relationship builder. A central component of boundary spanning work is to connect, collaborate, and establish relationships (Tushman and Scanlan 1981; Miller 2008; Schotter et al. 2017; van Meerkerk and Edelenbos 2021). Participants demonstrated an ability to establish strong relationships using clear communication, respect, and empathy. Even in situations where a certain level of familiarity exists, relationships can become stronger as shared by a natural resource professional, “You can always improve your relationships by talking and hearing both sides. I guess in that aspect, it improved relationships all across the board.” The challenge faced by participants in both sites, however, was quickly establishing relationships in order to concentrate on identifying a water or agricultural topic of common interest. For this to occur, participants needed the opportunity to meet informally, allowing for active and honest participation. One participant stated the obvious, “...everybody knows they have to, you know, be at the table and talking.” This simple statement became even more apparent later in the engagement process when in-person meetings became virtual. If not for the establishment of a strong and solid

foundation early on, the accomplishment of each team’s identified goal may not have come to fruition.

In practice, participants’ attempt to develop solid relationships was met with a variety of challenges and setbacks. Although many participants had prior working relationships with each other, the onset of COVID-19 and lack of a unified project goal challenged these seasoned participants. One interviewee recognized the value of humor and consistently used it to lower others’ defenses. His ability to reach out to others in this manner not only provided relief but set the stage for relationship building. As one participant commented, “...humor can be used as a way to disagree or maybe disarm tension.” Others utilized the chance to make connections by taking advantage of informal opportunities, such as lunch breaks and those times before and after meetings. One interviewee summed it up, “Having a meal together encourages relationship building.”

Participants also demonstrated restraint and chose their battles wisely, often recognizing that frustrations were high; for example, “I didn’t want to be the reason our conversation went down that road, right? So, how do you share your opinion and not, you know, I was never there to create an argument about it, right? Sometimes that caused me to take the high road and just, okay move on.” The recognition by participants that relationship development may involve holding back and respecting others’ opinions is an underappreciated aspect of this boundary spanning skill. Another participant seconded the principle of restraint when he said, “I’ve always found sometimes you just need to keep your mouth shut and listen and you might learn something...”

In addition to developing internal linkages, participants from both locations sought out external relationship building opportunities. Using the knowledge gained during discussions, participants reached out to other organizations with similar interests. One NP producer shared this experience, “I’ve taken back some of the information that I acquired, you know, to some of the groups, particularly the groups that are working with our cold-water streams.” Participants at both sites used their network to develop connections outside of the group. In these situations, participants acted as a connector or liaison between organizations sharing information, encouraging knowledge exchange, and working to bridge divided groups or disenfranchised stakeholders.

Over time, the relationships established between participants within the two sites gave way to less reliance on meeting facilitators. As one facilitator expressed, balancing “self-directed teams vs. them looking to us for guidance, is where that sweet spot is...”

3.2 Perspective-taking

We found perspective-taking, the ability to acknowledge and encourage diversity of opinion, bridge or connect

across diverse groups, and reframe an issue so that others have a better understanding (Dabrowski 2018; Goodrich et al. 2020) was the second-most frequently used boundary spanning skill exhibited by participants in the two study sites. As one participant framed it, "...it wasn't even a conversation about [irrigation] pivots, it's just understanding what their life experiences are..." Those participants who engaged in iterative conversations, asked open-ended questions, and encouraged others to reflect on new perspectives.

Perspective-taking was described as valuable by participants in both sites, as reflected by one participant who told us, "...giving somebody the floor, recognizing that they've got a valuable opinion about something even if they're not the expert in the room, I think is important." Water resource issues often involve multiple boundaries (e.g., geographical, jurisdictional, cultural), and thus, there is much value in recognizing professional, scientific, and local knowledge. Interview participants from both sites acknowledged the benefit in learning from others. As one participant affirmed, "I think a lot of us are working toward the same goals but have a different roadmap of how we would like to get there." Because many of the participants were experienced in the participatory process, they acknowledged different pathways to achieving a common goal.

3.3 Authentic leadership

Authentic leadership, the ability to motivate and lead others, seek a shared group identity or common goals, and commit to the engagement process (Gardner et al. 2005; Walumbwa et al. 2008), was the third most exhibited boundary spanning skill. At one point during the process, one participant expressed frustration with the lack of an identifiable topic and stated what the majority were thinking, "The biggest challenge is that it was [an] open-ended [process] and most of us are results oriented. How do we get from point A to point B, not [knowing] how do we decide what is point A?" It is during these moments when leadership is most needed. Over the course of several meetings, one participant empowered others by supporting the addition of outside subject-matter experts, demonstrating his commitment to the process, and encouraging reflection. "I think there were times when we backed up and went back to okay, what are we trying to achieve? Let's redefine this. Let's make sure that we're still on track and still looking at the same issue that we were trying to look at before."

A common challenge faced by both sites was achieving their identified goal even in the face of a major pandemic which forced participants to meet virtually. Several participants were challenged by unfamiliar technology and struggled with staying engaged. However, one participant

summed up his feelings, "...leaders don't sit back and not say anything." The ability of these two groups to successfully complete their vision was helped by participants who volunteered to lead tasks and remained committed to the group.

3.4 Trustworthiness

Trustworthiness is characterized by high integrity, transparency, honesty, and genuineness (Williams 2002; Miller 2008; Ernst and Yip 2009; Goodrich et al. 2020). Interestingly, trustworthiness was often projected through one's experience or subject-matter expertise as demonstrated frequently throughout this study. According to one participant, his belief that a particular member's experience constituted trustworthiness was explicitly stated, "Quite frankly, the Nebraska Community Foundation has enough sand in their bucket that we could trust them to do what we wanted to do." Study participants often commented on the involvement of subject-matter experts who had experience with implementation of an endowment, and how this enabled the group to "really run with it." When interview participants were asked how they encouraged others to trust one another, several cited the engagement process as something necessary for trust development. Many participants explained that their group needed time to get to know each other and frequently described trustworthy individuals as other participants who responded in a respectful and empathetic manner. "No one engaged in behavior or speak that would erode that trust," commented one participant.

During the course of the engagement process, participants encountered the addition of new stakeholders. We found that it was often those participants who had already built a level of credibility within the group, who were not only accepting of new stakeholders, but supportive of new members. In some cases, stakeholders with subject-matter expertise were brought on board after the topic was decided upon. Rather than disrupting the group's cohesiveness, these new participants were welcomed, and their knowledge respected and valued. Our analysis suggests that trustworthiness, while often formed over time, is the precursor to trust building and more successful relationship building. As one producer participant remarked, "I think trustworthiness is earned, and when people get together after a few meetings with enough time around people, [they] develop trust. That's how I develop trust."

3.5 Autonomy

Autonomy, the ability to think independently and share thoughts contrary to others while remaining loyal to one's home organization (Tushman 1977; Williams 2002; Miller 2008; Schotter et al. 2017), was demonstrated in a variety of

ways. All participants were expected to identify a water issue important to them and support each other in the endeavor, e.g., identifying and moving ideas forward. Not surprisingly, this required participants to challenge one another and try on new ways of understanding problems and potential solutions. These activities caused discomfort for several participants. It was at these moments, when participants began to doubt the process, that one particular CP site participant pushed the boundaries. His confidence was evident when he suggested the group focus on invasive species and its impact on river conveyance. His suggestion was not only a demonstration of autonomy, but ambitious and a turning point for that group.

One particular NP interviewee, challenged by the group's inability to settle on a topic, demonstrated his autonomy by expressing his concern that the group was trying to "create a problem to solve." The group responded by agreeing to coalesce around a topic by the next meeting. We contend that autonomy is not simply a matter of speaking one's mind. The challenge is to remain committed to one's organization yet push boundaries and the status quo while encouraging others to do the same. As one participant put it, "I listened to them, and I threw out something way different for something else to think about."

3.6 Effective science communication

Effectively communicating highly scientific, technical, or complex information in a relatable or clear manner (Cash et al. 2003; Bednarek et al. 2016; Nel et al. 2016; van Enst et al. 2017) was the least used skill in both study sites. That said, several participants from each site recognized the value in fostering iterative conversations, engaging experts, and using feedback loops to provide a platform for clarification. One participant acknowledged the value of a fellow participant's knowledge, "She helped a lot as far as helping us through some of the stuff we were talking about and I think she brought us a little bit of an industry perspective, you know that the group didn't have." Seeking out or identifying those individuals with the ability to break down complex information so that it is understandable is valuable, as is knowing when to reframe an issue. Moreover, an overload of highly specialized information can alienate stakeholders and discourage valuable discussion (Bednarek et al. 2016; Reed and Abernethy 2018). As one producer participant stated:

Sometimes it's easy to think because you have the science background or pieces like that, you know how to best solve the problem. Maybe you do but you got to have the best way to communicate how you're going to solve that problem and actually move it forward.

More than one participant recognized a disconnect between science and producers, suggesting that science not

only needs to be relevant to others, but "distilled down to a level that is understandable to all."

Our inductive analysis identified three additional boundary spanning skills (identification and/or interpretation of body language, power differentials, and support/creation of a neutral third space). Here we offer preliminary definitions of each skill supported by evidence from our inductive analysis and make connections to existing literature.

3.7 Identification/interpretation of body language

Many stakeholder participants commented on the significance of body language and social cues during the engagement process. As one natural resource professional observed, "if people had a puzzled look on their face, then usually somebody said, well you need to explain that better, you know." "I would much rather prefer to meet people in person. You pick up from the body language and the social cues," commented one participant. This skill is reflected in the boundary spanning literature as an awareness of other individuals' feelings by actively monitoring their words, emotions, and behaviors (Williams 2002; Ansett 2005). Consequently, by continually attending to those around her or him, boundary spanners are more effective in managing relationships (van Meerkerk and Edelenbos 2021).

Interviewees' recognition of the importance of body language was also heightened by the pandemic and the switch from in-person to virtual meetings. The inability to judge people's reactions was diminished through virtual meetings, and participants at both sites struggled at times with the collaborative process. Several participants expressed their frustration with online meetings. "I need human interaction; it is very important because you can say all these things, but if you're not sitting across from somebody you can't tell their emotion." Another participant expressed, "Communication and body language, I think, you get more authentic conversations...".

3.8 Managing power differentials

There was recognition that "big" personalities need to be managed to support an inclusive stakeholder engagement process and that leaving dominant personalities to direct the process has its drawbacks. One participant acknowledged the effects of strong personalities:

I think that we have in our group, you know, about a half dozen relatively big personalities. So, if you have people like me [big personalities] that are involved in a larger group, you know, we can steer a conversation perhaps the way that we might want to, and others might not. So, I think that that is a challenge.

Another participant supported this observation and remarked that participants with subject-matter expertise were more likely to drive the direction of the conversation:

You saw a little bit of struggle, they each had their own pet project direction that they wanted that to go, and sometimes those didn't all agree. Then sometimes you would see, when we decided on a direction, it was kind of a power struggle of which one of those people got to be the person whose idea it was ...”

In those circumstances, quiet or inexperienced stakeholders often retreat, but in this particular situation, this participant chose to challenge and question the approaches long advocated by participants with more experience collaborating on public issues.

Recent literature supports a boundary spanner's involvement in managing or mitigating power imbalances early on and throughout the engagement process (Delaine et al. 2015; van Meerkerk and Edelenbos 2018; Liu et al. 2018; Jensen-Ryan and German 2019). The consequences of not managing resource, knowledge, or positional imbalances are often significant and may lead to increased stakeholder conflict, lack of trust, or high stakeholder attrition. Certain individuals are needed to resolve the “management of difference” in order to pursue mutually beneficial outcomes (Williams 2002, p. 115).

3.9 Support/creation of a neutral third space

Participants who support and take advantage of activities and circumstances that allow for the development of a neutral third space are vital to the overall success of the engagement effort. The ability to use humor as a way to reduce tension and maintain a safe space was employed by one participant during a time when emotions ran high. At one point during the engagement process, the CP site struggled to find consensus on the fund title; the comfortable environment created by earlier goodwill was quickly dissipating. One participant noticed the tension and used levity to lighten the mood which allowed this group to pause and then move forward in a more relaxed manner. A neutral third space can also help support participants who represent disenfranchised communities. A comment shared by several participants from both sites was the chance to gather consensus “from the ground up” and “create a safe environment for people to bring up stuff.” One participant acknowledged the importance of a neutral third space by seeking to “break into smaller groups that allowed you to get to know each other.”

The literature on a boundary spanner's support or creation of a safe space is highlighted by Ernst and Yip (2009) who suggest that a neutral zone can serve as a base for developing new or enhancing current relationships. In creating this

shared space, individual ideas are emphasized, transcending “social identity boundaries” (p. 5). People are more willing to share their perspectives and personal beliefs when individuals can interact as individuals and are not categorized into distinct groups (Ernst and Yip 2009; Prysor and Henley 2018).

4 New insights

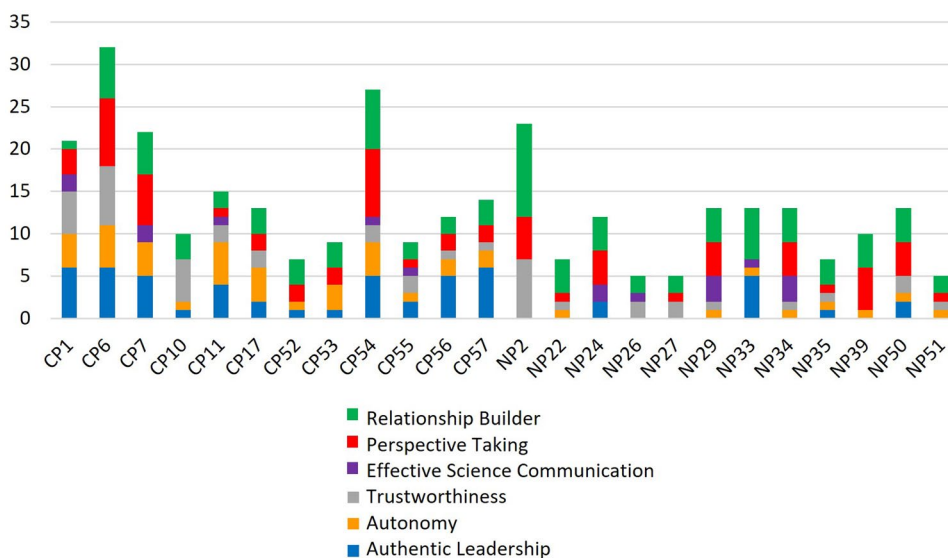
Our study set out to answer two questions: First, do stakeholder engagement participants in the context of water resource management exhibit boundary spanning skills? Second, what qualities of boundary spanning skills were exhibited, and how were they applied in practice? We find ample evidence that participants did exhibit boundary spanning behaviors. In looking across sites, several patterns emerged in how boundary spanning skills are employed.

First, we found that some boundary spanning skills were exhibited more often than others. For example, more than half of all participants exhibited relationship builder, perspective-taking, and authentic leadership. Autonomy, trustworthiness, and effective science communication were used less frequently. Only a small handful of participants in each site used six or more skills. This suggests a continuum of accessibility, readiness, or ease of use of established boundary spanning skills where relationship building and perspective-taking seem to reflect tacit skills more readily applied, whereas autonomy and authentic leadership were implemented less regularly and may entail higher risk and/or a higher degree of skill. Thus, convenors might take into consideration tacit boundary spanning skills present among the make-up of participants.

Moreover, participants had less to say about trustworthiness as compared to perspective-taking and relationship builder, and this may be due to the difficulty of articulating how one performs acts of trustworthiness as compared to sharing perspectives on interpersonal trust within a group. It may also suggest an opportunity to elevate trustworthiness in the minds of stakeholders and practitioners alike as a key facet of boundary spanning skill. Further, few interviewees demonstrated effective science communication. These findings together suggest opportunity and need for training in boundary spanning skills.

Second, the use of boundary spanning skills based on coded passages from the interview transcripts varied between participants within and between the two sites (see Fig. 2). Participants from the CP site generally noted their use of the boundary spanning skills more frequently than those participants in the NP site. Evidence of boundary spanning skills was mentioned a total of 191 times by participants from the CP site and 126 times by participants in

Fig. 2 Use of each boundary spanning skill evident through coded text of interview data from CP and NP participants



the NP site. Four of the top five participants who most frequently noted their use of boundary spanning skills were from the CP site. Only effective science communication and relationship builder were noted more frequently by participants in the NP site, although effective science communication was the least noted skill in both sites. These differences may be attributed to prior stakeholder engagement experience of participants at each site. In the CP site, several individuals were recognized by fellow participants and the facilitators as having more years of participation in collaborative natural resource management. This contrasts with the NP site, where the breadth of subject-matter expertise was diverse, but participants generally had less experience with collaborative management. Moreover, the NP site participants were generally less familiar with each other which could explain why more NP participants mentioned relationship building.

Third, through analysis specifically of observation data collected with the CP site, we found that the frequency of the boundary spanning skill exhibited varied as the engagement process moved forward (see Fig. 3). This suggests a potential compounding effect where some boundary spanning skills may activate use of other skills or there may be a situation effect in which the skill is more or less important depending on the stage of engagement. For instance, effective science communication was generally observed more frequently in the middle of the engagement process, while autonomy was observed less frequently toward the end of the engagement process.

Fourth, not only is boundary spanning a multidimensional skill set, but in practice, participants use multiple boundary spanning skills interchangeably. For example, in the CP site, one participant displayed authentic leadership in what became their group’s main outcome, an endowment fund, by providing a clear and convincing case for the fund’s purpose

and process. Another participant took on the role of knowledge expert, demonstrating an ability to effectively communicate complex information while projecting credibility and competency (i.e., trustworthiness). Moreover, perspective-taking and relationship builder often overlapped. This is consistent with previous research on boundary spanners implementing interrelated competencies during the collaborative process (Miller 2008; Williams 2010; van Meerkerk and Edelenbos 2021).

The inductive analysis found that a handful of participants from both study sites were attentive to the body language, facial expressions, and emotions of others during the engagement process. These findings, however, also demonstrate potential limitations of virtual engagement. Our participants were willing to continue meeting virtually through the pandemic, but our findings show an individual’s ability to accurately interpret non-verbal communication and emotion is limited in virtual settings, potentially hampering

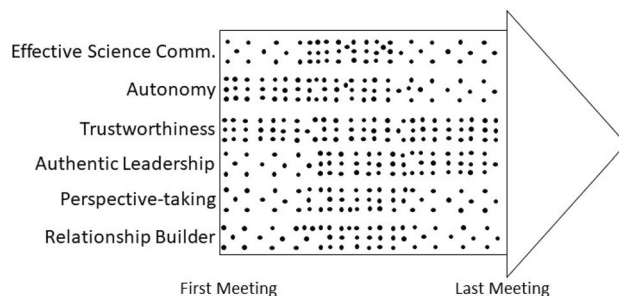


Fig. 3 Generalized frequency of boundary spanning skills exhibited during the stakeholder engagement process at the CP site. (Density of dots indicates generalized frequency of exhibited boundary spanning behaviors by participants as the engagement process moved forward; derived from observation data)

management of relationships (Ansett 2005; Williams 2002; van Meerkerk and Edelenbos, 2014). One participant explained, “It’s harder generally speaking to get a feel for what people are thinking and how they’re physically reacting to things.”

Second, it became clear that participants were acutely aware of other team members with strong personalities, particularly when in opposition to their perspective. It was made clear by several participants in both sites that managing these “big” personalities was needed to ensure diverse participant’s ideas were reflected in the engagement process.

Finally, through the inductive analysis we found that participants supported the establishment of a neutral or shared space where relationships can develop, and knowledge is shared. For instance, several participants from each site took advantage of informal opportunities to get to know others on a more personal level. For example, one participant felt comfortable enough to share a joke during a time when the group struggled with the details of fund design. Without the establishment of a neutral space, participants may be less inclined to demonstrate vulnerability or remain open-minded. This is consistent with previous research on boundary spanners supporting a neutral zone or low power distance between team members where values can be explored, assumptions can surface, and internal hierarchies are removed (Ernst and Yip 2009; Liu et al. 2018).

5 Takeaways

Our work shows how boundary spanning skills are exhibited specifically in the context of stakeholder engagement for addressing water resource management challenges—a growing issue not just in the US Great Plains but globally. The findings of this study demonstrate that engagement participants exhibited boundary spanning skills, although to varying degrees. Importantly, some boundary spanning skills were used more than others, which provides a window of opportunity for training that could increase a broader range of boundary spanning skills in stakeholder engagement contexts. Finally, while the purpose of the research was to observe six specific boundary spanning skills, we found evidence through the inductive analysis that other boundary spanning skills may also enhance the stakeholder engagement process.

Our analysis provides insight for practitioners. For example, boundary spanners may aid smaller communities who face water or land management challenges, but lack the financial resources needed to hire a professional facilitator. In those instances where communities lack support or the capacity for professional facilitators and convenors, boundary spanners can assist in partnership development, promote engagement strategies that empower participants, and manage power disparities (Worosz et al. 2022 in review).

A next step is to examine boundary spanning skills across a broader set of contextual settings as well as degrees of conflict (Ansell and Gash 2008). Our study did not employ a comparative analysis; thus, we were unable to assess how such factors shape boundary spanning. Future research should ask how different contextual conditions influence boundary spanning, who employs these skills, as well as how boundary spanning relates to stakeholder engagement outcomes.

Acknowledgements An earlier version of this paper was developed through an interdisciplinary workshop supported by the Agriculture and Food Research Initiative (AFRI) Advancing scholarship and practice of stakeholder engagement in working landscapes Grant No. 2020-01551 project accession No. 1023309 from the USDA National Institute of Food and Agriculture.

Author contributions All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by JLD, MEB, and WME. The first draft of the manuscript was written by JLD, and all authors commented on subsequent versions of the manuscript. All authors read and approved the final manuscript.

Funding This work was supported by the Agriculture and Food Research Initiative (AFRI) Water for Agriculture Grant No. 2017-68007-26584/project accession No. 1013079 from the USDA National Institute of Food and Agriculture.

Declarations

Conflict of interest The authors have no competing interests to declare that are relevant to the content of this article. Weston M. Eaton is an editorial board member of Socio-Ecological Practice Research. He was not involved in the peer-review or handling of the manuscript, and has no other competing interests to disclose.

Ethical approval Approval was obtained in line with the principles of the Declaration of Helsinki. Approval was granted by the Institutional Research Board (IRB) of the University of Nebraska-Lincoln (05.29.2019/#20190519298EX).

Consent to participate Informed consent was obtained from all individual participants included in the study.

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