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## Working Together for Soil Health: Liberating Structures for Participatory Learning in Extension

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### Cover Page Footnote

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**Abstract.** Liberating Structures (LS) provide a user-friendly toolkit to shift group power dynamics and allow all stakeholders to contribute. We explored the novel use of LS in soil health extension to conduct high-engagement events with diverse stakeholders. Our goals were to promote social learning, networking, and to encourage innovation. Soil health themes emerged highlighting specific practices, and the necessity of addressing broader scope issues of education, economics, and policy. Participants reported increased knowledge of soil health, professional connections, and forecasted participation in soil-health-promoting activities. Participants also expressed a sense of community, expanded perspectives, and appreciation of the co-development process.

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### INTRODUCTION

A dominant strategy within Extension has been ‘linear technology transfer,’ a paradigm encouraging adoption of emergent agricultural practices through one-way communication and the standard presentation-by-expert-to-audience format (Klerkx et al., 2012; Rogers, 2003). Extension modalities are moving towards adoption of adult education strategies to enhance learning effectiveness (Bell & McAllister, 2021). These efforts include high-engagement activities and co-innovation processes focused on social learning between producers, crop advisors, conservationists, and researchers toward integrating all stakeholders’ knowledge and experiences. Co-learning has been shown to create knowledge that is pragmatic, tangible, contextually relevant, actionable, and focused on fostering community (Bremer & Meisch, 2017; Jagannathan et al., 2020).

As outreach models transition, Extension professionals require strategies encouraging participant-driven innovation processes across diverse stakeholders that promote group equity, develop the innovative capacity of individuals, and foster innovation-promoting social networks (Klerkx et al., 2012). Wang et al. (2019) found that potential behavior change was increased when perceived risk for adoption was lowered and awareness of the benefits of conservation practices was enhanced, a phenomenon described in the social sciences as the expansion of the mental model. Our team identified Liberating Structures (LS) as proven and versatile tools to create environments with high levels of engagement for co-learning while supporting expansion of participants’ mental models.

Liberating Structures (LS) is a user-friendly toolkit for developing events that build connections and foster innovation within complex systems. See *The Surprising Power of Liberating Structures: Simple Rules to Unleash a Culture of Innovation* by Lipmanowicz and McCandless (2014) for the LS menu. The theoretical and conceptual framework of LS is based on a history of educational engagement strategies including Socrates, Montessori, and more recently, complexity science and action inquiry (Singhal et al., 2020; Torbert, 1991). Using LS supports both equitable power distribution within a group and participant engagement in peer-to-peer inquiry, but retains enough power for leadership to enable progress toward group objectives (Torbert, 1991). These tools have been successfully employed in a variety of fields, including increasing engagement in university classrooms and improving healthcare standards (Singhal et al., 2020; Mallet & Rykert, 2018; Chumley & Magrane, 2011; Mahoney et al., 2016). The use of LS in agricultural Extension to conduct participatory events with diverse stakeholders can promote a shift toward social learning, networking, and co-innovation.

## METHODS

As part of the Washington Soil Health Initiative, a LS format was used for participatory Extension events with diverse stakeholders to promote peer-to-peer learning, networking, and co-innovation. Two, five-hour, in-person sessions (n=27, n=31) with distinct participants were hosted in Pullman, WA, in February 2020. Using the LS toolkit, the agenda was storyboarded to facilitate a rapid co-innovation process progressing through the sharing of common purpose, identifying key questions and issues surrounding soil health, and preliminary solutions (Table 1).

The event was open invitation, announced throughout eastern Washington using emails targeting key stakeholder groups via listservs of over 1800 unique contacts from previous soil health activities. Stakeholders were identified and recruited to represent producers, crop advisors, policy interests, conservation agencies, industry, and academic research, within fruit and dryland wheat production systems (Figure 1). Demographic and motivation information was collected with registration to capture diversity among participant interests and soil health backgrounds. The approximate group size of 30 individuals was chosen to maximize opportunity to participate while maintaining connections between participants and facilitating group sharing. Initial seating was auditorium-style with rows of four to allow easy movement as ‘structures’ changed. Tables and writing materials were available around the perimeter of the room. All participants gave oral informed consent for data collection.

At the beginning of each event, facilitators presented ground rules that encouraged attentiveness and respect. Facilitators outlined activities, kept time using a bell, and guided reflection. The use of specific LS verbiage was limited. Each LS activity had a distinct and dynamic format, typically with a prompting question enabling participants to work through different stages of the innovation process in various group sizes, time limits, and space arrangements. Outcomes were assessed with a post-workshop evaluation form to determine the impact of the sessions on innovation processes and network building.

**Table 1.** Agenda of Storyboarded LS Activities to Lead Participants through Soil Health Innovation and Co-Production

| Activity Objective   | Liberating Structure Tool      | Format  |
|--|--------------------------------|---|
| Rapidly share purpose of gathering and facilitate networking                   | Impromptu Networking           | In groups of two, each person shares a two-minute response to group prompt  |
| Make the purpose of the work together clear                                    | Nine Whys                      | In pairs, each person answers repeated queries of ‘Why is this important to you.’ The uncovered underlying motivations are then shared with another pair. |
| Get practical and imaginative help from colleagues immediately                 | Troika Consulting              | In groups of three, participants take turns playing the role of client with a question and consultants who offer advice on the question                   |
| Articulate the paradoxical challenges the group must confront to succeed       | Wicked Questions               | Alone, and then in a small group of 4-6 participants discuss and distill “How is it that X and Y can happen simultaneously?”                              |
| Discover, spark, and unleash local solutions to chronic problems               | Discovery and Action Dialogues | In small groups participants discuss a series of seven progressive problem-solving questions  |
| Rapidly generate and sift a group’s most powerful actionable ideas             | 25/10 Crowd Source             | Participants write their ‘boldest’ solution and ideas on notecards, notecards are rapidly exchanged, ranked, and shared with the group                    |
| Discover and focus on what each person has the freedom and resources to do now | 15% solutions                  | Participants individually generate solutions that will generate largest impact with fewest resources, then form small groups to share and discuss         |

Note. Process adapted from Lipmanowicz and McCandless (2014)

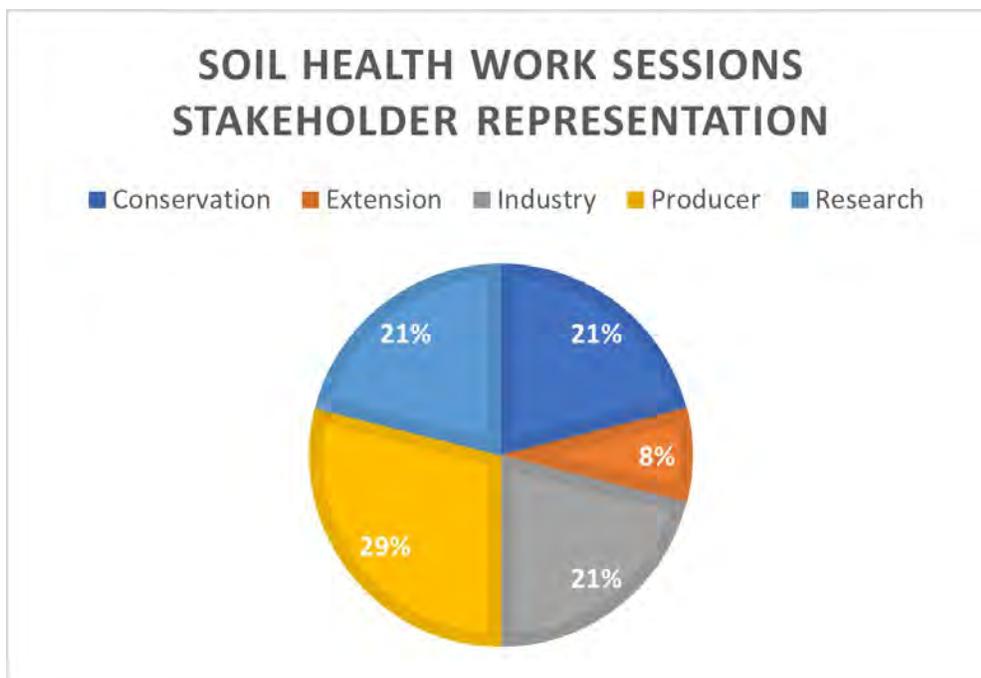


Figure 1. Stakeholder representation across both work sessions.

## RESULTS AND DISCUSSION

The use of LS for participatory Extension was new to participants, who were primarily used to unidirectional content transfer. During the work sessions, participants identified three pathways forward to promote soil health in Washington State: policy and economic changes to allow producers more flexibility in managing soil health, consistent and effective soil health metrics and novel research on regenerative nutrient cycling processes, and an increase in community awareness of soil health. Adoption of a variety of soil management techniques (e.g., cover crops, effective microbial solutions, soil erosion prevention, etc.) with the intention of improving soil health on farms increases the subjective well-being of producers and their communities (Friedrichsen et al., 2021).

The sessions met the organizers' goals of enhancing peer-to-peer learning, building social networks, and fostering co-innovation with 80% of participants reporting increased knowledge, 80% reporting a new professional connection, and 92% indicating an intent to take action to increase soil health within the next six months (Table 2). The LS toolkit shifted participant experience to focus on co-knowledge production including increased sense of community, active learning, increased empathy of others' world views, creativity, and reflection (Table 3). These results indicate outcomes of expanded mental models, co-production of knowledge, and social learning (Jaganathan et al., 2020). These important shifts in participant experience are necessary to help support the transition from linear learning to a co-development of innovations paradigm.

To improve participant experience, we recommend considering hearing-impaired attendees, clearly stating the workshop goals at the beginning, and allowing participants to reflect on group goal achievement.

## CONCLUSION

The novel use of Liberating Structures in agricultural Extension was effective at promoting co-innovation and building networks across stakeholder groups. LS tools were easy to learn and implement, resulting in positive experiences for facilitators and participants. Over 30 LS tools are freely available and can be applied towards a multitude of ends including road mapping and needs assessments, evaluation, brainstorming, problem solving, education, and almost any application where facilitators desire to engage every participant in the room.

**Table 2.** Evolution of Work Session

| Participant self-reported response                                       | % of survey respondents reporting |
|--|-----------------------------------|
| Expressed increased knowledge  | 80%                               |
| Reported a new professional connection                                   | 80%                               |
| Would recommend participation to a colleague                             | 63%                               |
| Indicated taking action to increase soil health within the next 6 months | 92%                               |

**Table 3.** Participants' Perceived Impact of Workshop

| Emergent Themes  | Participant Quotes   |
|--|--|
| Sense of community and social networking   | “Knowing I’m not alone”  |
| Active learning to foster co-development of Innovation   | “It made us think right away. We had to put our thinking caps on early. As opposed to listening.”  |
| Development of empathy towards the perspective of other stakeholders’ perceptions of soil health | “It gave me the opportunity to see how others in the agricultural industry think”<br>“Helped understand issues farmers face—good discussion of issues and good networking” |
| Creative in-depth learning and reflection  | “What exactly is [the] issue [of soil health]—helped me think this thru [sic]”<br>“Think outside of box—our own personal box”  |

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