

A Communication Systems Framework for Sustainability Science



Bridie McGreavy, Laura Lindenfeld, Brianne Suldovsky

University of Maine, New England Sustainability Consortium



Key Insights

The Communication Systems Framework is an organizing device for studying and guiding communication practices so that sustainability science teams and organizations can reach their goals for interdisciplinary collaboration, stakeholder partnerships, and sustainability solutions. In our research with the Sustainability Solutions Initiative and the New England Sustainability Consortium, two large-scale sustainability science networks in the northeastern part of the United States, we identified key communication structures and processes that shape who participates on teams and the respective roles they play, the level of satisfaction with the process, and progress toward stated goals. We recommend using the Communication Systems Framework to encourage the emergence of teams and organizations that demonstrate adaptive capacities such as learning and the inclusion of diversity and where sustainability values and solutions can be identified, negotiated, and implemented.

Introduction

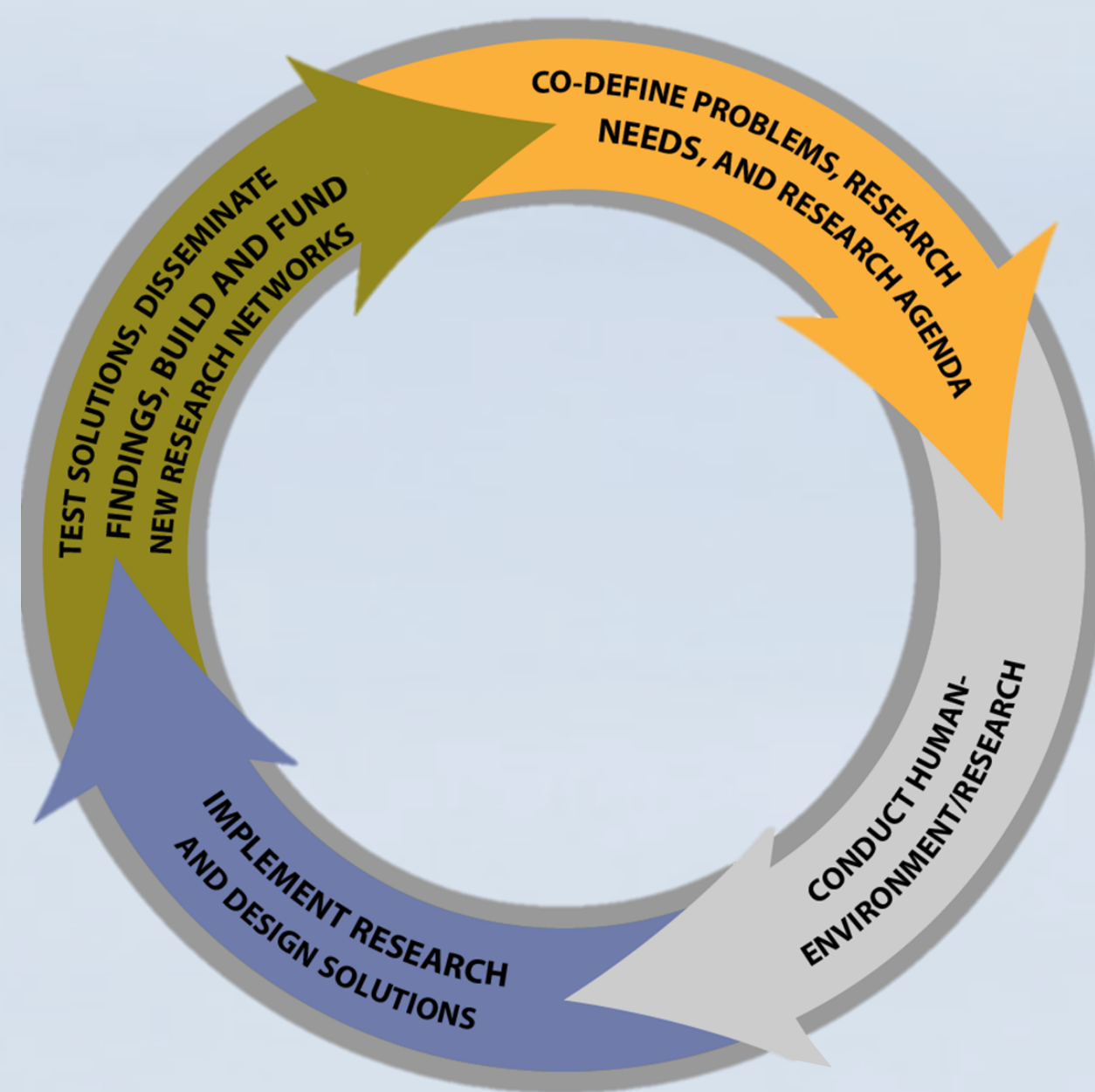


Figure 1. Sustainability Science Knowledge Co-Production Model^{1*}
*See *handout* for references.

Sustainability science develops solutions to complex problems through collaborations across disciplines and institutions.¹ Researchers and stakeholders form teams and organizations to create new knowledge. Communication guides how teams form and how knowledge is produced by shaping how sustainability problems are defined, research proceeds, and the types of outcomes that emerge. Our communication systems framework assumes that how this process of self-organization occurs cannot be known in advance. Paying attention to how specific structures and processes shape individual, team, and organizational patterns can help project leaders and collaborators communicate in ways that promote intended outcomes. In Phase I of the Communication Systems Framework research we identified structures, processes, and outcomes within 20 sustainability science teams within the Sustainability Solutions Initiative (SSI).² In Phase II, we refined and expanded our structure and process dimensions within the New England Sustainability Consortium (NEST), a collaboration between University of Maine, University of New Hampshire, and a host of other academic, governmental, and non-governmental institutions in New England. Our first project as a consortium intends to improve the scientific basis for decision making about beach and shellfish management.

Questions & Methods

RQ1.

How, through communication, do we create organizations that allow us to reach our project goals?

RQ2.

How do structures and processes shape interdisciplinary collaboration, and stakeholder engagement?

RQ3.

How can we align needs for information and preferences for collaboration to achieve our goals?



Figure 2. Meeting face to face (or boot to boot) with interdisciplinary and cross-institutional partners shapes how teams form, how we learn from each other, and project-related identities.

Phase I

Sustainability Solutions Initiative Framework Development

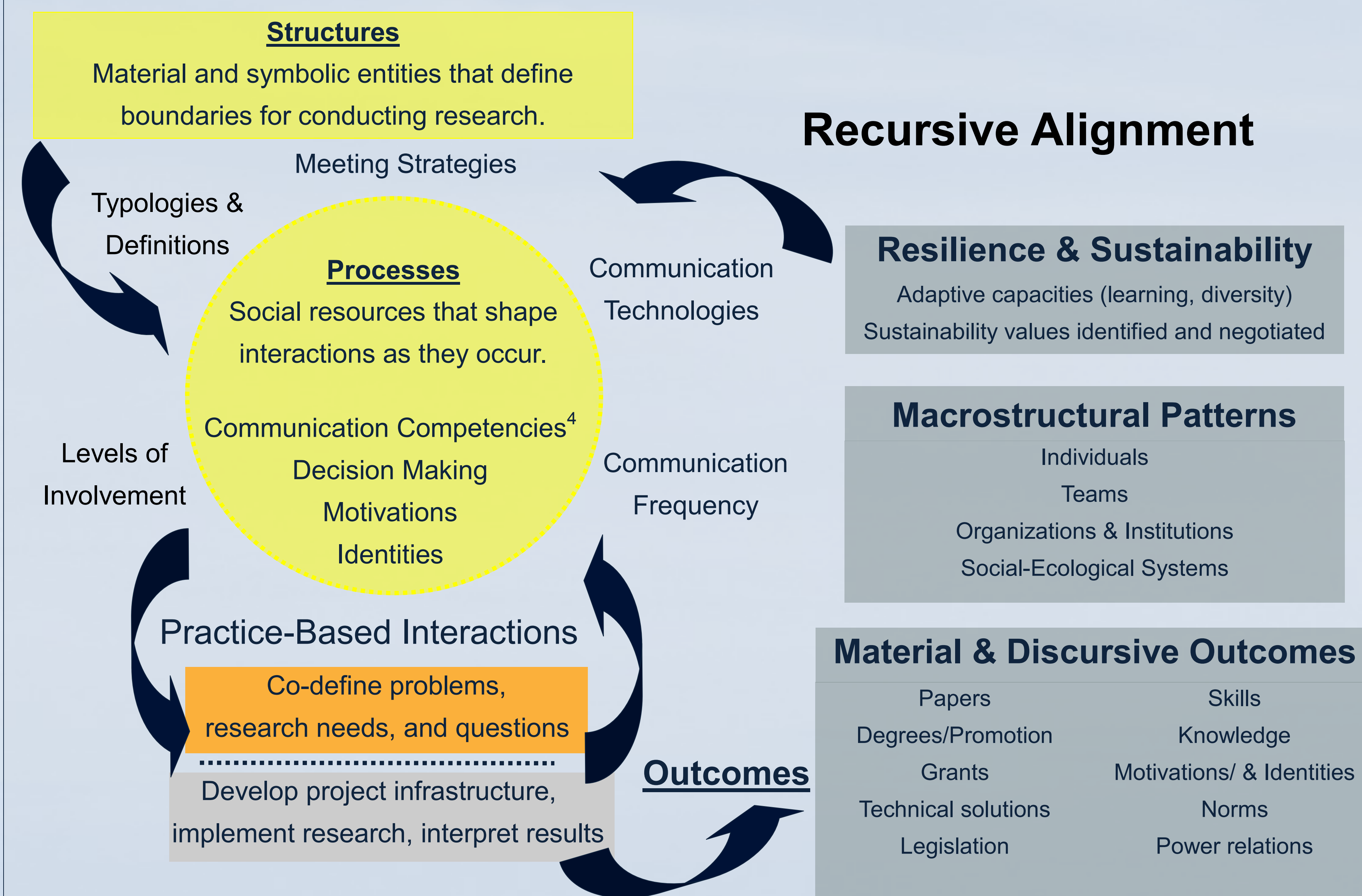
- Participant observations at SSI events
- Interviews with faculty and students on 20 SSI teams (n=41)
- Survey to faculty and students at all participating institutions (56% response rate, n=88)
- Member checking interviews (n=5)

Phase II

New England Sustainability Consortium Framework Refinement

- Participant observations at NEST events
- Survey to faculty and students (74% response rate, n=29)
- Interviews with faculty, students, and stakeholders (n=39)
- Additional interviews intended 2015

Communication Systems Framework



Key Concepts

Communication as system: Part to whole relationship; System emerges through interactions among human and non-human actors that shape patterns of social and ecological order.

Recursivity: Systems contain the seeds for their growth and renewal in which structure and process mutually interact to shape dynamically unfolding patterns of order.

Communication competencies:
My team members:
~communicate well with each other.
~show respect for diverse opinions.
~laugh or use humor frequently
~discuss outcomes.
~work to build a common language.

Decision making models:
~Single person
~Consensus based
~Core group (n=3 to 5)
~Project & problem specific
~Lack of decision making

Select Results

Phase I

- **Structures** influenced who participated within teams and their research-related role.
- **Process:** Teams using single-person decision making demonstrated reduced satisfaction and slower or no progress towards goals.
- **Outcomes:** Decision making and communication competences strongly correlated with inclusion of diverse ideas ($r = 0.81$ and $r = 0.66$, respectively). Communication competence was also strongly correlated with mutual understanding ($r = 0.64$).

Phase II

- **Typologies and Definitions:** The definition of "safe" levels of bacteria are not uniform across stakeholder groups. These differences in framing influence problem definition and how power further shapes decision making.
- **Meeting Strategies:** Participants described the importance of meeting face-to-face for learning about one another, demonstrating a commitment to the project, and promoting creativity in the research design process.
- **Decision making:** 65% (n=19) prefer that every member of the team have influence but one or a few people have final authority. 79% (n=23) do not prefer that a single person on the team be responsible for decision making.

"But I'd much rather meet in person for the right amount of time. Two to four hours, well-defined meeting, where you can interact and play off of one another's energy is way more useful time."

Recommendations



1) **Words, technologies, and meeting strategies** structure participation. Awareness of differences in structures helps identify what to change so that the team can be more inclusive and responsive to "stakeholder" needs and to the role of power.

2) **Decision-making matters.** If a single person on the team defines structure in ways that foreclose others' participation to shape those structures, team members will not have satisfaction with the process and the team is not likely to make progress towards interdisciplinary, sustainability-related goals.

3) Sustainability science teams **need high communication competence**, for example laughing together, listening to one another, and avoiding negative sarcasm.

4) **Face-to-face meeting strategies**, especially in the early phases of a sustainability science collaboration, may be essential for learning, creativity, and demonstrating commitment to the project.



Supported by National Science Foundation award #IIA-1330691 to Maine EPSCoR at the University of Maine. Support for NH EPSCoR is provided by the National Science Foundation's NSF EPSCoR Award# IIA-1330641.

