



*Team-building exercises can foster trust and camaraderie.
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Lesson: Creating Interdisciplinary Research Teams, A Two-Session Exercise

By Heidi Scott, SESYNC | April 7, 2023

Overview:

Collaborative teams are essential to the study of complex socio-environmental topics. Teams that achieve high levels of new research, groundbreaking publications, and alliances across disciplines and stakeholders have several common traits. Successful teams are committed to a common goal, research approach, communication lines, and standards of performance to which members hold each other accountable. When creating interdisciplinary teams, certain strategies are important: fostering team diversity (both identity- and disciplinary-based diversity); learning empathy, interpersonal skills, and communication styles; supporting researchers across age and academic hierarchies; and integrating individual skills and styles effectively to synergize research operations. In this lesson, learners will practice the art of selecting, recruiting, and synergizing an interdisciplinary research team. While team building may be hypothetical for this lesson, it can also be used as a way to generate diverse and synergetic teams at the beginning of an actual research project—for example, a semester-long experiential learning sequence that tackles a real-world problem.

Assumed Prior Knowledge:

Appropriate for undergraduate, graduate, and higher-level learners. This lesson may be especially useful for graduate students and postdocs who wish to develop their skills in team building before embarking on a career in socio-environmental science.

Learning Objectives:

- Detail the combination of interpersonal, communication, and technical skills that are features of successfully integrated research teams.
- Study how specialists hone their skills to productively collaborate across disciplinary boundaries and achieve more integrated research outcomes.
- Develop social sensitivity and interpersonal awareness in a team-building context.
- Brainstorm team-building exercises to attract and coordinate a diverse team with a high level of group intelligence.
- Identify team collaborators; develop a research question process for a hypothetical or real research need.

Key Terms and Concepts:

team building; epistemology; interdisciplinary design; scientific methods; group intelligence; social intelligence; group diversity; integrated research; communication; empathy

The “Hook” (suggestions for quickly engaging students):

For 2 minutes, ask learners to brainstorm and jot down a list of teams that they’ve been part of over the course of their life. This might include sports, adventure, or performance groups; community or school groups; or previous, collaborative science work.

Have each learner choose the team they enjoyed the most. Then, for 3 minutes, have them list features of the team: Was its strength based on leadership, common goals, accomplishments, fun and camaraderie, communication, diversity of skill and identity, or something else?



*Team-building and brainstorming exercise.
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End “the Hook” by asking for a show of hands for each feature above. This quick survey may give a sense of how team-making relies on a diversity of skills and how the social and emotional aspects should be integrated into team design.

Teaching Assignments:

Creating Interdisciplinary Research Teams (Two, 75-minute classes)

1. As preparation for the session, have learners read the article by Cheruvilil et al. 2014, “Creating and maintaining high-performing collaborative research teams: the importance of diversity and interpersonal skills,” paying special attention to the highlighted portions.

[Cheruvilil et al. 2014.pdf](#)

- Also ask learners to upload to your learning group’s online shared space a digital copy of their skills-based CV to share with peers during the session. If they only have a traditional CV, ask learners to revise it to display skills, disciplinary knowledge, and experience at the top.
 - The instructor should identify and recruit more advanced learners (advanced undergrads, grads, and/or postdocs) who can serve as the Principal Investigator (PI) in a hypothetical team-based research project. There should be one PI for every five to six learners in the class. Prior to the start of class, ask these advanced learners to serve in the PI role. They should each be prepared to “elevator pitch” (1-2 minutes) a research question based on a local or regional socio-environmental issue; this pitch will inform and entice peer collaborators from class.
 - If the instructor does not wish to select PIs, he/she/they may instead use the previous class to preview the lesson, lay out the responsibilities of the PI role, and offer volunteers the opportunity to lead a group.
2. **(10 min.)** After “the Hook” above, use these Lesson PPT slides to provide common understanding.

[Interdisciplinary Research Teams Lesson Slides.pptx](#)

3. **(10-20 min.)** Invite the PIs to pitch their research question to the class in 1-2 minutes. Learners should take notes on each pitch and select the top two projects they wish to join. Depending on the size of the class and number of PIs, these quick pitches should take 10-20 minutes total.
4. **(15 min.)** The online course space will serve as a communication and networking device: PIs start a discussion thread with their research question and invite interested peers to “reply” in that thread.
- Non-PI learners should upload their CVs and write a case for their inclusion on two different teams based on their skills (technical, interpersonal, communication, etc.); identity (how their perspective is important to group circumspection); and interest in the research question.
 - While the non-PI learners are writing their posts, the PIs should review the replies of their interested peers and start to make selections. Each group should have four to six individuals including the PI.
5. **(15 min.)** Now comes the formal “team draft.” Each PI selects one collaborator per round, with a total of three to five rounds (depending on team size). If a learner is drafted by another team, PIs must select others.
- PIs should select collaborators based on established team-making principles:
 - Disciplinary knowledge (major, courses taken, internships, publications)
 - Diversity of identity (including gender, race, age, etc.)
 - Communication skills (including “brokers” who foster interaction)
 - Genuine interest in the research question and project goals.
 - Note: This part of the lesson has the potential to feel like a cruel team selection for 5th-grade dodgeball. Learners who are selected later in the draft may feel undervalued. That’s actually a useful outcome here because it shows how some skills tend to be valued over others and how articulating “soft” skills like empathy, communication, and writing ability is critical.

- If any learner is not matched with a team in their top two choices, that individual enters “free agent” status, and other PIs and their groups may select him/her. By the end of this process, all learners should be included in teams of about four to six people.
6. **(10-15 min.)** Convene the teams for a quick set of welcomes and introductions. Groups should prepare for the second class session by typing up the beginning of a Research Team Profile, including the team’s name; research question; and members’ profiles (name, major, anticipated role in collaborative research).
 7. As homework, have each learner answer the following questions and post them under their team’s thread in the online course space.
 - What’s the name you use, your pronouns, and something else personal you’d like to share (such as your guiding values, something about your family, where you grew up, why you chose your major, etc.).
 - What do you enjoy about working in groups? What do you loathe or fear?
 - If the group were to have an extracurricular team-building process, what would you choose? (i.e., ropes course, hike, kayak, picnic, etc.—Keep in mind issues of accessibility for all.)
 - What would your ideal role be in a collaboration that tackles your research question?
 8. **(15 min.) In the next class session**, learners should sit in their groups from the start. Have them share their responses to the homework questions and discuss the group dynamic further. The PI should lead the discussion but not dominate it. At the end of this 15 minutes, each group member should have a sense of the people they’re working with and where their skills fit into the collaboration.
 9. **(30 min.)** Each group should open a Jamboard (or similar brainstorming software) or use actual sticky notes for this process. For each question, create a new page for sticky posts.
 - What excites you about working with this specific group of collaborators? What concerns you?
 - How can we assign roles and collaboration based on individual strengths? How should we delegate tasks and communicate, and what’s our rough timeline?
 - Are there neglected elements in the formulation of our research question? For example, if the question is about “ecosystem impacts due to high alkalinity in regional surface waters,” what additional factors do we need to include to get the full picture? (Ecologists may prefer natural science questions and answers and neglect social impacts such as environmental justice, recreation, or policy issues like failing to regulate farm or industry runoff).
 10. **(30 min.)** Groups should now synthesize their notes into a series of concise responses to the above questions, which they type up in a [Shared Conceptualization](#) (p. 4) that builds on the Team Profile from above. While the PI may continue to lead discussion, he/she/they should consider and give voice to other perspectives and not dominate the discussion or the composition of the Profile or Conceptualization. Have each group submit their Integrative Team Plan as homework to the instructor.

11. If this is not a hypothetical exercise, but the beginning of a true collaboration, start the next class session by having non-PI group members briefly present their Team Profile and Shared Conceptualization to the whole class, with time for discussion. If successful, this exercise has formed teams based on diversity, trust, and mutual interest that have scrutinized their skills and their research question, and formed a provisional plan of action.

Background Information for the Instructor:

1. A Practical Guide for Managing Interdisciplinary Teams: Lessons Learned from Coupled Natural and Human Systems Research

- This article profiles a case study of an interdisciplinary socio-environmental research project that sheds light on how to design and support team science. The authors explore new ideas surrounding integrative science and find two useful areas for planning and collaborative leadership: data management and co-authorship.
- Henson, V.R.; Cobourn, K.M.; Weathers, K.C. et al. (2020). A Practical Guide for Managing Interdisciplinary Teams: Lessons Learned from Coupled Natural and Human Systems Research. *Social Sciences*, 9(7), 119. <https://doi.org/10.3390/socsci9070119>

2. Interdisciplinary Ecology in Practice

- This “water cooler chat,” sponsored by the Ecological Society of America, is moderated by an ecologist, Scott Franklin, and an environmental consultant, Timothy Nuttle. They provide concise answers to questions about the nature of interdisciplinarity and challenges to implementation, and provide a list of additional links to organizations that support this kind of work.
- Ecological Society of America. (n.d). *Interdisciplinary Ecology in Practice: ESA Water Cooler Chat ~ October 9th, 2020*. <https://www.esa.org/about/interdisciplinary-ecology-in-practice/>

3. Ten tips for developing interdisciplinary socio-ecological researchers

- This accessible article provides practical advice for early career researchers and their mentors, as well as senior researchers and lab leaders, in the form of 10 tips:
 - Develop an area of expertise.
 - Learn new languages.
 - Be open-minded.
 - Be patient.
 - Embrace complexity.
 - Collaborate widely.
 - Push your boundaries.
 - Consider if you will engage in interdisciplinary research.
 - Foster interdisciplinary culture.
 - Champion interdisciplinary researchers.
- Kelly, R., Mackay, M., Nash, K.L. et al. (2019). Ten tips for developing interdisciplinary socio-ecological researchers. *Socio-Ecological Practice Research*, 1, 149–161. <https://doi.org/10.1007/s42532-019-00018-2>

Related SESYNC Content:

- Scott, H. (2023, June 7). *Creating Actionable Science on Campus Lesson*. SESYNC. <https://www.sesync.org/resources/creating-actionable-science-campus-lesson>
- SESYNC. (2023, May 19). *Team Science, Interdisciplinary, and Transdisciplinary Resources*. <https://www.sesync.org/resources/team-science-interdisciplinary-and-transdisciplinary-resources>
- Gosselin, D.C., Thompson, K., Pennington, D., & Vincent, S. (2020). Learning to be an interdisciplinary researcher: Incorporating training about dispositional and epistemological differences into graduate student environmental science teams. *Journal of Environmental Studies and Sciences*, 10, 310-326. <https://doi.org/10.1007/s13412-020-00605-w>
- Toman, E. (2016, August 11). Social science identities in interdisciplinary research and education. *Integration and Implementation Insights, i2insights*. <https://i2insights.org/2016/08/11/social-science-and-interdisciplinarity/>