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Explainer – What Is Interdisciplinary Team Research? Are There Best Practices?

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Overview:

Scientific research is very collaborative today and, thus, almost always includes teams of people, rather than single investigators. Interdisciplinary team research, which integrates knowledge and expertise from different disciplines, can be challenging—especially when the disciplines are extremely diverse in their methods and epistemologies. This is particularly true when members include a mix of scholars from one or more of the following: natural sciences, social sciences, and humanities. SESYNC provides many resources to help team members understand and overcome those challenges. This explainer is just a brief overview of the steps and practical considerations that teams should take to ensure a productive and transparent team process that integrates an array of talents and scholarship. In short, integrating practical skills and situational awareness with durable support structures can help overcome the challenges that face interdisciplinary teams.

Steps for Successful Team Research:

- Identify individuals with the right leadership skills.
- Select an inclusive and representative team across demographics and ranks.

- Thoughtfully design meaningful meetings, particularly the first team meeting.
- Focus on best practices for meeting facilitation.
- Articulate the team's array of complementary skills that achieve unique results.
- Establish clear and multiple communication channels.
- Design iterative and evolving research protocols.
- Navigate conflict resolution to rebound from intra-team strife.
- Craft deliverables to integrate different forms of knowledge.
- Ensure adequate organizational support throughout the project's duration.

Practical Considerations in Detail:

1. **Leadership skills** are not the same as **scientific skills**.
    - Group leadership requires **self-awareness and humility**, as well as a willingness to accept feedback, adapt procedures, and ask for help both within and outside the group. Effective leaders are not always the most celebrated or prolific scientists; instead, effective leaders have skills in **communicating**, **showing empathy, negotiating differences** among team members, and **setting a clear process** and **common goals**.

2. **Inclusion** and **representation** are critical.
    - Team design should engage not only the needed disciplines but also **integrate demographic diversity** and seek the **input of stakeholders**, which may include non-academic community members, Indigenous peoples, and industry.
    - Team builders must consider all aspects of team demographics and seek a diversity of identity, experience levels, and epistemological or disciplinary approach.

3. Teams should accommodate **different learning and collaboration styles**. Interdisciplinary collaboration is a dynamic process that plays out both at the individual and team levels.
    - Identifying preferred **modes of communication** (i.e., written vs. visual; email vs. in-person meetings; real-time collaborations vs. delayed feedback) is important in optimizing the **skills** and **time commitment** of each team member.
    - Groups should discuss and establish **practices for team engagement** that honor the epistemological hybridization of their process. This work may involve integrating procedures that are unfamiliar to some group members and may require iterative rounds of process-design building.

4. **Common ground** builds epistemological bridges.
    - Interdisciplinary work can improve by teams identifying boundary objects, which exist in multiple disciplines and cultures and **facilitate communication** among these worlds. In team science, a boundary object is a common resource that has contrasting significance to diverse team members and provides insight into collaborative opportunities based on the team's plural understanding of the object. Boundary objects have **plasticity** so their

meaning and significance may shift based on social context, but they are also **concrete** and have clear meaning in each context. This flow of meaning can also provide insight and integration of a group's **power dynamics** and **relative worldviews**.

- Field samples, conceptual or more technical models, museum specimens, and historical documents and images are all potential boundary objects that help a group situate their epistemological differences on common ground.

5. **Familiarity** and **trust** are essential attributes of strong teams.

    - Trust builds from **accountability**, especially when there is a high degree of task interdependence. But it also comes from **familiarity** and r**apport**, which are soft skills developed through **constructive team social events**.

6. **Conflicts** are common at all scales of collaboration, and they can have **positive effects**.

    - Planning for **conflict arbitration** and **adaptation** in the wake of conflict is key.
    - Micro-conflicts can be catalysts for **creative exchange**. Group- and project-level crises, although difficult, can lead to productive project evolution, especially if leaders possess the skill of iterative project design evolution.

7. **Designed interactions** led by **skilled facilitators** can accelerate progress.

    - Facilitators can provide an **outsider's perspective** on design and process and provide relief for team leaders. Facilitators with diverse scientific skills can be **bridges between individual**s, by accelerating research between **generalists** and **specialists**.

8. **Research conventions** based on **high levels of specialization** may require re-design.

    - Splitting analyses into disciplinary sub-teams is efficient and common, but it can lead to separate products that can't be integrated into a more meaningful whole. **Integration** of team deliverables across disciplines should be built into the design, execution, and completion of teamwork.
    - Mechanisms that ensure frequent, effective communication and exchange among sub-teams need to be in place before analyses are set in motion.

9. **Organizational support** for teamwork should be robust, creative, and durable.

    - Organizations must provide the **necessary commitment** (e.g., money, staff, computational expertise, resources for learning, sufficient time) for interdisciplinary collaborations to flourish.

Further Reading:

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This work was supported by the National Socio-Environmental Synthesis Center (SESYNC) under funding received from the National Science Foundation DBI-1639145.