Preliminary Suggestions for

Success in Interdisciplinary Teamwork

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The New Directions Initiative is bringing together very interdisciplinary teams to work on environmental problems. "Very interdisciplinary" means not just geochemists working with geophysicists, but earth scientists working with humanities scholars. For many of us, this is unexplored territory. I'm writing this document for the teams gathering at the March 2002 New Directions workshop, with two hopes: that it will help this year's teams to work together productively, and that they will tell us what helped and what didn't help, so that together we can learn how to work together.

> By now you've found colleagues in other fields that you want to work with, and you've managed the financial and administrative paperwork to set up a project together. With those obstacles behind you, it's tempting to think that nothing more can go wrong and to plunge joyfully into doing the work. But there are special challenges to working cooperatively with colleagues from other disciplines. Intentional communication, especially at the beginning of a project, is necessary to avoid confusion, destructive conflict, and disappointment. Intentional communication is also needed to establish ways of working together that allow each discipline's strengths to be brought forth.

Different disciplines are different. In our professional education, we each learned our own discipline's ways of working, our own group's answers to basic questions like:

- What constitutes a question, theme, problem, idea, or issue that is worth working on?
- What counts as an explanation?
- What are reasonable levels of uncertainty in our results?
- How much theoretical basis, and how much observational ground-truth, is required?
- What skills and techniques are used in doing research?
- What concepts and theories must our results use or be consistent with?
- How, and to whom, do we communicate our results?
- What special terminology can we use without having to explain its meaning?

In working with professionals from other disciplines, we discover that they are schooled in different answers to these questions. Our work together will succeed only to the extent

that we understand these differences well enough to preserve the strengths of our different approaches while working together constructively. This requires attention to communication at the beginning of the project and a project structure that encourages ongoing communication.

Although Katzenbach and Smith (1993) were writing about teams in the corporate workplace, their definition of a team highlights important components of an interdisciplinary research project:

> A team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable. (p. 45)

This is the essence of interdisciplinary research: a group of people with complementary skills, knowledge, and points of view, who are working together because they share commitment to a single purpose. Working together requires commitment to a project timeline and to quality standards for the project's deliverables, which are the research project version of performance goals. To work together, team members need agreement and commitment on their approaches to conducting the research, to communicating with each other, and to managing the project. Finally, without mutual accountability, we would not be "working with" each other, but only "working alongside", or "working for" each other, and the true interdisciplinarity nature of the project would be lost.

Common purpose

> The team's purpose must be understood in common by all the members and it must be meaningful to all the members, inspiring both pride and responsibility. (Katzenbach and Smith, 1993, p. 52)

> An important factor in later effective teamwork is the utilization of skills of the different disciplines in planning the project and the extent to which the different disciplines have a stake in the results. (Luszki, p. 168)

> When there is a group of people, each of whom speaks a special professional jargon but each of whom also speaks a common language, it is sometimes necessary to drop the special languages and learn to understand each other in

> terms of the common tongue, that is, to communicate in neutral terminology. (Luszki, p. 270)
>
> Developing a common mission may seem like a simple task, but it is one too frequently skipped in cross-sector projects. Often the individuals on the team focus on their parochial interests, fail to open themselves to broader points of view, and become critical of the motives and work style of their teammates from other professions. (Lippincott, 2000)

The purpose defines the project and is the foundation of the individual and collective work of the team. Confident in a common understanding of the purpose, individual project members can act autonomously when those ubiquitous unforeseen circumstances occur. When they are aware of mutual commitment to the purpose, project members are motivated to do the work of expanding their vision of research to encompass the visions of their teammates. The combination, confidence in a common understanding as well as awareness of mutual commitment, enables project members to work together constructively in weighing priorities and choosing among (or combining) the goals, products, and methods suggested by their different disciplines.

> It is tempting to assume that, after writing the proposal together, the members of a project are in agreement about the purpose: the words are there, and we all signed off on them. But different disciplines often use the same words with different meanings. Early in the project, it is crucial to converse about specific examples, special cases, hypothetical outcomes, etc. so that the project members can develop a deep appreciation for the motivations and points of view of their teammates, and the team as a whole can create a shared understanding of the project's purpose. Project members need to listen to their colleagues' ideas about:

- What is the central, most important, or defining, aspect of the project's purpose?
- Which related matters are part of the project, and which are beyond the project boundaries?
- What does each member hope will be the ultimate effect of the project?
- How will the activities of this project contribute directly to that ultimate effect, and what will be left to others?

As this conversation continues, what emerges is a shared purpose that calls for a

meaningful contribution from each team member.

It's hard to be sure we really all understand the purpose in the same way. Luckily, the purpose is further clarified when we work together on planning the project's timeline and deliverables.

Timeline and deliverables

What work are project members actually going to do? Again, we are tempted to think that we all agree, because a timeline and list of deliverables were in the proposal. And again, the different languages and tacit assumptions of our different disciplines require that we take some trouble to make sure that we really do have a common understanding. By

labeling and describing the timeline and deliverables, the team is developing a shared vocabulary that will be the basis for clear communication, as well as a yardstick for measuring progress. In the project's discussion of timeline and deliverables, team members should listen to their colleagues' expectations about:

- How the results will be published and distributed.
- The form and contents of the final report.
- Intermediate steps and preliminary findings.
- Prior actions or results that each step will depend on.
- How much work each step will require, and how it can fit on the calendar.
- What standards of quality are appropriate.
- What shared resources will be required.

Working within our disciplines, many of these very concrete and detailed considerations are tacitly understood. Discussing the details with our interdisciplinary colleagues reveals differences among our distinctive approaches, improves our understanding, and allows us to see opportunities for working together. This learning process will continue throughout the project, so timelines, goals, and methods can be expected to need adjustment as the project progresses, more so than a single-discipline project. The discussion of timeline and deliverables will also require an equally detailed discussion of approach.

Approach

> Team members must agree on who will do particular jobs, how schedules will be set and adhered to, what skills need to be developed, how continuing membership is to be earned, and how the group will make and modify decisions, including when and how to modify its approach to getting the job done. (Katzenbach and Smith, 1993, p. 56)

"Approach" answers the question, "How are we going to do it?" The aspects that need to be clarified are (1) research methods, (2) project management, and (3) arrangements for communication and working together.

A discussion of research methods follows from the rough draft stage of the timeline and deliverable specifications, and provides important information for making sure the timeline and deliverables are possible. In interdisciplinary projects, research methods must be discussed at a concrete and detailed level, because all project members do not understand the techniques of each discipline. In the discussion, members need to describe methods, techniques, skills, concepts, theories, and other contributions that their disciplines could make to the project. The meetings on these topics promise to be lively and educational, as all the project members get a fast-track education in the cooperating disciplines, and the group decides how to incorporate and combine approaches to achieve project goals.

As the research approach is clarified, the degree to which it achieves the ideal of interdisciplinary research can be evaluated by using some questions that Klein borrowed from Peston (1978):

1. Does the project, formulated in interdisciplinary terms, show a recognition of the existing contribution made by the separate disciplines?
2. Is the interdisciplinarity genuine in the sense that the problems are formulated in terms which enable the different disciplines to get together rather than compete with one another?
3. Is the method of data acquisition likely to be helpful to all the relevant disciplines or is it biased in a particular direction?
4. Does the interdisciplinarity enhance the possibility of hypothesis testing or does it obscure it?
5. What difference will the results of the research make to the policy decisions that will eventually be taken? (Klein, 1990, pp 136-138)

Next comes assignment of responsibility for particular jobs, including project management. An important consideration is management of perceived differences in status that can impede interdisciplinary teamwork. If project management is reserved to members of a single discipline, potential contributions of other disciplines may not be recognized or volunteered. In addition, interdisciplinary work requires team members to be open to the points of view of other disciplines, which is difficult when members feel a necessity to defend their own way of doing things. One rule of thumb is that all project members should contribute to research and writing as well as to decision-making. This allows the disciplines to be integrated at all levels, but it is only possible in a small team in which all project members understand the project goals, timelines, and methods.

> There are two basic considerations which are conducive to successful teamwork. The first is effective intrateam communication; the second is realistic, respectful division of labor, combining both assigned and achieved status for all members. (Stone, p.356)

> Best research results generally can be anticipated when the team is a closely interacting group. Through continuous talking and working together, errors and misunderstandings can be corrected and a common line of action developed. (Luszki, p. 274)

By now, it's clear that effective communication is crucial to the success of interdisciplinary research projects. Trust is also essential, because project members are taking a risk in going beyond the safe boundaries of their disciplines and in sharing control of their research. Time spent, at the outset, to discover how team members prefer to communicate, and to make a plan for the communication to happen, will prevent miscommunication, lack of coordination, and confusion throughout the project. In some teams, members email each other copies of research materials, and return them with comments. Many teams schedule time for multiple drafts of reports and publications so that members can review and contribute. When a team has developed a common language, email exchange is convenient and effective for clarifying thoughts and defining disagreements, although it is not a substitute for in-person conversation. It may be best to designate one team member as the convener who takes responsibility for calling meetings and encouraging everyone to stay in touch.

Mutual accountability

> Mutual accountability does tend to grow as a natural counterpart to the development of team purpose, performance goals, and approach. (Katzenbach and Smith, 1993, p. 60)

> Stone distinguishes young teams, which he calls secondary groups, from older teams, which he calls primary groups. Secondary group relations are basically self-protective of the individual, who tends to think in terms of "I" rather than "we." Primary group relations reflect the team's devotion to a common task and shared cognitive framework. (Klein, 1990-91, p.37)

> Research indicates the strongest indicator of success in interdisciplinary teamwork is shifting to a primary group orientation while building common language and shared assumptions. (Klein, 1990-91, p.38)

> When each member of the team sees the importance of his role, not in terms of personal prestige, but as a contribution to a service greater than he can achieve through his own skill alone, then there is basis for real collaboration. In this situation, members are established in a true partnership, operating on the basis of mutual respect, not a partnership bought at the price of concession and assumption of a servant role. (Luszki, p. 274)

In interdisciplinary research, we need each other. We need the skills, knowledge, points of view, and just plain hard work, of other team members. We need mutual commitment for struggling together to create a new reference frame that makes our work more effective than if we were working separately. Mutual accountability can grow naturally as an interdisciplinary team works together, if we care about the project purpose, and if we take the risk of depending on our teammates, of being responsible for more than just our part. As the project progresses, remember that team members are experiencing these risks, and may sometimes need to have a task organized in a less collaborative, less threatening way. A team that is clear about its purpose and the roles of the different disciplines and team members can make these adjustments.

What have we gotten ourselves into?

> Well, Fran, you only get out of something as much as you put into it. (Fran's father, personal communication)

Interdisciplinary research projects are more work than the *intra*disciplinary kind, but they have the potential to do uniquely useful things, and they are a lot of fun! Both the extra work and the extra fun tend to be interpersonal. We are required to join with diverse strangers to shape a common mission, and not only do we make new friends, we have the fun of moving beyond our routines. We must think about our own jargon and technical terms, we must learn the language of other fields, and we have the fun of exploring a new linguistic landscape. Beyond language, we work to learn the assumptions and techniques and points of view of other disciplines, and thus broaden our understanding of the world and maybe pick up some tricks that could be usefully applied in our solo work. Working in an interdisciplinary team provides plenty of practice at keeping our minds open, and

surely we'll be better people for it. This project will take extra time, but we'll be spending that time with colleagues who share our passion for the project purpose.

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