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LINGUISTICS AND INTERDISCIPLINARY INITIATIVES AT COLORADO: OBSTACLES AND OPPORTUNITIES

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The success of an organization created to further interdisciplinary research, such as Colorado/Boulder's Institute for Cognitive Science, requires more than personal commitment to specific interdisciplinary projects. There must be student, institutional, or external demand for its research, and the people involved must be flexible, willing to work on cross-disciplinary communication, and able to invest their time. Members also need to be perceived as valuable members of their home departments. The structure of the interdisciplinary organization must foster a cooperative culture and allow time for it to emerge. Providing occasions for formal and informal interaction and a fair reward structure are essential; students also need rewards for the extra effort they need to invest in taking nonglamour courses outside their field. Finally, for state institutions, great persistence is likely to be needed in order to overcome obstacles imposed by bureaucratic external governing boards.

Interdisciplinary success begins with personal commitment to specific interdisciplinary projects, so successful projects have to deal with problems that people from different disciplines care about for some reason. But much else beyond that initial personal commitment is needed to sustain interdisciplinary work and make it pay off intellectually. This paper is a reflection on the factors that help or hinder successful interdisciplinary collaboration in research and teaching, based on the experience that the Linguistics Department at the University of Colorado has had over the last decade. Most of the paper will focus on the department's interaction with the Institute for Cognitive Science (ICS) of CU/Boulder. When I speak of an 'institute' below, therefore, I have in mind a structure in which all institute members have their tenure homes in academic departments (linguistics, computer science, psychology, etc.). Their salaries, however, may come through the institute rather than the department.

In preparing this report, I interviewed ICS Director Walter Kintsch, Associate Director Martha Polson, and Bellcore (Bell Research Laboratories) veteran/ICS faculty member Tom Landauer. These conversations indicated considerable consensus, but also revealed several different angles on the issues. Of course, I have also drawn on my own observations and experiences during my eight years at the Aphasia Research Center of Boston University School of Medicine

and my twelve years at Colorado, seven of the last eight of them as department chair. (They gave me some time off for good behavior.)

The presentation below as a list of separate topics is artificial, as each aspect seems to be interwoven with most of the others; under many of the headings there are points that would fit equally well under some other heading. Such resistance to linearization, I suppose, corresponds to my topic itself: how to foster inchoate ideas and help them become thriving research lines.

1. Demand for research and courses

Demand for the output of an interdisciplinary project — such as student demand, institutional demand, or external research funding — is needed for a project to become part of the core of an interdisciplinary program. You need to be able to recognize that there is the potential for such a demand and figure out how to cultivate it. Web pages with guest books seem to be a good way to attract the attention of potential students these days; administrators anxious to leave a mark on the institution can sometimes also be instrumental in obtaining support for a particular type of research.

2. Adaptability

The people involved in an interdisciplinary project have to be flexible enough to abandon the idea of simply 'applying what they know'. Good research partners can't be like the proverbial person with a hammer to whom everything looks like a nail. Therefore, it's important for us to train students to be flexible in their approaches to problems, and to be flexible ourselves. (Example from my own experience in moving from child phonology to neurolinguistics: phonological rules don't work in aphasia like they do in most of child phonology, my original field. Instead, there are statistical tendencies to move towards unmarked syllable structures. If I had had the tools to deal with this fact, perhaps I would have been able to work on aphasic phonology. Instead I had to flex in a different way, and worked on cross-linguistic studies of morphosyntax.) Students shouldn't become 'people with hammers', or even 'people with Swiss Army knives'; instead, they should become capable of adapting existing tools and creating new ones.

3. Communication

Interdisciplinary work runs into problems created by differing jargons and research traditions. Walter Kintsch noted that you may not even realize that your interpretation of what someone means by the same word is a little different from yours. More subtly, communication can be undermined by differing assumptions about values (e.g., the worth of studies using large numbers of subjects vs. case studies, or the value of neural plausibility in a simulation). You need to understand the values of the other field, and you need to learn to communicate the values of your own field, as well as trusting your colleagues to some extent.

Kintsch also noted that having ICS people inside the various departments made major differences in having other members of those departments come to

understand the value of interdisciplinary work. Therefore, you need key people in all the departments if you're trying to build institutional structure; it seems to be the way for departments to learn that other fields may have something to offer them and are worth investing in. (Kintsch recalled that Computer Science at Colorado used to try its own introspection for understanding linguistics and psychology, until they discovered, through their ICS members, that they were reinventing the wheel.)

Communication about what people really do, via key members in the various departments, is also essential in dealing with another perennial problem: a proposal to hire a person who does interdisciplinary research often arouses resistance, for fear of diluting the department's program. The reaction of a department is likely to be the objection that the candidate is 'not a linguist', 'not a computer scientist', etc. Someone in the department has to be able to communicate what the candidate will bring that will strengthen the department as a whole.

4. Personal time/Development time

Investment of time — our most highly-valued good in academia! — has to have a perceived payoff (a low risk-to-benefit-ratio) for both the people who are doing the work and those who are paying them. Enormous patience is required for scheduling meetings and getting people to serve on institute committees. Scheduling interdisciplinary courses, getting courses cross-listed so that they can be counted towards the degrees in the various departments, and getting credit for courses taught outside the instructors' home departments require patience, knowledge of the rules, and the ability to negotiate with the people who have the power to change those rules. An institute also needs to move fairly quickly when opportunities do become available; having goodwill in the overlapping departments and in the administration pays off when there's a chance for a key hire.

It takes time for a cooperative culture to emerge, and for people to see what it's good for. The structure of the interdisciplinary institution has to foster the cooperative culture, and allow time for understanding to develop. Internal informal research presentations with discussants from different disciplines, jointly-taught courses, and jointly-led seminars are specific things that ICS has done to foster the emergence of such a culture.

Payoffs for organizing and attending any of these events may be remote; the people who do the work need recognition, because that may be all they get for a while. Organizers of these events also have to realize that meetings will typically be attended only by subsets of the whole group; there's no point in getting upset over that. That's the personal time risk/benefit equation again.

One thing that makes the university a great incubator is that the people paying us for our work aren't asking for time sheets (at least until we apply for grants). Our output is intellectual substance, crudely measured in publications and successful grant proposals.

5. Distance

Collaboration requires contact, and it's a fact that new collaborations are principally born of conversations during casual contact. Social opportunities provide introductions and attention to each others' work. So interdisciplinary organizations must maximize opportunities for members to have casual contact; the coffee and pastries and beer and munchies at meetings are investments, not frills. Retreats, however, have not seemed to be effective ways to increase new research, at least not in proportion to the time and money that they require.

Committee contact also seem to catalyze project starts; a very important site for engendering new ICS projects has been interdisciplinary student doctoral committees. (One might see students as bees cross-pollinating departments.) However, for such committees to be formed, some nuclear interdisciplinary faculty teams need to exist. Walter Kintsch noted that students won't do interdisciplinary work without that support structure, because there's so much extra to learn (see 8, Curriculum).

Providing central space and facilities devoted to the interdisciplinary group are obvious ways to bridge physical distances, expensive though they are. There is also another kind of price: people housed in interdisciplinary facilities are almost always separated from their departments (it is rare that an institute can share building space with more than one of its overlapping departments). This increases their marginalization in the department. One solution is for institute members to have offices in their home departments, and labs in space dedicated to the institute.

6. Institutional structure

A lot of what an institute does is to obtain and re-distribute wealth. This includes indirect cost returns on federal grants, funding obtained from the university and from outside donors, student research and/or teaching assistants, donated equipment, support for students, library orders, and intangibles like visibility from giving institute lectures and publication in institute working papers. The structure of the institute has to insure a real and perceived fair distribution of payoff for everyone, not just for the people in the richest departments (usually computer science and psychology). Some directors get along with departments and schools, some don't; no one can make everyone happy, but their primary responsibility is to the institute members.

The actual and perceived fairness of the institute director is crucial: the director must not put forth a particular agenda while acting as director. This doesn't mean giving up one's own research, but it does mean recognizing that it doesn't have priority for the institute. The same is true for the executive committee, the curriculum committee, and whatever other decision-making bodies there are. The goal of fostering creativity and hard work entails that there must be a loose, bottom-up structure; an institute has to be a loose coalition of partially overlapping research groups. The individual investigators must have responsibilities and be able to see the rewards of their work.

7. Payoffs

What faculty want is help with research (grants and publications) and help with teaching (assistants). Students want exciting research, money to live on, good job prospects. Smaller amounts of money, like travel funds and student research funds, may be the only reason a lot of graduate students initially participate in institute activities. Departments want new lines and prestige, within the University and outside as well; schools and colleges want outside funds and national visibility. The institute must provide as much of what everybody wants as possible; circle back to items 1, 4, and 6 above. Being occasionally able to fund a new line in a department has been crucial to ICS — either as a ‘bridge’ (short-term funding then taken over by the department) or as a permanent line (see also 3, Communication). That’s the kind of power that can be bought by a sufficient share of the indirect cost return.

8. Curriculum

There have to be non-glamour prerequisites to the exciting courses; programming, phonetics, formal syntax, and statistics are probably candidates for the most-hated requirement, and students need tangible rewards for enrolling in a program that demands so much of them.

Interdisciplinary programs have the same design issues as programs within departments, but they are compounded, because the student needs to master a larger assemblage of research tools, and furthermore to acquire the level of understanding necessary for the adaptability described under 2. above. Curriculum committees have to decide how much coursework and how much research apprenticeship to require; differing institutes have arrived at differing solutions, and probably no solution is perfect or stable.

9. Legislators and taxpayers

Interdisciplinary courses and programs are key mechanisms in training students who are capable of working across discipline boundaries (see 2. Adaptability and 3. Communication). State bureaucracies seem to be in the business of stifling innovation in the name of preventing program proliferation. A change of state government can negate years of patient work. Sorry, I don’t know any answer to this one except sheer persistence. Clearly, the bottom line is that success requires commitment, from the university, the interdisciplinary group, and the individual people who are in it.

