

**INTERDISCIPLINARY AND COLLABORATIVE TEACHING:
OVERCOMING BARRIERS TO VITALITY IN TEACHING AND LEARNING**

Virginia Sapiro, Dean of Arts & Sciences, Boston University

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ABSTRACT

This “thought piece,” originally produced as a white paper through the Office of the Provost at the University of Wisconsin – Madison, draws on various reports, studies, and recommendations generated on that campus and elsewhere, scholarly literature, and personal experience to outline the remaining issues and generate a possibilities and recommendations for further action. Whereas most previous reports focus almost exclusively on administrative concerns and functions, this discussion paper focuses equally squarely on the nature of interdisciplinary and collaborative teaching and improvement of its quality.

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1. THE STARTING POINT

What and where are the barriers that advocates of interdisciplinary and collaborative teaching uncover in their efforts to respond to new needs in our teaching programs? What can campus leaders at all levels do to facilitate integrating interdisciplinary and collaborative curricula and teaching as major contributors to undergraduate, graduate, and professional education, assisting them in their striving for excellence? The national movement toward interdisciplinarity has been moving forward for some time across large and small campuses and public and private ones, from major research institutions to small liberal arts colleges. Experts across the country and abroad agree that universities have gone too far in chopping up learning into small agency-like bits. For many years now colleges and universities have been professing the ambition to become more interdisciplinary in both research and teaching, in the latter influenced by arguments like that of the well-known Boyer Report on “Reinventing Undergraduate Education,” which challenged universities to think beyond disciplines in formulating undergraduate education (Boyer Commission 1998). Colleges of liberal arts and sciences – and the universities in which we operate -- well know we cannot successfully fulfil our teaching mission if we organize our infrastructure and culture of teaching and learning as though completion of a major is the only important aspect of undergraduate education.

Agreement with the principles does not make the task easy, however, because of the vast array of competing demands in a time of ever-tighter resources. And, of course, not all key principles are widely agreed.

Interdisciplinary teaching is not new, and it is not going away. The contemporary, highly professionalized, monopolistic version of the discipline/department structure evolved over the 20th century, and this model of disciplines very quickly bred the counter-image of interdisciplinarity (Boxer 2000). Ellis (n.d.) located the origins of the concept of interdisciplinarity in both the 1920s efforts of the Social Science Research Council to develop a social science research agenda and in the work of the Vienna circle. Of course, the period from World War II through the Cold War stimulated many interdisciplinary science projects such as the development of the atomic bomb and other weaponry, and interdisciplinary social science projects such as those revolving around intelligence and defense personnel needs. Most observers identify the sciences, and science agencies such as the National Science Foundation as the most important source and instigators of the more contemporary push for interdisciplinary research and teaching (Friedman 2001).

Interdisciplinarity has also remained an important theme in the social sciences (although it is certainly more powerful in some areas than others) for three related reasons: (1) the strong pull of studying “social problems” requiring collaborative understanding such as poverty, racism and race relations, inequality more generally, urban blight, and the like; (2) the American tradition, reaching back to the Progressive era and social science organizations before that urging that public policy be based on rational decision searches and expertise; and (3) the influence of prestigious interdisciplinary research centers and programs such as the Institute for Social Research at the University of Michigan, or the Center for Advanced Study in the Behavioral Sciences in Palo Alto. Louis Menand points out that in the humanities, as the distinct disciplines have developed a less discernible and distinct core and boundaries, scholar/teachers have made a strong turn to interdisciplinarity and even antidisciplinarity (Menand 2001).

There are many reasons for the growth of interdisciplinarity. In her essay on women's studies and interdisciplinarity, Marilyn Boxer quotes a scientist explaining the rise of interdisciplinary fields like materials science as the effect of the "inexorable logic that the real problems of society do not come in discipline-shaped blocks. . . . There are no problems in society called 'chemistry' or 'geology' or 'economics'" (Boxer 2000:125). A report at the University of Maryland has probably put it best. "Why pursue interdisciplinarity? Simply put: life is interdisciplinary" (Dezure nd.).

This discussion paper tackles the question of encouraging collaborative and interdisciplinary teaching by drawing on the various reports, studies, and recommendations generated on this campus and elsewhere, as well as my own experience as a career-long interdisciplinary scholar, teacher, and administrator. My efforts are not limited to the usual specific administrative questions of credit assignment and the like, although that is here, too. It also covers issues related to nurturing high quality collaborative and interdisciplinary teaching such as professional development -- the learning process for both teachers and learners. The spirit of this discussion paper is to offer specific possibilities and recommendations, but recommendations that are embedded in a text designed to generate discussion and reflection. Successive sections take up the themes, "Defining terms: What are we talking about?" "How interdisciplinarity works," "The student's eye view of collaborative and interdisciplinary teaching," and "Leadership, administrative and policy support for collaborative and interdisciplinary teaching." Each section concludes with possibilities and recommendations offered in the spirit of food for thought.

Recommendations:

1a. At many – maybe most – major research universities there is already significant commitment to interdisciplinarity among the faculty, and many examples. Don't waste time preaching to the choir or depressing the folks who have been hard at work on this for a long time. Recognize whatever positive moves have been made, celebrate the many faculty and staff who have worked to provoke and give substance to this commitments. Focus on how to sustain what is there, help it grow and develop where appropriate, make the current efforts go viral, and how to help faculty and academic staff become engaged in it where appropriate.

2. DEFINING TERMS : WHAT ARE WE TALKING ABOUT?

Policy discussion and recommendations should be based on conceptual clarity. Much of the relevant discussion on encouraging interdisciplinarity has confused related but different concepts. Contrary to common slides of tongue and pen, a *discipline* and a *department/program* are different entities. The former refers to the organization of knowledge, the latter to a functional subunit of an organization. Crossing departmental boundaries in teaching does not necessarily create interdisciplinarity, and staying within them does not necessarily maintain disciplinary boundaries. Moreover, we must distinguish between *interdisciplinary teaching* and *collaborative/team teaching*. One is not a requirement or condition of the other. The remainder of this section elaborates on these conceptual issues.

2.1 The Discipline

Scouring definitions of “discipline” and therefore by implication “interdisciplinarity” demonstrates little consensus on meanings – certainly not of the sort that can definitively clarify policy and organizational thinking. Eloise Buker (2003), a political theorist trained in making conceptual distinctions, explored definitions of these concepts by examining her home fields of political science, supposedly a standard “traditional discipline,” and women’s studies, supposedly a more radical interdisciplinary field. She derived this definition of “discipline” from her literature review:

(1) a discipline has a past, a present, and a future and so confers identities on its practicing members; (2) disciplines share a vocabulary with technical terms that facilitate precise communication; (3) a discipline has a set of key questions that guide inquiry; (4) a discipline has a set of methods or strategies of interpretation; and (5) a discipline produces shared epistemological understandings of what counts as evidence.

After reviewing the realities of political science, noting the wide varieties and sometimes major conflicts within its professional community with respect to each of these elements, she found it difficult to dichotomize political science and women’s studies cleanly into the different categories of discipline and other.

Even brief reflection on most of the classic liberal arts and basic sciences suggests that precious few could stand stronger against a rigorous test of disciplinarity than could many “interdisciplinary” fields except, perhaps, insofar as they are disciplines because scholars say they are. Do cartographers and cultural geographers or archeologists and cultural anthropologists share a discipline? Can physiological psychologists, experimental social psychologists, and psychoanalysts even understand each others’ vocabulary and methods? Continental and analytical philosophers have been known virtually to refuse to share a department together. Across the natural sciences, social sciences, humanities, and arts, fields containing both a “theoretical” and “applied” or “practice” side usually show all the marks of heterogeneity that break what are often represented as the tidy boundaries of disciplinarity.

Disciplines are institutionalized at the local level in departments, and at the national and international level in professional associations and sets of elite graduate departments that train the vast majority of the eventual leaders of their fields. This institutionalization both nurtures critical differences in how teacher/scholars understand and practice their fields and provides the communities of practice that prevent the complexities and even conflicts within the disciplines from leading them to abandon the idea their self-identification as disciplines. People understand they are part of a discipline because they were trained in one, because they are part of its professional societies, and because they are in a relevant department or program. Nevertheless, in many, perhaps most fields, they probably have more trouble identifying the “core” of their discipline as a whole than earlier generations did. Louis Menand (2001) writes, for example, that “If, 30 or 40 years ago, you asked a dozen anthropology professors what anthropology's program of inquiry was -- what anthropology professors did that distinguished them from other professors -- you might have gotten different, and possibly contradictory, answers, because academic fields have always had rival schools in them. But, by and large, the professors would have had little trouble filling in the blank in

the sentence, ‘Anthropology is-----.’” Today, he suggests, the answer is more likely not to point to a substantive core, but to one based in practice, and more tied to institutional arrangements: “Anthropology is whatever people in anthropology departments do.”

In any case, as Buker points out, these or other possible definitions (e.g. the existence of professional journals, associations, or accreditation bodies; handbooks or grants programs; or majors and graduate degrees) do not distinguish clearly distinguish disciplines from more interdisciplinary fields despite the fact that, “In talking about disciplines, we academics often resort to the term traditional discipline and fantasize that everyone knows what is meant. We may be clear about fields like biology, philosophy, and English, but fields like biochemistry, international studies, and ethnic studies are less clear” (Buker 2003). Louis Menand (2001) underscores the difficulty across the board, reporting on the time one of the directors of the Stanford Humanities Center “read the titles of projects submitted by applicants for fellowships and asked the audience to guess each applicant’s field. The audience was right only once -- when it guessed that an applicant whose project was about politics must be from an English department.”

2.2 The Department or Program

Department and *program* are terms referring to institutional, bureaucratic structures. University rules can authoritatively define what constitutes a department or a program (or even a “department-like

body.” Some are built around fields conventionally understood to be disciplines, some organize fields that are conventionally understood to be interdisciplinary, some may revolve around problem areas that are not (or are not yet) widely understood even as fields at all. An interesting demonstration would be to gather a group of people consisting of faculty from different departments and ask them to review the list of departments and programs at one university to determine in each case whether the organizing principle is a discipline, an interdisciplinary field, or something else.

Academics who share a discipline may reside in a wide variety of departments or programs, carrying on their teaching and research in a manner that is little different from how they would proceed if they were gathered together in a department organized around their “home discipline.” Ph.D. economists, for example, are represented many tenure-granting departments, among others: Economics (and many other departments with “economics” in the title), public policy schools, social work, business, geography, and others. Achieving interdisciplinarity does not always require leaping across departments or colleges, but it often does; collaborative teaching that takes faculty across department or program boundaries does not always entail interdisciplinarity, but it often does. In addition, departments vary widely in the degree to which they value teaching and curriculum development, and in how tightly and carefully they have constructed their curriculum or the list of their course offerings in any given semester.

Departments and programs are historical creations, of course, and while most evolve as their members collectively and individually respond to changed circumstances, and as they hire from successive generations of scholars trained in different eras, the institutional structure also takes on a life of its own. For this reason a *Science* editorial once concluded that universities “partitioned along academic lines that no longer truly reflect today’s intellectual life. These academic groupings are now just categories that accountants and business managers use to build a budget” (quoted in Pellmar and Eisenberg 2000: 45). Universities regularly create new departments and programs out of what were new, interdisciplinary fields in order to give them more standing and facilitate advances in teaching and research. It’s a safe bet to say that few universities would create their current configuration of departments and programs if they had it to do over again.

Regardless of the disciplinary or field base of departments, they are the basic unit of the organization of teaching and curriculum, and through their hiring and personnel practices they have tremendous (but certainly limited) power over teaching and pedagogical practices. Departments are often accused of putting constraints on educational change because they are parochial, self-interested organizations. It is more constructive to place a different framework on the problem: Regardless of discipline, a department that takes its educational mission seriously is thoughtful, careful, and proactive in defining its educational and curricular mission, goals, obligations, and principles of its collective pedagogical practices and therefore the specifics of its curriculum and the resources and personnel it takes to achieve all that. In a large research university, these missions, goals, obligations, and principles can be especially demanding, and often cross-cutting, covering undergraduate majors and certificates, “service course” obligations, graduate or professional students, perhaps both “academic” and “clinical” training, and a wide range of expectations leveled not just by university policy and goals, but by those of the larger professional bodies.

2.3 Interdisciplinarity

Interdisciplinarity, like the discipline, has primarily to do with the organization and pursuit of knowledge. Many scholars, especially those in interdisciplinary fields, have spent time exploring and defining interdisciplinarity in order to provide a solid intellectual framework for their teaching and research. Teacher/scholars in relatively new fields may be especially likely to reflect on pedagogical, epistemological issues and the like because they cannot take as much for granted as can those who receive more longstanding traditions from their predecessors.

A document from the University of Maryland Center for Teaching Excellence points out, “the term interdisciplinary is used variably as a concept, a methodology, a process, a way of knowing, and even a philosophy” (Dezure 2003). Only one of many reasons why so many definitions exist is that they depend on “whether the reference is to programs, courses, research areas, modes of teaching and learning, or administrative structures” (Sill 2001). It also seems to depend on the broad field of the work, and the fields from which the interdisciplinary scholar/teacher hails (Wissocker 2000). Interdisciplinary teaching models emerging from the biological or health sciences are unlikely to be fully satisfactory for interdisciplinary teaching emerging from the arts, and interdisciplinary teaching that crosses the broad divisional divides, or brings together professional and “basic” academic fields is likely to face different issues again. The issues at stake also depend on whether we are talking about undergraduate, graduate, or professional programs.

It is thus important to identify the reference point in discussions of encouraging interdisciplinary and collaborative teaching, especially as we get down to specifics. That, of course, includes questions of whether we are talking about particular courses, student programs such as majors and certificates, or interdisciplinary university programs and departments. Interdisciplinarity at the *course* level does not always require interdisciplinary administrative structures or even collaborative or team teaching. A considerable amount of interdisciplinary teaching is done by single individuals who have been trained, or trained themselves in multiple disciplines or in interdisciplinary fields, and who integrate into their courses the questions, approaches, materials, theories, or findings and conclusions of multiple disciplines. Not only do many individuals do this, but many programs and departments include subfields that are interdisciplinary in the sense that the teacher/scholars in those areas are widely expected to be able to integrate ideas and materials born of multiple disciplines into their course work. In many social science fields – sociology, psychology, political science, for example – this has long been the case.

How interdisciplinary is interdisciplinarity? What type and degree of field mixing are we talking about? Once again, the answer, appropriately, will vary, even within one university. One of the most often-cited writers on the topic, Lisa R. Lattuca, says that interdisciplinarity implies an interaction among different fields that “may range from simple communication of ideas to the mutual integration of organising concepts, methodology, procedures, epistemology, terminology, data, and organisation of research and education in a fairly large field” (Lattuca 2002: 712). The next section of this discussion paper looks more in depth at this question.

Interdisciplinary programs vary in their collective conception of interdisciplinarity and they take on different institutional forms. The variation in programmatic forms stem from many sources, including historical accident, the repeat of models found elsewhere, the inspiration of or constraints faced by founding faculty and staff, policy design, compromise and negotiation, and the push

and pull of internal and external resources. Thus once again, it appears that the potential needs of interdisciplinarity, and the barriers may depend on the context, which in turn shapes definitions, goals, and activities.

2.4 Collaborative and Team Teaching

Interdisciplinary teaching need not be done by a multidisciplinary team, but it is certainly one of the dominant methods of accomplishing interdisciplinary teaching. Collaboration by teacher/scholars trained or working in different fields is usually the obvious and best solution to leaping disciplinary and program boundaries, at least intellectually. This may be especially true on a major research campus, where the standards for evaluating expert knowledge – knowing enough about a subject enough to dare to teach it – are very high. (I will say more about the barriers of expertise later.) “Interdisciplinary teaching” and “team teaching” are not interchangeable terms, but the latter is surely one of the best avenues to the former, especially when the area of inquiry is very new.

I would like to propose a distinction between *collaborative* teaching and *team* teaching. The former term is the broader one, including usual cooperation among different people in the preparation of a course, for example, even if the course is taught by an individual, or sequentially by different individuals, in the end. In the end, of course, most instructors engage in collaborative teaching at some point to some degree, even in traditional disciplines. Academics share syllabi, consult with each other on readings and pedagogical practices, and as the Internet has become a ready resource for teaching, borrow each others’ materials to an increasing degree. Many professional organizations sponsor websites and listservs to facilitate this collaboration. But there are degrees of collaboration, and certainly, degrees of the expectation that courses and teaching, more broadly, are the products of communities or collectivities of people working together. Team teaching extends the collaboration throughout the process.

Without the data to serve as systematic evidence, I would venture that interdisciplinary teaching is unusually *collaborative*, even when the course is not actually “delivered” in team form. Where instructors have not experienced lengthy training and professionalization in their teaching area, where no long and deep tradition of practice for particular courses exists (as there is, for example, for what most discipline-based departments define as their “bread and butter” courses), they are probably especially likely to consult with others on literature, major questions and approaches, and design features. In departments and programs with longstanding conventions about how their disciplines are organized there is less need for the kinds of constant, comprehensive discussions of curriculum, pedagogy, and content that take place in new fields. A relatively high degree of collaboration, as distinct from team teaching as such, is probably an essential element of interdisciplinary teaching.

A final note on collaborative and team teaching before moving on: We should facilitate collaborative teaching not just because it is an important element in interdisciplinary teaching, but because it is an essential way to keep our undergraduate, graduate, and professional programs vital regardless of whether they are disciplinary or interdisciplinary. Few if any fields remain the same for long periods of time, student bodies change, and preparing for the future worlds in which our

students will live and work (indeed, trying to figure out what those worlds might be like) all require considerable collaboration and consultation on the part of faculty and academic staff and university leadership to keep up and, as befits a university such as this, point the way. Many discipline-based departments would benefit by the flexibility

that might come from being able to incorporate more collaborative and even team teaching, even into areas that might be defined as part of their more traditional missions. More collaborative teaching may assist us in pursuing a wide range of the strategic goals of our undergraduate, graduate, and professional education programs, including general education, integrating research into the undergraduate curriculum, providing service-learning opportunities, developing learning communities, and the like.

Recommendations

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2a. Be clear about what we are talking about, making appropriate conceptual distinctions and problems with regard to *disciplines*, *interdisciplinarity*, *departments*, *programs*, *collaborative teaching*, and *team teaching*.

2b. Recognize that virtually no one who has made the attempt has managed to develop a terribly clean distinction between a *discipline* and an *interdisciplinary field*. This recognition is important for advocates of interdisciplinarity, resisters, and everyone in between.

2c. In discussions of policy and administrative issues relating to interdisciplinary teaching, be clear about whether the goal is providing interdisciplinary courses or curricula or departments and programs or some combination. These are related, but different.

2d. Given the nature and history of disciplines and other fields, it does not make sense to say that disciplines are necessarily more rigorous than other fields, or that new and interdisciplinary areas are necessarily more creative and interesting than disciplines. All sides should cease making these overly broad and factually suspect claims.

2e. Recognize that many of the problems that get in the way of interdisciplinary teaching also afflict other campus-wide goals of undergraduate and, sometimes, graduate and professional education .

3. WHAT INTERDISCIPLINARITY IS AND HOW IT WORKS

Only the first step in understanding interdisciplinarity is to say that it is teaching that “involves” or “mixes” or “border crosses” or “hybridizes” or “creates a dialog” among multiple disciplines or fields. This mixing can happen in different ways, to different degrees, and for different purposes. These differences have specific implications for how to facilitate or encourage interdisciplinary teaching, and certainly how to design courses and programs in new areas. It is rare for faculty to be aware of these variations when they first come together to engage in interdisciplinary efforts, although as they settle into their work, they almost inevitably find they have to deal directly with how they will mix the disciplinary frames with which they have arrived, because the configuration they choose -- or slip into -- has practical consequences. Indeed, this problem is often a source of conflict.

This section will seem rather more “academic” than most university administrators would want in their search for keys to enhancing interdisciplinary and collaborative teaching. But teaching and research are academic matters, and contrary to conventional wisdom, the barriers are not only constructed of such things as course credit assignment, as important as those are. Intellectual matters, including how people learn, are consequential, too.

3.1 How Interdisciplinary Is Interdisciplinary?

How interdisciplinary is interdisciplinarity? As an editor, I find that question much on my mind as I read proposal after proposal trumpeting interdisciplinary methodology and claiming that a resulting book will be of interest to readers in every discipline within a mile of the topic. *** Is the literary critic who analyzes five novels and a film to understand the rise of consumer culture doing interdisciplinary work? Is the environmental scientist who borrows a model from game theory?

We might ask about both: Is their work interdisciplinary, or are they simply expanding the tool kit of their own disciplines? (Ken Wissoker [2000], editor-in-chief of Duke University Press.)

There are many variations in the disciplinary composition of interdisciplinarity, and many efforts at typology are available in the literature. One common version is to distinguish among “multidisciplinary,” “interdisciplinary,” and even “transdisciplinary.” The University of Michigan Undergraduate Curriculum Development Testbed (UCDT), a large scale program of undergraduate education reform supported in part by the National Science Foundation, drew on the extant literature to create an especially useful typology for evaluating course development in their plan for a Global Change Curriculum. The typology is reproduced in Figure 1. The differences turn on (1) how distinctly represented are the fields that feed the course; (2) how much the feeder fields are maintained as the primary theoretical, conceptual, or methodological organizers; and (3) how these different feeders are brought into contact with each other. At one end, at its best, is the intellectual smorgasbord, an inviting array linked only by the platform on which the separate dishes sit, while at the other is the newly created dish, in which only the connoisseur might accurately detect exactly which ingredients are contributing to the complex taste.

It is important to note that the typology in Figure 1 refers to the *theoretical* conception of interdisciplinary teaching rather than how specific courses, curricula, or programs are organized, although the typology has practical consequences for organizational, resource and other institutional matters. Single individuals or collaborative teams may teach a course in any of these modes. And programs of varying institutional composition can aim for any of these variants.

Multidisciplinary approaches, because they require minimal integration, are probably most amenable to organization with relatively few resources. The classic “variety show” course, so often used in introductory discipline-based courses to introduce subfields, or in introductory interdisciplinary courses to introduce disciplinary approaches, requires an organizer, of course, but it can then rest on a stream of instructors, all offering individual sessions falling comfortably into their own area of training. The more that integration or transformation of the original knowledge bases is required on the part of instructors, the more discussion and debate, mutual learning, coordination and negotiation, and therefore time (the gateway to many expensive resource demands) and other resources are needed.

A comparison of Women’s Studies programs across the country exemplifies how local versions of one interdisciplinary field can commit themselves to very different conceptions of interdisciplinarity. At many institutions, Women’s Studies programs take the multidisciplinary

form. There, the curriculum is formed by listing the courses on women or gender found in the various departments across campus, perhaps with the addition of one interdisciplinary introductory course. Even that, in some places, might take the multidisciplinary form, offering a sampling of perspectives of different fields. The Women's Studies Program at the University of Wisconsin - Madison chose from the beginning to aspire to a curriculum falling much closer to the other end of the continuum. "Program" courses were to be individually interdisciplinary as much as possible, at least opening the possibility of whether there was or could be a distinct, coherent women's studies body of knowledge or theory. For a long period of its history, Women's Studies faculty understood that not only were their "Program" courses to be interdisciplinary; they would not attempt to cross-list their own much more discipline-based courses on women or gender into the Program. Only the practicalities of offering a full curriculum under conditions of financial constraint led to a change in this policy. The interdisciplinary programs on the Madison campus vary in their approach, but most fall closer to the multidisciplinary end.

Figure 1
Typology of
Interdisciplinarity

1. *Multidisciplinarity* (disciplinary courses that are informed by other disciplines) The disciplinary contributions may be mutual and cumulative, but they are not considered integrated. Communication among disciplines is considered to be minimal--thus it tends to be transitory and limited.
2. *Informed Disciplinarity* (disciplinary courses that are informed by other disciplines) Teaching issues and research questions of informed disciplinarity are essential disciplinary in nature, that is, they are motivated by a disciplinary question. When faculty use informed disciplinary teaching they make use of examples from other disciplines to help students make connections between disciplines. Nevertheless, these connections do not change the focus of the class from one discipline to another. This method borrows methods, theories, concepts, or other disciplinary components.
3. *Synthetic Interdisciplinarity* (courses that link disciplines) Example: A course that examines historical and legal perspectives on public education. Only when the borrowing described above is motivated by an interdisciplinary question or issue does scholarship qualify as interdisciplinary. Synthetic interdisciplinary occurs when teaching issues and research questions bridge disciplines. These bridging issues and questions are of two subtypes: (1) issues or questions that are found in the intersections of disciplines, and (2) issues and questions that are found in the gaps between disciplines. In the former case the issues questions belongs to both disciplines; in the latter, it belongs to neither.
4. *Transdisciplinarity* (focuses is on developing an overarching synthesis) Example: Sociobiology--applies the principles of natural selection and evolutionary biology to the study of animal

behavior. Application of theories, concepts, or methods across disciplines with the intent of developing an overarching synthesis. The theories, concepts, or methods transcend disciplines and applicable to many fields. The disciplines do not contribute components, but rather provide settings in which to test the transdisciplinary concept, theory, or method. The disciplines become subordinate to the larger framework.

5. *Conceptual Interdisciplinarity* (examines issues without a compelling disciplinary basis).

Example: Cultural studies, feminist theory, postmodernist, or critical theory. typically begins with a critique focusing on the limitations of disciplinary understandings of the issue or question. The interdisciplinarian then proceeds to create their own framework to answer the question or address the issue.

Source: University of Michigan, Undergraduate Curriculum Development Testbed (UCDT).
<<http://www-personal.umich.edu/~dey/ucdt/>> Accessed 6/12/03

Why would the form of interdisciplinarity be consequential to organizers of an interdisciplinary course, curriculum, or program? The conceptual differences flow directly from the motivation for offering interdisciplinary teaching to students in the first place. Is the purpose to expose students to different approaches to give them an appreciation for their variety, or to offer them a menu from which they can make informed choices of approaches in the future? Is it to set up an interesting debate in order to challenge and develop their intellectual skills, and perhaps learn from the model of instructors engaged in civil but intellectually armed combat? Or is the goal to take a problem, for example poverty, or global warming, or romanticism, and show students how complete understanding requires the interwoven insights of different approaches, perhaps leading to the birth of new, synthetic ones. Or perhaps the point is to work with students to stand on the shoulders of what went before, taking a substantially new approach to the problems at hand.

These pedagogical goals are likely to be shaped, in turn, by the larger motivation for interdisciplinarity that ties the scholar/teachers' teaching efforts to their research field. The wide variety of interdisciplinary fields developed in response to different stimuli and felt needs. Many of them are responding to a problem-centered need where, in a paraphrase of a quotation cited above, neither life nor its interesting problems and issues are organized in disciplines. We might think of this as a conception that is centered on eliminating artificial boundaries. Another, rather different problem-centered need would focus less on the boundary issue, and more, perhaps, on a puzzle-piece metaphor. In this case, the point is bringing together scholars with (and then, teaching students to develop) complementary knowledge and skills to work on common problems. A third motivation is described by Louis Menand as "paradigm loss," the proposition that a discipline, some disciplines, or all disciplines have lost their meaning and are, irrelevant or inappropriate as organizers of knowledge (Menand 2001).

Scholar/teachers may pursue interdisciplinarity for what seems simply missing in the current configuration of disciplines. Women's studies and the various ethnic studies in the United States offer good examples. Women's studies was initiated by women (primarily) who, at a time of social and political change and increasing presence of women in universities, noted the absence of women or gender as subjects of teaching and research, and the absence of perspectives that, they thought, were derived from women's experience while they saw many common perspectives in the academy as emanating specifically from men's experience. The rise of African-American studies and other ethnic studies can be described in the same terms.

Many interdisciplinary scholar/teachers have written very thoughtfully about the relationship between their interdisciplinary and disciplinary teaching and writing. In the main, contrary to the rhetoric of some of the advocates and resisters, they suggest that the relationship between discipline-based and interdisciplinary teaching and scholarship is often complementary and symbiotic, a source of vigor and rigor for both.

Susan Friedman, who holds a professorial joint appointment in the Department of English and Women's Studies Program, was one of the founders of the UW-Madison Women's Studies Program, and was a major force behind one of the successful "Cluster Hire" programs in recent years, probably speaks for many scholar/teachers who live in these multiple academic worlds:

Two things have remained consistent in my own forms of interdisciplinarity. I offer them not as prescriptions or models but, rather, as strategies that have been for me productive. The first has

been the deliberate putting together of different disciplines and fields for the purpose of dialogue. The second has been the sense of a double "home" from which I "travel" to other disciplines and back again: a disciplinary "home base" in literary studies and a political "home base" in feminism. My disciplinary "home" has provided an intellectual anchoring -- a substantive base of knowledge about literature, narrative and figuration, and representations in general and a methodological base of evolving strategies for reading texts in various cultural contexts (Friedman 2001).

She pursues the metaphor of travel, noting that intellectual travel, like the best of physical travel, does not simply result in adding to one's stock of knowledge and experience or providing the opportunity return home with some souvenirs. It also "denaturalizes home, brings into visibility the constructedness of what is taken for granted within one's home base." It "dislodges unquestioned assumptions and produces new insight, new questions to ask, new solutions to intellectual impasses at home" (Friedman 2001).

In encountering other disciplines by working together on teaching or research on problems of common interest one can quickly find that another discipline has a whole literature that seems to make the efforts of one's own home discipline seem paltry (and perhaps, a literature for which one does not have appropriate language skills to read). It is common to have to explain from scratch the basic assumptions, theories, and approaches of one's own discipline, and find in doing so that this is actually quite difficult, perhaps a bit embarrassing when confronted by a smart scholar who is well trained -- but not in one's own discipline. But these experiences by no means necessarily lead scholar/teachers to be agents against their own disciplines, as Friedman's discussion of her "home" discipline suggest. In fact, in the same essay, even as a leader in interdisciplinary studies, she finds herself hesitating at the strong institutional push for interdisciplinarity:

I have found myself saying to [campus leaders], as well as to colleagues in women's studies: "Wait a minute, slow down a bit." We have to think through what we mean by interdisciplinarity. There are many different ways of being interdisciplinary. What are they? Precisely? Are some more productive than others? Can some interdisciplinary work be "sloppy," superficial, insufficiently grounded, and other interdisciplinary work be rigorously enlightening? If so, what's the difference in interdisciplinary methodologies? Do we want to throw out the "disciplines" entirely? Is there a significant difference between individuals being interdisciplinary and a team of discipline-based people working together in a multidisciplinary fashion? Can we have interdisciplinarity without some sense of disciplinary borders being crossed or transgressed? What about the "home" base--both substantive and methodological--that a discipline provides? How do we get the benefits of disciplinary depth and interdisciplinary scope? (Friedman 2001)

This worry *among practitioners of interdisciplinary studies* about "collapse the boundaries and you get mush" (quoted in Boxer 2000: 125) is part of the reason that those who participate in efforts that push more toward the more integrated forms of interdisciplinarity as compared with multidisciplinary (Figure 1) tend also to devote rather more energy and discussion time to reflections on the "ways of knowing" and implications of pedagogical choices than may be common in most department and programs based on more traditional disciplines.

In some cases, scholar/teachers have developed interdisciplinary fields in order to create space to work in an area that, they think, ought to be a proper subject or approach within their own home disciplines, but which those disciplines reject or undervalue. The point then is not to compete with the

home discipline, but to supplement it, perhaps in hopes of bring the new knowledge “home.” Louis Menand correctly points out that this was the impetus for women’s studies and ethnic studies.

Women's studies departments, for example, came into being not because female professors wished to be separate, but because English and history and sociology departments were at first not terribly interested in incorporating gender-based courses into their curricula. The older generation of professors, whatever their politics personally, in most cases did not recognize gender or ethnic identity as valid rubrics for teaching or scholarship. So outside the discipline became a good place for feminist scholars to be (Menand 2001).

In the UW-Madison Women’s Studies Program, like many others, many of the founders and early participants claimed that if Women’s Studies did its job properly, it would wither away not out of failure but success, because research and teaching on women and gender would become a normal part of what teacher/scholars in the various biological and social sciences and arts and humanities fields could and would do. It did not take many years for the same people to take the “both and” view that the success of Women’s Studies lay in both what it contributed to the variety of fields and what it contributed that was unique.

When significant numbers of the members of a discipline participate in interdisciplinary work it does not leave the original discipline untouched, and those who hold the current shape of their own disciplines sacred have reason to worry about such contact. Sometimes the contact eventually causes a rupture, as when the group that became the American Political Science Association formed in 1903, having recently broken away from their home disciplines of economics and history. Margery Garber’s essay on “coveting your neighbor’s discipline” points out that boundaries have long been broken by the waves of influence from what, selectively and temporarily, seem to be master disciplines, or at least those with some important key to the kingdom of wisdom, and therefore appropriate from them key theories or concepts, authority figures or methods. The first instance she found was in the 19th century, when scholars of many fields regarded music as a model, but we could easily go back to the influence of Newtonian physics on philosophy, politics, and economics in the 18th century, or of the exporting of organic metaphors into the same fields and others in the 19th century from the discoveries of biological systems. Cybernetic theories became all the rage across many fields in the 1970s, and such movements as the “linguistic turn” in the humanities, and the diffusion of models, methods, and vocabulary from the cognitive sciences, poststructuralist literary theory, chaos theory, economic choice models, and evolutionary biology, not to mention statistics all attest to the degree to which core members of many disciplines traffic with the products of others. Just for fun, Figure 2 offers a well-circulated illustration.

Figure 2
Interdisciplinarity: The View of ... umm ... an
Astronomer

Politicians think they are Economists.
Economists think they are Social
Scientists. Social Scientists think they
are Psychologists. Psychologists
think they are Biologists. Biologists
think they are Organic Chemists.
Organic Chemists think they are Physical
Chemists. Physical Chemists think they
are Physicists. Physicists think they are
Mathematicians. Mathematicians think
they are God.
God ...umm... so happens that God is an Astronomer.

Source: Vinay L. Kashyap, in Mini-AIR, *Journal of Improbable Results*, 1997.

~~<http://www.improb.com/archives/miniair/twentieth-century/MINI9703>~~, accessed 6/8/03.

3.2 Becoming Interdisciplinary: Support and Barriers

Becoming a good interdisciplinary scholar/teacher requires rigorous study and care just as does becoming a good disciplinary scholar/teacher. In fact, in some ways it requires more self-conscious care because of the conceptual, methodological, and practical issues involved in crossing boundaries without the kinds of guideposts provided to those who remain within a single scholarly tradition. To this end, the set of questions distributed at a conference session entitled “The view from the other side: Crossing the great divides in disciplinary and teaching territories,” reproduced in Figure 3, offers a good template.

Participants in interdisciplinary collaboration often find that without very clear, self-conscious discussions about these kinds of questions, the collaboration is not as successful as it might be. Indeed, without these kinds of discussions, the collaboration is likely not to be as collaborative as it was intended because the disciplinary differences among the collaborators become stumbling blocks despite their best intentions. Unfortunately, these discussions are hard work – much harder than the initial phase of being inspired to try to combine forces. A growing literature of both case study exemplars and more systematic research into collaborative processes in the development of interdisciplinary projects may offer helpful guidance to those engaged in the process.

Figure 3
Self-Guiding Questions for Interdisciplinary Work

How do we begin to incorporate new materials, either from a different discipline or a different culture or time period?
Knowing that whatever we choose will become [for students] representative of a culture or a discipline, how do we choose?

~~What do we seek to gain from adding materials or methods from another~~
culture or discipline? How can we ask the right kinds of questions, so that we are not simply dabbling in an unfamiliar area?

How do we measure the credibility of a newly-formed perspective?

What are the special problems created by using a comparative framework, either one which compares geographic areas or one which compares disciplinary perspectives?

To what extent can we escape our own culture or disciplinary perspective, especially one reinforced by graduate training?

To what extent are we responsible to give our students some indication of more traditional disciplinary concerns, to prepare them for subsequent work with more traditional colleagues?

To what extent have or should interdisciplinary perspectives such as Women's Studies or Cultural

Studies become "disciplines" themselves?

Are there any borders that cannot or should not be crossed?

Source: Distributed at a session on "The View from the Other Side: Crossing the Great Divides in Disciplinary and Teaching Territories" at the Eleventh Berkshire Conference on the History of Women,

A study of collaborative interdisciplinary processes undertaken by Sharon Derry and her colleagues at the National Institute for Science Education at the UW- Madison highlights some of the important process issues by analyzing the early development of an interdisciplinary working team (Derry, DeRussel, and O'Donnell 1997). One of the most important early tasks is to negotiate a common language and understanding from the perspective of their different fields and experiences. Participants used different strategies to accomplish this. One obvious one was to find and emphasize the commonalities that might derive from some shared memberships or experience. In this case, for example, "both physical and social scientists found common ground in their understanding of *experimental control*, a concept common to their mutual experiences as readers and designers of

experimental research.” However, as they continued their work some of these apparent commonalities would fade as, for example the physical and social scientists discovered their “understanding of *experimental control* would differ at a more fine-grained level” (Derry, DeRussel, and O’Donnell 1997: 2).

An alternative strategy for finding common ground was to work at the metaphorical level to find equivalence, for example, between astronomers’ galaxies and educators’ school systems. Once again, however, closer inspection would reveal the important differences that underlay the apparent congruence. As a result of this deeper work, collaborators might negotiate a shared understanding or, as often happened, one discipline would become dominant,. In that case, further negotiation of meaning was

largely a matter of members of the dominant discipline teaching others their language and practices. Given the difficulty of this work, and the delicacy of the negotiation process, we should perhaps not be surprised that Derry and her colleagues found in the initial meeting that there was in fact “little debate or extensive building by one member on the ideas raised by another” (Derry, DeRussel, and O’Donnell 1997: 9). Given that, it is easy to see how plans for collaborative integration, for example, in a course or curriculum, might end up falling more to the “multidisciplinary” end of the continuum than originally hoped. Indeed, even within disciplines, many of us have found that the interactions embedded in team teaching can tax a partnership.

The encounter with the unfamiliar that collaborative interdisciplinary work engenders, and the resulting negotiations that occur among collaborative partners underscores the point that academic fields are not just bodies of knowledge, theory, and method. “They are also sets of social relationships and practices” (Lattuca 2002:717). Thus building collaborative teaching or research programs requires developing new social relationships and practices in the context of problems of developing expertise where all the partners do not begin from the same place.

Interdisciplinary teacher/scholars experience knowledge barriers requiring effort to overcome. A survey of interdisciplinary scholars’ use of library resources indicated that the vast majority “expressed difficulties in adapting to the vocabularies and culture of their non-affiliate disciplines.” Likewise, they thought they had to know more than did scholars in single disciplines, and thought they had to maintain more contacts (Spanner 2001). In my own experience trying to recruit interested faculty to teach core courses in the Women’s Studies Program, and later as a consultant to faculty trying to develop interdisciplinary courses and teaching programs in other fields, one of the greatest barriers is professors’ own sense that they lack the knowledge to teach a truly interdisciplinary course that meets the standards to which they would normally hold themselves. (If, when I asked faculty members to teach one of our introductory courses the rejection paragraph began, “I would find this very interesting to do, but...” the completion of the thought was much more likely to be, “...the preparation time I would need to learn the material outside my field would be overwhelming” than “...my department won’t let me.”) It is one thing to contribute one’s home field’s knowledge to a multidisciplinary collaboration, and quite another to claim enough expertise to offer up one’s neighbors’ fields as well. The prospect is often – perhaps especially – intimidating, even for accomplished and influential scholars.

Transporting concepts, theories, models, methods, arguments, and findings from one disciplinary context to another is difficult. Indeed, even the concepts found in the previous sentence are only variously appropriate across the disciplines, and they certainly vary in meaning. As most philosophers of knowledge today agree, individual concepts are drenched in theory, and perhaps, in many cases, the particular configuration of human observation and experience that informs those concepts. If true, concepts cannot be easily wrenched out of one disciplinary context and used, willy-nilly in another without someone from the original home field noticing that the concept being defined or used “incorrectly.” Likewise theories. The practical meaning of this philosophizing for encouraging collaborative interdisciplinary teaching is that it is difficult and time-consuming work. Any time “experts” become involved in critical evaluation process, for example in peer review of syllabi, teaching, grant proposals, or manuscripts and publications, trouble arises. One faculty team, reporting on their efforts to create an interdisciplinary course, admitted to what

is probably a common obstacle: their tendencies to try to “protect [their] own disciplines from being given short shrift” (Ruwe and Leve 2001).

University press editors are in a good position to see how academics evaluate each others' work within and across disciplinary lines, and how they respond to different kinds of criticism. Ken Wissocker (2000), editor-in-chief of Duke University Press, offers an insightful essay from this perspective. He observes that although scholars can often cut some slack for themselves and their disciplinary colleagues as they test the boundaries and conventions of their own fields, largely because they recognize and can sympathize with the efforts, when approaching the work of a scholar from another field they often seem to forget about the negotiating, balancing, and puzzle-solving and simply see inadequacy, carelessness, and incompetence at using important concepts and analytical tools. For example, "when literary critics criticize the piling on of archival material in a historian's work as positivist and underinterpreted, it rarely occurs to them to ask why the historian put the material there, or to think that the reasons might be similar to the ones that motivate all those close readings."

Thus, for instance, one might hear anthropologists say things like, 'Hasn't she ever heard of the critiques of Mary Douglas -- which are, after all, 25 years old?' Or, 'You call this ethnography? All he did was read Web sites.' Similarly, a literary critic might say, 'Fine ethnography, but this work doesn't seem to have a theory of representation.' Or they might bewail a dated reliance on Bakhtin or the use of a theory about separate spheres that has by now been shown to be distorted, at best (Wissocker 2000).

Wissocker concludes that interdisciplinary studies can only develop if scholars are willing not just to reach out and be interdisciplinary in the production of their own writing (or, we should add, courses), but to become aware of the incompleteness of their own home fields, and of the degree to which they have been professionalized as loyal members of a field even when they advocate and participate in interdisciplinarity. "The real challenge is to find a way to hold the interdisciplinary and the disciplinary in view, not only as authors, but as readers, listeners, and participants in academic institutions," he argues. "Only then will truly interdisciplinary work flourish."

Becoming interdisciplinary, becoming a collaborative partner in interdisciplinary teaching or research, requires both hard scholarly work on the part of scholar/teachers who participate and extended and sometimes difficult communication, interaction, negotiation, and compromise among collaborative partners. Given the battle faculty face in keeping up with their "home" fields for research and teaching purposes to the standards that they expect from themselves at a major "research" institution, and given the struggle they face in finding adequate time to update their courses from semester to semester, it is no wonder that many who might feel inclined to participate in interdisciplinary teaching, or might wish to go beyond the basic multidisciplinary model find their efforts stymied. Time is a problem, even where there is considerable administrative support for interdisciplinary education (Glista and Petersons 2003). But so is what Lisa Lattuca has called the "imaginative work of interdisciplinarity" (Lattuca 2002:711).

For this reason, many campuses and foundations have sought means to create the physical, intellectual, and time spaces for engaging in the many different tasks involved with becoming interdisciplinary. Some efforts rest on the premise that interdisciplinary teaching or research does not begin with the specific research project or the course proposal, but with intellectual growth and development, interaction, and collaborative sparks that develop around substantive problems rather

than pedagogy or research methods. These, in turn, give rise to research or teaching programs. An example of such a program was the Luce Seminars at Emory University funded by the Luce Foundation from 1989-96, in which 9 to 12 faculty members formed a seminar with semester-long topics such as “responsibility”

or “nature.” Although the seminars were not designed specifically to create research projects or courses, follow-up study showed they had visible effects in these areas. The vast majority of participants said their participation altered their teaching, for example, in engaging the confidence to try new things in their teaching, to alter the design or content of their courses or to begin to engage in team-teaching or interdisciplinary course development (Frost and Jean 2003). The Rackham (Graduate School) Summer Interdisciplinary Institute at the University of Michigan selects about 30 faculty and 10-15 graduate students to a summer program around a particular interdisciplinary theme (in 2002 it was “Explorations in Scale: Size, Measure and Value”) to explore that theme together (with the aid of speakers, field trips, and the like) and then to create particular projects relating to the theme.³ The University of Pennsylvania has also had a provost-sponsored program to fund interdisciplinary faculty seminars.⁴

Some programs, of course, aim specifically at creating faculty groups that will create courses. Grinnell, for example, has a Faculty-Faculty Tutorial Project in which pairs of faculty (or occasionally, somewhat larger groups) apply to a program that explicitly sets up one person as the consultant for another to extend his or her area of expertise with the aim of teaching innovation.⁵ The University of Michigan’s Center for Research on Learning and Teaching offers its Interdisciplinary Faculty Associates Grants Program that organizes pairs of faculty during the course of an academic year plus a summer to work as pairs on interdisciplinary course development, but to meet with all the teams periodically over the course of the project period to compare notes.⁶

An Institute of Medicine report on interdisciplinarity in the brain, behavioral, and clinical sciences underscored these communication and learning issues as a barrier across the biosciences, and emphasized not just creating organized settings in which scholars could work with each other, but also the importance of creative spaces for informal and chance encounters.

[Chance] interactions can promote interdisciplinary collaborations. The casual discussion of research at the coffee machine, the fortuitous meeting in the corridor with a colleague from another department, an interesting seminar, or interactions among students and postdoctoral scientists—all can trigger collaboration (Pellmar and Eisenberg 2000: 44).

Creating such spaces is, of course, a challenge on a campus as large and decentralized as the University of Wisconsin - Madison. There have been some efforts to build interaction of the generalized, non- parochial sort, including the Chancellor-sponsored “Faculty Connections dinners.” In recent years many faculty have commented on their perception that a rise in the number of informal colloquia and discussion

³ The (Michigan) Rackham Summer Interdisciplinary Institute is described at <<http://www.rackham.umich.edu/Events/interdis.html>>.

⁴ Information on the Penn Interdisciplinary Seminar for faculty is at <<http://www.upenn.edu/almanac/v48/n28/ProvFund.html>>.

⁵The Grinnell Faculty-Faculty Tutorial Program is described at
<http://www.grinnell.edu/offices/dean/supfac/oncampusopportunities/curric_dev/curric_dev_projects/#ind3>.

⁶ The Michigan Interdisciplinary Faculty Associates Grants Program is at
<<http://www.crlt.umich.edu/crlttext/ifagranttext.html>>.

groups has occurred; many of these, although based in departments, are welcoming to interested faculty and often graduate students from other departments, although many prefer a consistent commitment (which also serves the idea of intellectual development from sustained interaction) rather than occasional drop-ins.

Faculty and academic staff, however, have more than enough ways to occupy their professional time. The sparks that light creative interaction and collaboration, by and large, will not come from administration sponsored programs aimed at fostering interaction, or even the efforts of the many “teaching and learning” centers and programs on campus. The former are unlikely to be associated with “sparks,” and the latter are likely to be attractive for faculty and staff ready to follow through rather than gain their early inspiration. In the end, interdisciplinary education, like disciplinary education, will be most like to develop because some group of scholar/teachers have a passion for understanding and helping others understand where the stars came from, or how to make liveable cities, or how sound makes music, or how to keep prevent so many children from dying of war or dread diseases. But these scholar/teachers need help.

Thus far I have been assuming we are talking about faculty and academic staff trained in a discipline who are now venturing outward. An important long term solution for which the Research-Extensive campuses much take responsibility lies in the way we education and professionalize graduate students.⁷ Although it is true that faculty who work with graduate students are more likely to bemoan the lack of time to provide them with adequate training to excel in their own home fields than to be looking for additional topics to add to the curriculum, preparation for scholarship in an interdisciplinary world must be part of what we offer. Increasingly, for graduate students trained in the context of research projects based in interdisciplinary research centers and institutes, this is already the case. But that means that progress is uneven across the fields, with the largest opportunity in the biological and physical sciences and some parts of the social sciences, and the narrowest opportunities in the humanities.

What would be the goals of graduate education for interdisciplinarity?

- Inoculation against disciplinary hubris which might be best summarized as never assuming one’s own discipline has the only useful research literature. Reading – and trying to understand – related work in another field can begin to open a habits of interdisciplinary consulting and perhaps collaboration, and a facility for learning new academic languages and practices that is useful.
- Developing appropriate competence in a disciplinary or interdisciplinary field that is linked to the student’s special field of expertise. This requires taking the Ph.D. minor seriously, and avoiding, if possible a “distributed minor” that includes courses in one’s own major program unless they are in subfields substantially different from the student’s own in basic assumptions, approaches, or methods. It could also involve working on an interdisciplinary research project or serving as a teaching assistant in an interdisciplinary program.

⁷For a list of “promising practices” in interdisciplinary doctoral training, see the University of Washington hosted site, “Re-envisioning the Ph.D.,” <http://www.grad.washington.edu/envision/practices/topics/t03.html>

- Gaining experience in interacting with peers in other fields.
- Being encouraged to develop not just as a professionalized scholar of a field, but as a scholar, an intellectual, a student of the world with a passion for learning and teaching.
The last point brings us back full circle, to a faculty culture in which faculty visibly model taking joy in curiosity and learning beyond the narrow furrows of their fields.

There are models for offering graduate level course work aimed at developing interdisciplinary skills in a substantive context. Some departments and faculty are especially welcoming to graduate students from different programs in their graduate courses, while others tend to restrict participation to their own graduate students. The graduate school at the University of Michigan has an annual competitive program of support for “Rackham Interdisciplinary Seminars,” in which teams of 2-3 faculty seek support to develop and offer new interdisciplinary seminars at the graduate or undergraduate level. The Women’s Studies Program at the University of Wisconsin - Madison offers a research seminar that is required for any graduate student pursuing a Ph.D. minor in Women’s Studies that is designed to focus on methods and problems of doing interdisciplinary research in the field. When I have taught this course I have required extensive interaction among variously arranged interdisciplinary pairs of students. The best example of a seminar of this sort at its best occurred when the mathematician and musician who at first couldn’t figure out what they had in common other than the first letter of their fields discovered how close their fields actually were in many ways relevant to their work on gender.⁸

During 2002-03 the Interdisciplinary Health Sciences Curriculum & Student Affairs Committee, representing each of the health sciences, explored the possibility of a common health sciences core course that would be aimed at helping students across the various health sciences understand the ways in which their success depended on their interdisciplinary knowledge and ability to collaborate. The Committee invited two faculty members experienced in interdisciplinary curriculum and teaching to join them for a meeting to offer some outside perspective on the problems and issues they were raising. Many of these would be familiar to planning for interdisciplinary curricula anywhere in the university: questions of whether to offer a multidisciplinary course or attempt a more integrated design; the difficulty of adding to already demanding programs and coordinating the schedules of students from different programs; how to choose and organize the focus and themes properly. But as we would also expect, this area, like others, has its own distinctive issues. In the case of the clinical health sciences, organizers have to face the steeply graded prestige differences among the students, and especially, the small probability that medical students would think they have much to learn from members of the other health fields. Helping them get over that parochialism would presumably be one of the objects of interdisciplinary learning.

Another good example of a program on the Madison campus that is well designed to focus on preparing tomorrow’s scholar/teachers for interdisciplinary contexts and work is Delta: A Teaching and Learning Community, a project of the NSF Center for the Integration of Research, Teaching, and Learning. (CIRTL).⁹ Delta is designed as a teaching and learning community for faculty, academic staff,

⁸ The syllabus for this course is available at
<<http://www.polisci.wisc.edu/users/sapiro/ws900/ws900.htm>>

⁹ Delta is described at <<http://www.delta.wisc.edu/index.html>>. CIRTL is at
<<http://www.wcer.wisc.edu/cirtl/>>.

and graduate students in fields of science, technology, engineering, and mathematics to integrate research, teaching and learning together, and to bring the scholarship of teaching and learning into the graduate curriculum more fully than has been done in the past. Delta is developing a wide range of different activities and fora, all of which are interdisciplinary.

An important issue for the wider university to face is that the sciences, which have long had a collaborative model of teaching and mentoring, are now pushing further and faster into interdisciplinary and collaborative approaches to teaching and curriculum, in part because of the motivation provided by National Science Foundation priorities (and those of other science agencies) and therefore, also, their funding. No such longstanding model of collaboration exists in the humanities or in many areas of the social sciences, and it is not clear how soon the good example of the sciences will spread. It is notable, however, how different the representation of teaching, especially undergraduate teaching is in the different academic professional societies. The website of the Modern Language Association contains relatively little on teaching per se. An ad hoc Committee on Teaching was only established in the late 1990s, and it frames its motivation not primarily in terms of any intrinsic importance of teaching, but in terms of the pressure on academics to account for their workload. In contrast, the website of the American Chemical Society, to pick a science out of a hat, is chock full of material on teaching and all levels, from K-12 up.

Recommendations

3a. Any serious discussion of policies and administrative arrangements aimed at encouraging interdisciplinary teaching should take account of the fact that there are many different degrees and types of integration of different fields and different aims covered under the term *interdisciplinary*, and that different forms are likely to require different configurations of resources and different commitments.

3b. Discussion of interdisciplinary teaching should be informed by understanding that interdisciplinary programming is not merely an alternative to disciplinary programming, but often has a close and symbiotic relationship with it, often constituting a major source of energy and renewal for the disciplines and partnership with them.

3c. Scholar/teachers embarking on interdisciplinary teaching and curriculum development should explicitly consider the kinds of self-guiding questions listed in Figure 3.

3d. Scholar/teachers embarking on interdisciplinary teaching and curriculum development and administrators and other campus leaders aiming to support those efforts should be cognizant of the difficult steps of learning and negotiation that are necessarily part of the collaboration process.

3e. The University should endeavor to develop programs that provide resources that can assist scholar/teachers in the process of developing interdisciplinary teaching and curricula. This assistance can variously be offered by colleges and at the campus level. Examples of the kinds of resources that would be useful are:

(1) Programs that are not explicitly aimed at teaching and research tasks per se, but which bring faculty and perhaps graduate students together for sustained discussion

around a common theme in a manner that offers an opportunity to model and create interdisciplinary collaboration in learning. See the Michigan programs as examples. Existing substantive discussion and research sharing groups based in particular programs and departments should consider opening participation to participants from other departments.

(2) In designing buildings and redesigning workspaces, planners should consider the possibilities the built spaces create for bringing people together in chance encounters where conversation is likely to occur.

(3) There should be at least one widely-available repository of research, documents, models, information, and other such assistance on interdisciplinary collaboration. Some universities have web sites aimed specifically at supporting interdisciplinary teaching and professional development.

(4) Consideration should be given to constructing a volunteer consultant force on interdisciplinary and collaborative teaching and learning, which would include faculty and academic staff who are experienced at developing and assisting with problem solving related to interdisciplinary and collaborative teaching. The model for this group could be akin to the consultants available through the Office of Quality Improvement, who essentially agree to try to be helpful.

3f. The Graduate School might consider further ways to assist and encourage graduate training for work in an interdisciplinary environment beyond what it is currently doing. Some possibilities are:

(1) help graduate programs assist their students in using their graduate minors seriously and wisely;

(2) encourage the development of appropriate courses or training programs. This might include helping with publicity about programs such as Delta or other department-based efforts;

(3) gathering and distributing information on interdisciplinary opportunities on and off campus for graduate students

(4) encouraging discussions of professionalization that consider how to balance conventional demands for expertise with the benefits that accrue from being able to work in an interdisciplinary, collaborative manner.

3g. Interdisciplinary programs should consider ways they can encourage graduate education in interdisciplinary studies aimed not just at teaching the substantive area on which they focus, but using the expertise at hand to offer a graduate course aimed at developing interdisciplinary and collaborative capacity and experiences. These could include courses, colloquia, working groups, or other means.

3h. Collaborators in interdisciplinary efforts should pay explicit attention not just to traveling to other fields, but to welcoming teacher/scholars from other fields into their academic homes. Doing this constructively means not expecting them to work as though they were trained in the field they are visiting and from which they are borrowing.

3i. When faculty are around their graduate students, they might model being interested in more than just their narrow fields.

4. THE STUDENT'S EYE VIEW OF COLLABORATIVE AND INTERDISCIPLINARY TEACHING

No matter what turmoil the faculty are in with respect to disciplines and interdisciplinarity, these three things are generally true of undergraduates:

- The most popular major among entering undergraduates is “Undecided.”
- It takes painstaking effort to try to teach undergraduates what our disciplines are, and while they may in the end learn something of the substance of our fields, most probably still do not truly understand what our “discipline” is by the time they graduate; indeed, many of us find that our first-year graduate students are rather foggy on the subject.
- As students consider their undergraduate careers as a whole, they already have a multi-disciplinary experience, at least. In some semesters, with an especially fortunate arrangement of courses (for example, sets of courses that converge on a particular problem like the environment or a theme such as perception and vision) their work in different courses may also take on a tighter interdisciplinary configuration. Advising can help students do this.

It may be that one of the special dangers of seeking an undergraduate degree at a major Research-Extensive university is not that the faculty don't care about teaching undergraduates or don't work at it (common stereotypes that are, in the main, false), but that they often work at teaching the wrong thing. How many introductory courses are, in effect, anemic graduate courses intended to introduce students to our professional world rather than introductions to a subject we find fascinating?

The American system of higher education does, in the end, emphasize breadth at the undergraduate level rather than the depth of, for example, a British student who “reads” one subject. Our students are limited in how many credits they may take in a major, and we require them to sample the different branches of knowledge. One of our most prestigious undergraduate honors society, Phi Beta Kappa, has rested admission since 1776 on how impressive is the breadth of a student's academic achievements.

But today's press for interdisciplinarity in the undergraduate academic curriculum is not focused just on the smorgasbord table. It is also a call for helping students learn how to approach a problem from multiple perspectives, how to integrate different forms of knowledge more closely, how to be prepared to work in a world in which the increasing interdependence of work means that they will have to gain levels of expertise that surpass that held by their predecessors, but at the same

time, understand where their work fits in, and be able to work with others to make the whole. In recent years various fields have pushed increasingly to “case” and “problem-centered” methods of teaching even within fields, and these

methods inevitably seem to push outward to involving different knowledge bases.

Research on student response to the new interdisciplinarity is, unfortunately, disheartening. In this section I will focus on the research literature based on student survey and assessment, emphasizing case study examples. Some of the examples come from universities whose student bodies are similar in important respects to UW-Madison, some are from campuses with different populations. But they converge on a couple of key points. Most notably, integrated coherent courses are better than multidisciplinary courses offering sequential samplings of different knowledge, and team teaching is more difficult to perform well from the student learning perspective than many advocates may think.

The University of Pennsylvania ran an experiment in which incoming first year undergraduates were given the choice of participating in a pilot program that would allow them more choice, but would also require them to take “a series of rigorous interdisciplinary courses, many of which are team taught.”¹⁰ Among those who indicated interest in the pilot program, 200 were randomly selected for the pilot program, and 100 were reserved for the control group. The study employed different methods to learn about the students before they started, while they progressed, and after the program was completed. The dean’s report on program part way through the experiment indicates that while the program is very successful, student criticism revolves around two major areas. *First*, “Many students have complained that the work load in many of the courses was excessive and, indeed, many of those teaching the initial versions of the pilot courses have acknowledged that they may have succumbed to one of the natural tendencies in a team-taught course, namely, for each instructor to overload the syllabus with what he/she believes to be ‘crucially important’ material in his or her field, with the result being an excessive workload for the students” (Beeman 2002). *Second*, “By far the most interesting, but also most complex, sets of student comments have come on the related, but nevertheless separable, issues of team-teaching and inter-disciplinary teaching.”

The Penn program had begun with the assumption that students who chose the interdisciplinary Pilot Program would be relatively strong students (drawn from a base in a very selective university) with good experience in basic disciplinary training and who were now ready to branch out into the freedom and complexities of interdisciplinary study. They found, instead, that a significant portion of the students were not comfortable with or were confused by the interdisciplinary and especially, the team-taught approach. Some faculty were assuming the students had a stronger disciplinary base than they in fact had, and students were not as able to make the connections among the different approaches as the faculty had expected. Where the faculty apparently thought that engaging each other and debating would be stimulating and thought-provoking for the students, many responded by tuning out while the professors argued with each other. Some are also simply uncomfortable with the amount of uncertainty involved in team-taught interdisciplinary courses,

The Dean of the College indicated that one major conclusion is that team teaching is very difficult to do well; especially,

bringing together teams of faculty across disciplines who have not taught together before has made issues of intellectual integration particularly pressing ones. In general, both the

instructors in

¹⁰ The Penn Pilot Curriculum as the students see it is at http://www.college.upenn.edu/pilot_curriculum/.

those courses and those of us who have observed those courses have concluded that simply bringing faculty from disciplines together and having them talk to one another about their disciplines, leaving the task of integration to the students, is not sufficient. It is becoming clear that it is important that faculty teams take some significant (though perhaps not sole) responsibility for bringing about that integration themselves (Beeman 2002).

As the experiment has progressed, the faculty teams are devoting more attention to the integration issues. Some of the most successful interdisciplinary courses appear to be the ones taught by individual professors, because they tend to offer more fully integrated courses, or by teams who have worked together extensively before. The dean also emphasizes that as the students who may not have been so satisfied with the freshman courses move further through their programs, some of them come to value the experience they had more than they did at first (also Bartlett 2002).

Many observations of other interdisciplinary, team-taught courses have made similar observations. A report on one such course on the two-year campuses of the University of Wisconsin indicated that where the faculty thought they had made the connections among the different fields obvious, not only did many of the students not “get it;” they also reacted to the team teaching by expressing frustration about not knowing how to please both professors at the same time, as their views were obviously different. The faculty team responded by reworking the integration of the material to make it tighter across the course, for example, by interweaving the different readings more, yielding greater success (Barisonzi and Thorn 2003). Another team reported that although they had worked hard at integration and design, they felt the pull of making sure their own discipline did not get “short shrift,” and as the semester moved on, they found it difficult to find the time to confer and deal with course-related issues.

By mid-semester, however, it was clear that rather than making connections, the students were disconnecting. Because they did not have a strong foundation in each discipline, they could not make connections from one discipline to another. We soon realized that we had created a course that was, in essence, four mini-surveys. By attempting to be comprehensive, we had severely compromised the interdisciplinary focus of the course--and the students' ability to master the material (Ruwe and Leve 2001).

They developed a set of advice for instructors venturing into team teaching including, among other things, making sure the members of the team have compatible teaching styles and expectations; ensuring that they reserve a regular schedule of meetings throughout the semester to deal with course issues; delegating, rather than sharing the nuts and bolts tasks to be sure it is clear who is doing what; agreeing in advance on evaluation standards as well as methods for dealing with problems such as breaches of academic integrity, and being “willing to sacrifice control over your own discipline; give up comprehensiveness in favor of mastery over less material” (Ruwe and Leve 2001).

I have emphasized the problems to counteract the often romantic view of collaborative team teaching that suggests that we need only facilitate the coming together of bright and creative teacher/scholars to foster teaching excellence and innovation. Indeed, the dean at Penn expressed some surprise that the interdisciplinary teams in the Pilot Curriculum seemed no more likely to use innovative pedagogical styles or creative uses of instructional technology than did other instructors on

campus. But it is also important to emphasize that collaborative team teaching does offer new opportunities to students and instructors, and those aspects that seem problematic at first may also have their up sides. A faculty

team who ran an interdisciplinary economics course geared at developing critical thinking argued that team teaching is a good way to launch students out of the phase of achievement through trying to agree with the professor. They argue that at an early stage of studying one discipline at a time with one professor at a time, students “may view discipline-specific methods and criteria simply as something to be mastered in order to receive a good grade. They have not yet realized that those different ways of judging competing theories are vitally important outside the classroom.” With team teaching, especially interdisciplinary team teaching, students cannot simply “mimic the professor’s thoughts as their own in the hopes of getting a good grade because no matter which professor they mimic, the other disagrees with them” (Borg and Borg 3001). This observation would suggest that for the students, the experience of the frustrations of team teaching may ultimately have important effects on cognitive development, although if their reaction is to “tune out,” faculty cannot simply assume the team method itself achieves the developmental goal. They have to assist actively and constantly in the integration process, which takes hard work and careful management.

The problem many students have with multidisciplinary team teaching is that the instructors often do not model the behavior to which they want the students to aspire. When instructors offer students a variety show, in which different experts offer their own set pieces, or alternatively, when they offer the debate and engage format, where the instructors make clear they do not share an approach or knowledge base, and leave other types of thinking to other scholars, they should not wonder why students are not eager or able to transform that knowledge. “If we want our students to engage in complex intellectual tasks to integrate the insights of different disciplines, then let’s join them in that task, modeling it and sharing the difficulties and the richness of its possibilities” (Dezure n.d.).

Ultimately, if students face a proliferation of interdisciplinary courses without the backup guidance of curricular pointers and advising, they will confront the same problems they have long found at the large universities: a dauntingly large menus of courses with little sense of how to create a coherent but exciting and creative whole. Thus, faculty who are considering interdisciplinary offerings must think about the curricular context as well as what they believe is an exciting individual offering. Increasing the interdisciplinary offerings requires that we continue to strengthen our advising system.

Recommendations:

4a. The design of interdisciplinary courses and programs should bear in mind that the less closely integrated they are, the more they take on the variety show or “point-counterpoint” model, the more difficult they may be for students to assimilate. Instructors should try to take the time to use as integrated a model as possible.

4b. Instructors who are planning to engage in team teaching for the first time should consult with experienced teaching collaborators and consult materials that offer guidance.

4c. Scholar/teachers who want to teach interdisciplinarity to students should model it as much as possible.

4d. Creating valuable innovative educational opportunities such as interdisciplinary teaching requires as much attention to curricular matters as it does to the nature of the individual courses.

4e. Increasing interdisciplinary offerings requires that advisors assist students in creating coherent and valuable curricula for themselves. Interdisciplinary programs and instructors should help provide advisors the information advisors need to do this.

5. LEADERSHIP, ADMINISTRATIVE AND POLICY SUPPORT FOR COLLABORATIVE AND INTERDISCIPLINARY TEACHING

This is where most reports on recommendations for encouraging collaborative and interdisciplinary teaching begin: the administrative structures and policies can encourage or discourage, help or hinder teaching innovation. In fact, however, most research and teaching innovation does not occur in response to policies of deans and provosts. Most occurs at an institution like the University of Wisconsin - Madison because of the interests, vision, skills, and commitment of the faculty and staff. But the fact that faculty and staff do this important work in some cases despite all odds doesn't mean they should have to have the odds stacked against them. Indeed, many UW-Madison deans and campus administrators have played a strong role in encouraging interdisciplinary teaching and research, What more can be done, especially in the current condition of tight resources? In this section I return to leadership and administrative questions to pursue recommendations for lower barriers on the one hand, and building in support and encouragement on the other.

Almost every report that has been written on facilitating collaborative and interdisciplinary teaching agrees with a few basic premises about where the problems lie. In department-centered reward systems, work outside a department's priorities does not get rewarded as much as work within its priorities. Developing new courses, curricula, and pedagogical strategies requires time and other resources that are in short supply. There is a culture in many quarters that says that high quality requires plowing deep and narrow scholarly furrows, and that interdisciplinarity or other attempts at breadth are likely to compromise quality. Each of these issues theoretically can be handled through administrative and policy action.

The problem is the lack of a best possible world. The UW-Madison, like many universities, has promised to do more and more with respect to enhancing undergraduate, graduate and professional training, and our ideas about what we ought to do far outstrip resources. This has never been more true. The early 1990s talk about doing more with less or "smart-sizing" has subsided for good reason. It has become clearer that, in the words of the UW-Madison Vice Chancellor for Administration, we have to do less with less.

How can we keep our teaching and learning programs vital under these circumstances? How can we add new pieces to keep up with our mission without simply burdening ourselves with more and more? The point is, ultimately the mission of our education programs. Completing a major is only part of what an undergraduate has to accomplish in earning a worthy degree. We need a culture change whereby departments and programs (including interdisciplinary ones) and their faculty feel ownership of a wider part of the full mission of a University of Wisconsin - Madison degree, not just the part that is aimed at concentration in their field. Department and programs and their faculty should be recognized and rewarded for their active ownership of that wider mission. Most faculty probably do not know the basic outlines of an undergraduate degree, for example, and have no idea what the

current Strategic Plan says about undergraduate education and why. They are likely to know more about graduate degrees because those are more fully lodged in individual programs, and they establish (and regularly revise) the

requirements.

We need more flexibility in workload and reward systems. Increased flexibility necessarily creates its own burdens, of course, because flexibility makes accounting more complicated. On the other hand, in a large and complex university, how can we enhance flexibility without creating chaos or jerry-rigged systems?

We have to do more for professional development. High level professionals, like faculty, are generally assumed to be able to take care of their own professional development but they need from the institution in which they work. The sabbatical system is precious in this regard, but it is not sufficient. Unfortunately, resources to support professional development are difficult to come by.

Recommendations

5a. Leadership at the campus and college levels should reinforce understanding of the goals and initiatives of the Strategic Plan and campus commitments regarding undergraduate, graduate, and professional education on the part of department leaders, faculty, and academic staff. Faculty should be engaged in the whole picture coherently, and what their roles and contributions are beyond the provision of majors and specialized degree programs and certificates. Although leadership can sometimes provide material incentives to faculty and programs that contribute to campus and college educational goals, if faculty are not widely brought into serious discussion of these goals, the incentives appear like lobs through the transom, and probably create as much incoherence as coherence.

5b. The campus has made major steps in the direction of the “Managing the Matrix” recommendations to “create and empower matrix governance structures” (see Appendix II, 10-12 for the complete text). The creation of the Institute for Cross-College Biology Education following the 2003 Report of the Committee on Cross-College Undergraduate Biology Education offers a good example. The repeated practice of conferring guardianship of undergraduate general education programs in the College of Letters and Science is another example. What other coherent support structures are possible for other teaching and learning commitments whose center of gravity does not rest comfortably within a single college. Residential learning communities, an interdisciplinary academic program that is integrated with residential life, is another example. Where the solution is a cross-college or trans-college structure, leadership will have to negotiate the relationships with colleges and college units. Where the solution is vesting guardianship within a college, leadership should attend to questions of unequal burden, and participation by faculty and academic staff across the colleges that benefit. In any case, where the campus has made a commitment to specific educational principles and goals, fulfillment of these cannot rest on faculty members’ individual initiative, piecemeal negotiations, and willingness to bear extra burdens.

5c. Creating and empowering governance structures should not be interpreted as creating a new governance structure for every collaborative activity on campus. At a certain point, the

proliferation of governance structures creates less (not more) flexibility, less (not more) rationality, and more (not fewer) contending fiefdoms. This is one of the reasons that reinforcement of the cultural norms of collaboration and identification with the all-campus and

college norms is important.

5d. Major governance bodies such as the Provost's Office, deans, divisional committees, the General Education Committee, and the Graduate School should periodically review the status of collaborative and interdisciplinary teaching (as well as other extra- or trans-departmental teaching initiatives) and their own contributions to furthering this mission.

5e. The symbolic and tangible reward and incentive systems should work on the premise that primary entity of which UW-Madison faculty, staff, and students are members is the University of Wisconsin -Madison as much or more than it is a particular department or set of departments. Departments, programs, and colleges should be held accountable for appropriate contributions to campus educational goals and initiatives, and should be rewarded for outstanding contributions to initiatives such as interdisciplinary teaching, and should find it costly to do less than their share.

5f. Faculty and their departments with undergraduate education missions have responsibility for contributing to the whole of undergraduates' education, not just their majors. Faculty should be rewarded by their departments for contributions to undergraduate education regardless of whether those contributions are primarily in supporting the major or other departmental courses or not. As long as the primary unit for determining merit is the individual department, all departments must share in recognizing and rewarding university work. By the same token, colleges should recognize and reward departments that do more than their share either collectively or because of department culture and practices that encourages individuals to participate.

5g. Key interdisciplinary and other non-departmental units ideally should be empowered to reward and support faculty participation. To do this there must be adequate direct support for these units (See FIP). In many cases this implies base budget allocations either for instructional FTE's directly, or to control as backfill. Faculty and academic staff who contribute to more than one unit should be assured that these different units will act jointly in merit, promotion, and awards considerations. College and campus leadership should monitor this cooperation.

5h. The process of evaluation for tenure, salary increases, internal grant support, workload specifications, and awards considerations should ensure that faculty/academic staff members' interdisciplinary activities and their contributions to education outside of their home departments is taken into full account. Departments and programs, divisional committees, deans, and other committees and organizations with evaluation and reward powers should all be specifically accountable to this norm. Faculty and staff with split appointments must not be expected to do a full load in each of their programs.

5i. Departments and programs that do more than their share in fulfilling broader campus missions should be given special consideration with regard to "backfill" to make sure their teaching programs do not suffer when department members take up broader university responsibilities such as interdisciplinary teaching. In order to earn this backfill, however, the

units should demonstrate they have seriously monitored their curriculum and priorities. (It is doubtful that any department is able to fill all its various goals as it might wish; all have to make choices.) Departments that are contributing extraordinary and sustained amounts of teaching to interdisciplinary programs should have this taken into account in consideration for new faculty hires.

5j. The university has moved to a policy of “credits follow instructor”¹¹ to provide “sending” departments with incentive and recognition for the efforts of their faculty. But credits follow instructor policy should not be interpreted to draw credit from the interdisciplinary programs that engage in the curricular planning, student advising, and other academic work that goes into creating the broader structure in which specific courses and teaching interactions occur.

5k. In cases where faculty or academic staff are associated with multiple departments/programs with different workload practices, the dean (or representative) should work with the units to develop a memo of understanding regarding the obligations of the individual. Likewise, where faculty or academic staff are associated with multiple departments/programs that have substantially different procedures for merit, promotion, or awards review, the dean (or representative) should work with the units to develop a memo of understanding to make clear what practices will apply to the individual. This is especially important for probationary faculty and staff. At the same time, it would be wrong to migrate to a workload and reward system which, in effect, is individually negotiated.

5l. One of the substantial roadblocks to team teaching is the difficulty of assigning credit and avoiding creating taxing overloads for the participants. In order to facilitate team teaching, we need a more flexible manner of crediting workload. Some possibilities are:

(a) Explicitly maintaining a banking system for teaching workload credits that must be balanced within a specified period of time. A banking system creates administrative burden, but it can enhance the flexibility of teaching contributions.

(b) Assign partial credits to team teaching participants.

(c) Recognize that the development of an interdisciplinary team taught course requires extraordinary workload for the participants. Therefore, the first time a team teaches an interdisciplinary course, give both participants a full course credit.

At the same time it is crucial to recognize that faculty are not paid by the hour or piece, and if we move to a world of compensation and reward in nano-units, we have already lost the battle. A move in that direction would be far worse than the current situation.

5m. Continuation of the cluster hire program in some form can aid the presence of interdisciplinary teaching on campus, but aspects must be rethought to have a direct impact on teaching and curricula. Specifically:

- The mere presence of faculty chosen by a multidisciplinary committee on the basis of the complementarity of their research interests is not likely in itself to result in curricular change. Only a minority of cluster proposals showed careful consideration of the issues involved in developing and supporting interdisciplinary teaching programs, and few demonstrated plans to follow through. They should do so.

11 <http://www.provost.wisc.edu/memos/cfi.html>

- To the degree that the clusters program tends to identify “interdisciplinary” work as the same thing as cross-departmental or cross-program work, existing interdisciplinary programs are disadvantaged among interdisciplinary efforts. They had to seek cooperation with other departments and programs in much the same way as single- discipline departments and programs did.
- Where there are well-working interdisciplinary programs in existence, campus and college leadership should consider as part of the cluster possibility the mechanism of hiring used very often to build interdisciplinary programs in past years: awarding a position to an interdisciplinary program, provided that a part of the new faculty member’s FTE would be lodged in the program, and the rest would be lodged in another program or department, creating a joint appointment.

5n. We should endeavor to provide opportunities and support for professional and program development aimed at teaching innovation and interdisciplinary work. Among the possible offerings are:

- (a) Interdisciplinary seminars such as those modeled by other campuses. These need not explicitly be aimed at course development but rather, fostering a culture of creative interdisciplinarity.
- (b) Seminars and workshops on collaborative and interdisciplinary teaching, including opportunities for faculty/academic staff experienced at collaborative and interdisciplinary teaching to share their experiences.
- (c) A volunteer consultant force on interdisciplinary and collaborative teaching and learning, which would include faculty and academic staff who are experienced at developing and assisting with problem solving related to interdisciplinary and collaborative teaching. The model for this group could be akin to the consultants available through the Office of Quality Improvement, who essentially agree to try to be helpful. (As in 3e, above)
- (d) “Toolkits” and other aids for developing, administering, and evaluating interdisciplinary and collaborative teaching programs; similar for individual courses.

5o. We should make sure that interdisciplinary programs and course creators are taking account of the growing knowledge about the practices of interdisciplinary teaching and learning, some of which was cited earlier. Assessments might be organized around the model provided by the University of Michigan Undergraduate Curriculum Development Testbed (Figure 4). See also the Fiscella, et al. 2000 report on “Accreditation criteria for interdisciplinary studies in general education.)

5p. Interdisciplinary programs should actively collaborate on seeking external sources of funding for interdisciplinary programs, program development, and professional development,

and should urge interdisciplinary programs to do so, and provide support for these efforts where possible.

5q. Much has been made of the degree to which the campus does and does not support collaborative teaching and interdisciplinarity. Departmental and program reviews should include evaluation of contributions to the interdisciplinary work of the university. With regard to interdisciplinary courses, such as study should include interdisciplinary course offerings within departments, regardless of whether they are team taught, as well as participation of department faculty in collaborative and interdisciplinary teaching outside the department.

6. CONCLUSION

The University of Wisconsin - Madison has made many advances in interdisciplinary teaching in recent decades. Collaborative teaching has perhaps moved more slowly, largely because of difficult “accounting” and support problems. Advocates sometimes seem to attribute the roadblocks to further progress primarily at the institutional and administrative level, noting, for example, that departments often do not give credit for work done outside the department for purposes of work allocation, merit pay, or promotion and tenure. This discussion paper explores some of these issues, agreeing that cultural, leadership, and administrative changes are required to support interdisciplinary and collaborative teaching and, indeed, research. But, to return full circle, advances in interdisciplinary education also require scholarly attention. There are many ways to construe interdisciplinarity, and it is not clear that all forms have the expected positive impact advocates claim. Fashioning great interdisciplinary teaching and learning, as its practitioners have found, is very hard work.

Figure 4
Assessment Criteria for Interdisciplinary
Courses,
adapted from the University of Michigan, Undergraduate Curriculum Development
Testbed

1. What type of interdisciplinarity does the curriculum represent?
 - understand the scope and intensity of conceptual interaction among the disciplines
2. In what interdisciplinary context did the curriculum emerge?
 - articulate what brought the faculty together to participate in the project
 - identify institutional factors that affect the climate for interdisciplinarity
 - identify the disciplinary antecedents
3. What process have faculty used to articulate the interdisciplinary curriculum? To what degree does the curriculum represent the shared vision of the collaborating faculty? To what degree are individual faculty committed to the curriculum? Which faculty will be around long enough to use evaluation data and analysis?
 - identify what questions the curriculum is designed to address
 - describe how faculty defined the course objectives, readings, and assignments
 - describe conceptual threads that bind the curriculum together
 - identify faculty and administrators that have a multi-year commitment
4. To what degree are the students prepared for innovative pedagogy? Are they prepared for the new learning experience? - describe the degree to which students are prepared for the curricular experiences which have or have not prepared them for an interdisciplinary experience
5. To what degree does the curriculum exhibit structural integrity? To what extent do students experience
 - "learning jet lag" due to abrupt shifts in pedagogy and expectations among faculty?
 - describe the transitions involving instructors and topics
 - describe the degree to which the faculty share pedagogical practices
 - do students and/or faculty understand and use their curricular road maps
6. What are the student outcomes? Have the faculty collectively articulated measurable student performance objectives?
 - outline the student outcomes and their operationalized definitions.
 - articulate cognitive and affective outcomes.
7. What is the quality of the reading materials (i.e., textbooks, course packs, handouts)? If reading materials have been developed for this curriculum to what degree do they facilitate learning? - develop a rubric to determine the utility of the reading materials
8. What examinations are available and viable? Will new examinations need to be created? - describe the validity and reliability of these instruments
9. How will the information be reported to the stakeholders? - identify how the stakeholders process information
10. What are the long-term prospects for continuation of the project? - determine the likelihood that the

project will continue, and how long the current personnel intend to be associated with the project

Source: University of Michigan, Undergraduate Curriculum Development Testbed (UCDT).
<<http://www-personal.umich.edu/~dey/ucdt/>> Accessed 6/12/03.

NOTES

Virginia Sapiro is the Sophonisba P. Breckinridge Professor of Political Science and Women's Studies and Associate Vice Chancellor for Teaching and Learning. In her home "traditional" discipline her primary areas of interest include the interdisciplinary areas of political psychology and, more recently, American political development, which breaches the boundaries of history and historical sociology. For three years she team-taught the common first-year graduate introduction to Political Science with a colleague who happened to be her husband. Early in her career she and a colleague in the humanities abandoned their efforts to create what would have been an exciting interdisciplinary team-taught undergraduate course primarily because they were untenured and the effort, although fascinating, was too time- and attention-demanding. Among the Women's Studies courses she has taught regularly are "Women, Social Institutions, and Social Change," an interdisciplinary social science-based course, and a research seminar in Women's Studies aimed at Ph.D. students from around the university who are pursuing a Ph.D. minor in Women's Studies, and designed, in her words, to "help us learn how to engage in interdisciplinary research and teaching rigorously and nonpromiscuously." She has also held high-level elected and appointed offices in the American Political Science Association, and is therefore certifiably attentive and loyal to a "traditional discipline." For comments/suggestions:

vsapiro@wisc.edu

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APPENDIX I:
BRIEF ANNOTATED
BIBLIOGRAPHY

This bibliography is intended as a starting place for probing these issues further. It includes some of the more thought-provoking, helpful, and nuanced articles and websites I found relevant to interdisciplinary and collaborative teaching while preparing this paper. Because perspectives on these issues – as well as practicalities – differ across (inter-)disciplinary areas and positions in academia, I have identified the fields and positions of the authors where possible. I have selected only pieces that seemed relevant well beyond their own home fields, and that offer clear implications or suggestions for practice.

Bartlett, Thomas. 2002. “Students Become Curricular Guinea Pigs: Penn Uses a Control Group to Test New Requirements and Courses,” Chronicle of Higher Education (May 10, A12), (www.chronicle.com, viewed 6/9/03).

A study of student views of team-taught interdisciplinary course in comparison with a more traditional curriculum. A good corrective to the view that the former are necessarily more attractive to students or better learning experiences than the latter. Offers good advice for design.

Boxer, Marilyn J. 2000. “Unruly Knowledge: Women's Studies and the Problem of Disciplinarity.” NWSA Journal 12 (2): 119-27.

Exploration of problems of disciplines and interdisciplinarity through an investigation of women’s studies, nicely embedded in broader literature on the sociology of scholarship. Very useful set of questions to be used by interdisciplinary scholars in thinking about their relationship to disciplines and both disciplinary and interdisciplinary organization within the academy and academic professional organizations. By a historian, the first chair of the first women’s studies program in the U.S., at San Diego State University, later a dean and Vice President for Academic Affairs at San Francisco State University.

Buker, Eloise. 2003. “Is Women's Studies a Disciplinary or an Interdisciplinary Field of Inquiry?” NWSA Journal 15 (1): 73-93.

Reflections on disciplinarity and interdisciplinarity that focus especially on their relationship within the life of one scholar/teacher. By a political scientist/women’s studies professor.

Dezure, Deborah. “Interdisciplinary Teaching and Learning,” Center for Teaching Excellence, University of Maryland
<<http://www.cte.umd.edu/library/podresourcepackets/alternatives/interdisciplinary.html>>, viewed 6/10/03.

Brief paper with clear advice on promoting interdisciplinary teaching on a research university campus. By the Coordinator of Faculty Programs at the Center for Research on Learning and Teaching at the University of Michigan.

Fiscella, Joan B., Cheryl R. Jacobsen, Julie Thompson Klein, Marcia Bundy Seabury, and Michael J. Field. 2000. "Accreditation Criteria for Interdisciplinary Studies in General Education." A task force report to the Association for Integrative Studies. <www.muc.muohio.edu/~ais/pubs/reports/genedaccred.html>, accessed 6/19/03.

A task force report suggesting criteria for accreditation of interdisciplinary studies offering extensive sets of guide questions under the categories of goals, curriculum, teaching and learning, faculty, and administration.

Friedman, Susan Stanford. 2001. "Academic Feminism and Interdisciplinarity." Feminist Studies 27(2): 504-10

An academic paper reflecting on the experiences gained from participating in both an interdisciplinary program and a classic liberal arts disciplinary department on the UW-Madison campus. Especially nuanced in discussing the influence of discipline on an interdisciplinary scholar, and the different ways that scholars cross and bridge borders. By a professor of English and Women's Studies at the UW-Madison, also leader

for the cluster hiring program on Cultural Studies in Global Context.

Frost, Susan H. and Paul M. Jean. 2003. "Bridging the Disciplines: Interdisciplinary Discourse and Faculty Scholarship." Journal of Higher Education 74 (2): 119-49

Discusses the development and both research and teaching impact of the Luce Seminars at Emory, which brought interdisciplinary groups of faculty together for semester-long discussions of select themes.

Discusses the results of surveys of the participants. By two administrators in the Emory Office for Strategic Development.

Garber, Marjorie. 2001. "Coveting Your Neighbor's Discipline." Chronicle of Higher Education (January 12, B7), www.chronicle.com, viewed 6/9/03.

A delightful and thought-provoking article on "discipline envy:" the widespread will toward interdisciplinarity, or "having it all." Tastes: "'Discipline envy' will be a familiar concept, even without any glossing. It's the wish, on the part of an academic discipline, to model itself on, or borrow from, or appropriate the terms and vocabulary and authority figures of another discipline." And: "While the proliferation of 'studies' in the humanities galls some commentators, few are exercised at the permutations of departments and programs in the natural sciences. I've seen no outrage at the founding of a Center for Genomics and Proteomics, nor any public outcry against such bastardizations as 'biophysics,' 'neuroscience,' or 'environmental science and public policy,' all relatively new entries in the course catalog." This article, by the Director of the Humanities Center at Harvard University, is based on a chapter of her book, Academic Instincts (Princeton 2001).

Klein, Julie Thompson. 1990. Interdisciplinarity: History, Theory, and Practice. Detroit, MI: Wayne State University Press and also by Thompson, 1996. Crossing Boundaries: Knowledge, Disciplinaries, and Interdisciplinaries. Charlottesville: University Press of Virginia.

Two widely-cited works on the history, theory, and practice of interdisciplinarity By a professor of Humanities in the Interdisciplinary Studies Program at Wayne State.

Lattuca, Lisa R. 2002. "Learning Interdisciplinarity: Sociocultural Perspectives on Academic Work." The Journal of Higher Education 73 (6): 711-739

Pursues the question, "How do college and university faculty create interdisciplinary spaces in colleges and universities," with a careful, serious exploration of contextualized or situated learning, understanding academic organizations, disciplines, and interdisciplinary fields as structures that mediate learning, professional apprenticeship, and cultural practice. One of the very few writings on this subject that focuses on some of the most important things faculty do in the course of their teaching and research

careers: learn, think, and communicate. This article is based in her dissertation research at Michigan (which won the 1996 The Outstanding Dissertation of the Year Award from the Association for the Study of Higher Education), published in 2001 as Creating Interdisciplinarity: Interdisciplinary Research and Teaching among College and University Faculty (Vanderbilt University Press). A professor of Ed Policy Studies at Penn State.

Menand, Louis. 2001. "Undisciplined." Wilson Quarterly 24 (4): 51-60.

Thoughtful essay on interdisciplinarity in the context of the many changes that have reshaped universities over the past half century. A sample: "The story of paradigm loss is the story of many converging trends--which is a good reason for concluding that the loss is not likely to be reversed anytime soon. One can ask, though, whether postdisciplinarity is a good place to be. My own view, for what it is worth, is that the academy is well rid of the disciplinary hubris of the early Cold War university, but that it is at some risk of sliding into a predictable and aimless eclecticism (as opposed to an imaginative and dynamic eclecticism, which I support)." Menand is a professor of English at the CUNY Graduate Center, best known for The Metaphysical Club (Farrar, Straus and Giroux, 2001), but also editor of The Future of Academic Freedom (Chicago 1998).

Pellmar, Terry C. and Leon Eisenberg, eds. 2000. "Bridging Disciplines in the Brain, Behavioral, and Clinical

Sciences.” Report of the Committee on Building Bridges in the Brain, Behavioral, and Clinical Sciences, Division of Neuroscience and Behavioral Health, Institute of Medicine. Washington, D.C.: National Academy Press. Chapter 4: “Barriers to interdisciplinary research and teaching.” 41-57.

A clear, useful report spelling out barriers and recommendations.

Ruwe, Donelle and James Leve. 2001. “Interdisciplinary Course Design.” The Clearing House 74 (3): 117-18.

Two professors from Fitchburg State reflecting on their experience in team teaching across disciplines, with very useful advice.

University of Michigan, Undergraduate Curriculum Development Testbed (UCDT). <<http://www-personal.umich.edu/~dey/ucdt/>> Accessed 6/12/03.

The website of a program initiative funded by the University of Michigan and the National Science Foundation to foster institution-wide reform of undergraduate education. The site is rich in information on the nature of interdisciplinarity and collaboration, on the development of the program, on issues to consider when evaluating (and launching) interdisciplinary courses, and recommendations

Wissocker, Ken. 2000. “Negotiating a Passage Between Disciplinary Borders.” Chronicle of Higher Education (April 14, B4) (www.chronicle.com, viewed 6/9/03).

A useful essay by the editor of Duke University Press. A taste: “If scholars are unable or unwilling to learn how to read work that draws on other disciplines -- to become aware of their own disciplinary biases, and to hold them in check -- all the talk of interdisciplinarity will be just that.”

APPENDIX II

EXTANT RECOMMENDATIONS RELATED TO INTERDISCIPLINARY

TEACHING I. UNIVERSITY OF WISCONSIN - MADISON SOURCES

The following 18 recommendations were listed or embedded in 4 reports on interdisciplinary education generated at the University from 1995 to 2003.

1. When establishing an “alternative structure” (i.e. collaboration beyond a single department/college), assign a lead department or college/dean and clarify decision-making authority, Only major decisions about major directions or policy should have to involve multiple deans. (ITUW)
2. Minimize the types of decisions that require multiple players. (ITUW)
3. Make decisions at broad levels that allow for operational decisions to be made independently. Example: Jointly agree on an annual budget with authority for flexibility at the department or faculty level (ITUW)
4. Workload documents need to reflect these efforts better (ITUW)
5. Link interdisciplinary teaching to scholarship of faculty members (a la Biology 151/152) (ITUW)
6. Develop a “getting started” set of guidelines for new centers to help them get started (ITUW)
7. Junior faculty members must be “protected from mismatching expectations of different units, such as the full service obligations of multiple departments (ITUW)
8. Consider developing “0” level appointments (ITUW)
9. Recommendation not to create new colleges to facilitate cross-college collaboration (MM)
10. Reallocate resources to support horizontal (cross-college) efforts; establish strategic partnerships or joint ventures across colleges where each college would be expected to contribute from existing budget to follow faculty. Horizontal units should have their own budgets which, if they existed within a single college, should be a line item in the college budget. (MM)
11. Create and empower matrix governance structures. Governance structures for cross-college activities must involve faculty and administrators and incorporate horizontal and vertical dimensions. Faculty governance participation is always essential, but in some cases a dean or committee of dean may also play a role. This recommendation takes the notion of “joint ventures” and expands the governance options. (MM)

12. Give deans of schools and colleges campus-wide responsibilities. In some cases, one college alone may be asked to perform cross-college responsibilities for the campus, and that unit's dean asked to manage it for the benefit of all ("trustee dean"). *Note: since this report, this has been the case for L&S responsibility for general education requirements.* In others, a committee of deans should be appointed to oversee governance and interact with faculty, with one dean designating as chair and "managing dean" on a rotating basis. All deans with cross-college responsibilities should be accountable to the Chancellor and Provost. (MM)

13. Give departments incentives for interdisciplinary contributions. Departments should weigh interdisciplinary activity equally with departmental in merit and other rewards. Departments should report on their interdisciplinary

contributions and be rewarded when they make substantial contributions. (MM)

14. Empower horizontal units so they can reward faculty participation. They need some department-like powers, have a formal voice in tenure decisions, may require partial tenure homes in some cases. Note that department-like bodies are covered in F.P.P. Ch. 5.40. (MM)

15. Both vertical and horizontal axes should be simplified. There is too much structural complexity “It would help if the vertical axis contained a smaller number of larger departments each with a clear mandate to participate in horizontal activities.” (MM)

16. Campus-level accountability and monitoring are essential Each major horizontal unit should be required to provide the Chancellor and Provost with an annual report in a format similar to that used currently by vertical units. Reports should be prepared by the responsible trustee managing, or horizontal dean and made available to all members of the horizontal learning community. (MM)

17. The Virtual Department could be one model for cross-college units that provide educational programming and may also embrace research and outreach. Faculty may have appointments in the Virtual Department but would have their tenure base in a department. Elements: A trustee or managing dean would administer the VD on behalf of all participating colleges; an executive committee with powers over academic matters; a chair selected through standard procedure. All participating colleges would have a voice in the governance structure. The VD would be an independent budget unit with its own UUDS number. Resources must come from participating schools and colleges, and faculty may transfer salary to the VD. Other needed resources must be contributed by the deans of the participating colleges. The dean with fiscal responsibility shall ensure that interdisciplinary participation is properly measured and rewarded and that resources that may revert to participating colleges are tracked. (MM)

18. Some suggestions for reducing obstacles and creating awards for collaborative teaching are

- (a) If a course is taught annually, alternate which faculty member gets the credit for teaching. (This still involves faculty taking on overloads)
- (b) The university could stage a competition for the first few years of a team-teaching initiative in which the top 5-10 proposals would be funded for a semester, with both faculty members receiving credit for the course.
- (c) Team-teaching could become part of the mentoring program A probationary faculty member might teach a course together, with both faculty members receiving credit for the course.
- (d) The Lilly Program could become involved in fostering a team-teaching program

for interested fellows and their mentors or colleagues.

(e) The Graduate School could sponsor a number of graduate courses each year that would be team taught. (MMP)

OTHER

INSTITUTIONS UNIVERSITY OF GEORGIA 1998

Source: Benson and Ruppertsberg 1998.

1. We should offer models which show how administrative and academic details of team teaching can be handled. These models would facilitate the use of team teaching and prevent excessive reliance on ad hoc solutions. These models should be centered on team teaching situations justified by course content (e.g., a history and literature course) or by pedagogy (e.g., teacher training).
2. We should sponsor forums at which faculty who regularly team teach speak about their experiences. These forums would provide interested faculty with useful information and advice and possibly encourage more team taught courses.
3. Possibly in conjunction with a forum, or as an independent event, we should invite one or more faculty with team teaching expertise to campus to discuss the issue.
4. We should consider team teaching situations that pair new faculty with more experienced faculty. This would be a useful way of providing new faculty with role models and with an opportunity for faculty development.
5. We should consider team teaching situations that pair advanced graduate students with experienced faculty. This could be a useful way of training students who are preparing for professions that involve teaching at the high school or college levels.

DIVISION OF NEUROSCIENCE AND BEHAVIORAL HEALTH, INSTITUTE OF MEDICINE, 2000

Source: Pellmar and Eisenberg 2000

Universities should:

Allocate appropriate credit for interdisciplinary efforts. They should include a fair allocation of research overhead costs to the home departments of all investigators and a fair crediting for faculty contributions to interdisciplinary research and teaching.

Review and revise appointment, promotion, and tenure policies to ensure that they do not impede interdisciplinary research and teaching.

3. Facilitate interaction among investigators through support for shared facilities. Universities can provide common gathering areas and ensure that new facilities are designed to promote Interaction.

4. Encourage development, maintenance, and evolution of interdisciplinary institutes, centers, and programs for appropriate problems.

UNIVERSITY OF MICHIGAN, REACCREDITATION SELF-STUDY, 2000

Source: University of Michigan 2000.

Key recommendations addressing general institutional issues:

1. Address and remedy specific barriers to collaborative teaching by faculty from different schools and colleges, such as cross-listing practices, course scheduling, and obstacles to out-of-department effort.
2. Encourage and support collaborations in developing courses of study that cross boundaries of academic

units and are open to students from several schools and colleges.

3. Develop ways to assess learning outcomes of interdisciplinary teaching and to evaluate contributions of these opportunities to the undergraduate experience.

4. Develop capabilities in the new M-Pathways data environment to track and understand the impact of interdisciplinary courses and programs of study.

Key action items for particular steps to be taken:

1. Create thematically-organized clusters of courses that allow students to explore how different disciplines approach common topics and themes, and develop and evaluate other border-crossing experiments.

2. Pilot a program that allows sophomores an opportunity to reflect on their academic goals and on the different ways in which the University organizes learning.

3. Facilitate a system of internal fellowships for faculty, allowing duty out-of-department to be taken elsewhere in the University for the purpose of developing new teaching or courses of study.

SOURC

ES UNIVERSITY OF WISCONSIN - MADISON

MM “Managing the Matrix: Sustaining Effective Cross-College Learning Communities,” A report by the

Council of Deans subcommittee on cross-college activity, 1995

MMP “Managing the Matrix” Progress Report, 1997.

ITUW “Interdisciplinary Teaching at UW-Madison,” OQI materials related to a “breakout session on interdisciplinary teaching,” 1998

FIP “Report of the Provost’s Ad Hoc Committee on Faculty in Interdisciplinary Programs,” 2003.

OTHERS:

Benson, Jeri and Hugh Ruppensburg. 1998. “Understanding and Reducing the Barriers to Team Teaching: Dean's Forum Project Report.” University of Georgia,

<http://www.uga.edu/deansforum/reports/teamteaching.htm> accessed 6/10/03.

Pellmar, Terry C. and Leon Eisenberg, eds. 2000. "Bridging Disciplines in the Brain, Behavioral, and Clinical Sciences." Report of the Committee on Building Bridges in the Brain, Behavioral, and Clinical Sciences, Division of Neuroscience and Behavioral Health, Institute of Medicine. Washington, D.C.: National Academy Press. Chapter 4: "Barriers to Interdisciplinary research and teaching.," 41-57.

University of Michigan, Institutional Self-Study for the purposes of reaccreditation. 2000

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