

**Fostering
Interdisciplinary
Inquiry**

Proceedings from a Conference

Consortium on Fostering Interdisciplinary Inquiry

Edited by Gail Dubrow, Eric Tranby, and Char Voight

**University of Minnesota | Brown University | Duke University | University of California, Berkeley
University of Illinois at Urbana-Champaign | University of Michigan | University of North Carolina at Chapel Hill
University of Pennsylvania | University of Washington | University of Wisconsin-Madison**

Fostering Interdisciplinary Inquiry: Proceedings from a Conference

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Consortium on Fostering Interdisciplinary Inquiry

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Edited by Gail Dubrow, Eric Tranby, and Char Voight

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Preface

The November 2008 Conference on Fostering Interdisciplinary Inquiry marked the culmination of eighteen months of intensive effort to break down barriers and advance interdisciplinary research, teaching, and engagement at ten of the nation's premier public and private research universities. These proceedings reflect the intensity of that effort, the breadth of the issues raised, and the comprehensive approach to addressing obstacles that have challenged these and other research universities before and since the National Academies' seminal 2005 report as well as other national studies.

The abundance of previous recommendations for advancing interdisciplinary activity that have emerged at every scale of study—from faculty committees at individual universities to national studies by distinguished institutions such as the National Academies—are critically important but ultimately insufficient without the kinds of concrete strategies for implementation that are the province of savvy administrators who are prepared to learn from the experience of their peers.

We believe that these proceedings and, indeed, the ongoing work of the Consortium build on these other efforts but also are different and distinctive. The genius of this project is the extent to which it engages those responsible for some of the most critical administrative functions of the university in reexamining the possibilities for fostering interdisciplinary research, education, and training. In that engagement, the participants examined the impact, positive and negative, of major university functions on interdisciplinary research, education, and public engagement and the interconnectedness between and among them.

These proceedings also embody a remarkable commonality of purpose among the participants, no less remarkable given the increasingly competitive academic marketplace in a severely constrained economic environment where institutions strive to attract the very best faculty, students, staff, and financial resources.

The ten universities—Brown University; Duke University; the University of California, Berkeley; the University of Illinois at Urbana-Champaign; the University of Michigan; the University of Minnesota; the University of North Carolina at Chapel Hill; the University of Pennsylvania; the University of Washington; and the University of Wisconsin-Madison—comprise the Consortium on Fostering

Interdisciplinary Inquiry. Starting in 2007, each institution committed teams of seven to ten academic and administrative leaders who identified common issues and worked to forge solutions in nine broad thematic areas—academic administration and faculty governance; collaborative technologies; development and fundraising; education and training; equity and diversity; finance and budget; research; space and capital planning; and communication.

One of the things that university leaders have learned from interdisciplinary ferment on their campuses is that collaboration, from the project to the multi-institutional level, is critical to the success of universities and to the process of undertaking reforms that will prepare them for the most difficult challenges of the 21st century.

These essential collaborations take place at a time when fostering interdisciplinarity and promoting collaboration could not be more urgent and more important. This conference helped in a positive way to identify and to begin to break old institutional and intellectual habits that have inhibited breakthrough interdisciplinary thinking. The findings from the institutional self-studies associated with this project are helping participants leave their intellectual, professional, and institutional comfort zones to discover new and better ways of working together and advancing interdisciplinarity.

Ray Stata, a member of the American Academy of Arts and Sciences and the National Academy of Engineering, and cofounder of the Analog Devices Company, wisely once said: "I came to the conclusion long ago that limits to innovation have less to do with technology or creativity than organizational agility. Inspired individuals can only do so much." "Organizational agility": in other words, ideas and execution matter. And there is a corresponding need for leadership excellence and organizational excellence to achieve the kinds of outstanding interdisciplinary progress we all expect. If the Consortium on Fostering Interdisciplinary Inquiry, through the member institutions' continuing efforts, have spurred that organizational agility and, through these proceedings, have provided a road map for others to join in, then the project already has been successful.

E. Thomas Sullivan
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University of California, Berkeley
University of Illinois at Urbana–Champaign
University of Michigan
University of Minnesota
University of North Carolina at Chapel Hill
University of Pennsylvania
University of Washington
University of Wisconsin–Madison

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¹Communication was not formally constituted as a functional area, nor was it the subject of self-study. However, the effort to develop cooperative mechanisms for communication and publicity led to the formation of a communications group, which worked in earnest to garner shared publicity for the work of the Consortium. For that reason, the group members are recognized here.

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CHAPTER 1

Introduction

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This volume contains proceedings from two years of work—undertaken from 2007 through 2009—by the Consortium on Fostering Interdisciplinary Inquiry, which culminated in a November 2008 invitational conference hosted by the University of Minnesota. The Consortium represents the cooperative efforts of ten U.S. research universities to understand the barriers to fostering interdisciplinary research, education, and training; and to draw upon a knowledge of one another's experience to identify and develop institutional policies and practices that improve the climate for interdisciplinarity.

All across the landscape of higher education, there is a growing recognition that solutions to some of the most vexing problems require interdisciplinary approaches to research, education, and training. This recognition has been accompanied by the widespread perception that our universities will require significant changes in organization, policies, and practices to put interdisciplinary pursuits on an equal footing with activity lodged within established disciplines. Indeed, there is an emerging consensus about the need for systemic reform that will eliminate both the hidden penalties and excessive transaction costs associated with interdisciplinary initiatives, provide positive incentives, and develop mechanisms for sustaining innovation in the areas of research, education, and training.

Signs of the emerging consensus can be found in the form of national studies, such as the National Academies' report *Facilitating Interdisciplinary Research*¹ and crosscutting initiatives by major funding agencies such as the National Institutes of Health and the National Science Foundation, whose calls have stimulated the formation of interdisciplinary teams and have provided substantial incentives for universities to make commitments to sustaining innovation along interdisciplinary lines. Meanwhile, pressure for institutional reform is also coming from within universities, as a new generation of faculty and students simply take for granted various forms of disciplinary boundary crossing; as faculty appointments to multiple departments become more the norm than the exception; as student academic interests no longer fit

neatly within the knowledge domain of a particular department, much less a single college; and as university strategic plans consistently direct major investments into emerging fields of interdisciplinary inquiry. Little wonder that faculty and students at research universities generally are calling for reform in basic institutional policies and practices to remove the barriers to establishing and operating programs of research, education, and training across many knowledge domains. Moreover, they are seeking changes in organizational forms and administrative processes that will allow them to conduct their work more easily within institutions of higher education.

BACKGROUND

The process of strategic planning or positioning that took place under the provost's leadership at the University of Minnesota during the 2004–6 period brought several themes into focus, among them repeated faculty concern about how existing policies and practices pose myriad challenges for faculty and students engaged in interdisciplinary activities. The vast majority of strategic planning task forces established by the provost called for central leadership, investment, and administrative reforms that would make it easier to cross disciplinary boundaries as a routine aspect of the faculty research and discovery process, postdoctoral training, academic teaching, and student learning. In that context, fostering interdisciplinary inquiry emerged as a central theme within the University of Minnesota's most recent round of strategic positioning activities.

Thus, an institutional commitment to fostering interdisciplinary research and education was an explicit element in the University of Minnesota's new strategic plan when I became vice provost and dean of the Graduate School in August 2005. Like its peers, the University of Minnesota had accrued a substantial record of making strategic central investments in interdisciplinary initiatives under successive leaders, but it had few established metrics for tracking the performance of its investments, relying largely on ad hoc review by outside experts to inform decisions about leadership and continuing investment.

Contributors are identified by their institutional affiliations and administrative titles as of the November 2008 Consortium on Fostering Interdisciplinary Inquiry invitational conference. Updated information is provided in the contributors' biographical profiles.

¹Committee on Facilitating Interdisciplinary Research, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, *Facilitating Interdisciplinary Research* (Washington, DC: National Academies Press, 2005).

These reviews occurred at the request of the senior administrator to whom the specific interdisciplinary initiative reported. The concept of periodic reviews of interdisciplinary institutes, centers, and initiatives is a more recent development modeled on the academic program reviews conducted at most research universities.

Like its peers, Minnesota has established myriad interdisciplinary centers and institutes to stimulate the development of collaborative research in emerging fields but has lacked the metrics, measures, and review mechanisms to make effective decisions for the future of those entities. Indeed, central administrators began to fear that they were far more effective at establishing interdisciplinary entities than they were at managing their performance; hence the capacity to “sunset,” or close, initiatives began to seem more innovative than the process of launching them.

If the process of renewed strategic planning demonstrated anything during the 2004–6 rounds of consultation, it was that the University of Minnesota’s faculty, like those at other major research universities, were clamoring for changes in the institutional culture that would foster collaboration among and between colleges, and between colleagues in a wide range of disciplines from science, engineering, and medicine to the social sciences, the humanities, and the arts, inclusive of the potential contributions of the professional schools. Reports from more than thirty different task forces called for changes in fundamental policies and practices to foster interdisciplinary inquiry, with concrete concerns raised about potential barriers in the tenure and promotion system, the distribution of indirect cost returns from external funding, and disincentives to various forms of cross-college collaboration built into the University of Minnesota’s newly refined responsibility-centered management (decentralized) budget system.

These calls for the reform of the University of Minnesota’s administrative policies and practices were framed in the strategic planning process as though they were issues exclusive to the University of Minnesota. In reality, similar concerns were arising simultaneously at most North American research universities. Peer institutions had similarly invested precious central funding in strategic initiatives intended to jump-start research in selected emerging fields, almost always interdisciplinary in character. Often these took the form of university-wide centers and institutes. Many research universities had established ad hoc committees charged with making recommendations about how to foster interdisciplinary research and education. University leaders were being pressed by their own faculty and students to consider reforms to faculty appointments, the mentoring system, the tenure and promotion

process, and the budgeting system that would reduce transaction costs and more readily facilitate interdisciplinary activities.

For that reason, many research universities responded positively to inquiries from the University of Minnesota about their willingness to join in a consortium on fostering interdisciplinary inquiry. On a national level, the National Science Foundation’s Integrative Graduate Education and Research Traineeship (IGERT) Program periodically convened its grant holders for a broader conversation about the prospects for institutionalizing the kinds of interdisciplinary innovation in graduate education and training it was dedicated to supporting, and the National Academies’ Keck Futures Initiative sponsored annual conferences for faculty in emerging fields of interdisciplinary research. At the level of national meetings of higher education leaders, however, few formal venues or mechanisms routinely allowed the leaders of research universities to compare notes on direction or strategy or to learn as much as they potentially could from one another’s trials, errors, and successful experiments with creating an institutional climate attractive to faculty and students whose intellectual interests transcended the usual administrative structure of academic colleges and departments. The idea for the consortium arose in this context, in response to a growing sense that progress toward implementing the reforms necessary to advance interdisciplinary activity depended on enabling leaders of peer institutions to compare notes, to learn from one another’s most promising practices, and to benefit from illuminating comparisons to sort out the factors that affect the success or failure of interdisciplinary initiatives.

Soon after I came to the University of Minnesota in August 2005 to serve as vice provost and dean of the Graduate School, my responsibilities within central administration explicitly expanded to include fostering interdisciplinary education and research as part of a collaborative leadership team with the vice president for research, the vice provost for undergraduate education, and the assistant vice provost for interdisciplinarity. As part of an overall commitment to exercising national leadership in areas of strategic priority for the university, President Robert Bruininks and Provost E. Thomas Sullivan enthusiastically embraced my 2006 proposal to establish the Consortium on Fostering Interdisciplinary Inquiry (CFII), with the University of Minnesota as its institutional home. Launched with the financial support of the University of Minnesota’s leadership, a consortium of ten public and private research universities was established in 2007 with a shared commitment to understanding and undertaking the reforms needed to promote interdisciplinary activity on their campuses.

My efforts to form and direct the Consortium had direct relevance to and benefits for the Graduate School's own mission to advance interdisciplinary education, research, and training since the Consortium promised to provide a wealth of information about how other leading research universities were tackling any number of issues that had not yet received close attention in the usual venues for sharing experiences, such as meetings of the Association of American Universities or the Association of Graduate Schools. Indeed, the structure of the Consortium's self-studies intentionally convened leaders of the usual administrative silos—research, graduate education, development, and so forth—and then intentionally cut across those areas to ensure that the impacts of one function on the next could be considered in the context of a whole administrative system whose cumulative impacts contribute to an overall institutional climate that is relatively receptive or barrier-filled for faculty and students engaged in interdisciplinary pursuits.

My perch at the intersection between the provost's office and the Graduate School at the University of Minnesota provided a solid administrative base for this new initiative to establish a national network of universities committed to fostering interdisciplinary activity while also providing a useful laboratory for experimentation with new initiatives, policies, and practices. Four years of ambitious experimentation took place within the University of Minnesota's Graduate School from August 2005 through the end of my administrative appointment in June 2009 with the knowledge and consent of two important governance bodies: the Graduate School's Policy and Review Councils, which deliberated over such matters as whether or not the University of Minnesota should allow graduate students to produce multiauthored, multidisciplinary collaborative theses and dissertations, and the Network of Interdisciplinary Initiatives (NII), a new type of organization founded during this period. The latter provided a vital feedback loop about interdisciplinarity and grew to be a democratic organization of more than 300 faculty postdoctoral appointees, and students actively engaged in interdisciplinary research, education, and training initiatives at the University of Minnesota. Together the Policy and Review Councils

and the NII ensured that new policy proposals and initiatives intended to foster interdisciplinarity were carefully considered from multiple perspectives and were amended to account for unanticipated issues prior to being adopted within the Graduate School.

During this period, both the Office of the Vice President for Research and the Graduate School were charged by the provost with responsibility for developing their own small units dedicated to fostering interdisciplinary activity, and the work of these offices was closely coordinated at the staff level. Indeed, staff from these two offices formed a core team for the purposes of managing Consortium communications, developing the self-studies, organizing the conference, and preparing these proceedings for publication.² This team was augmented by the services of an external consultant, a volunteer from the American Council on Education's Higher Education Leadership Program, and several members of the University of Minnesota's faculty as well as graduate student researchers working under their supervision, each of whom contributed to a preliminary analysis of self-study findings that were subsequently used by functional committee chairs and cochairs in preparing original conference presentations and in revising them for publication in the proceedings.³

Since leaving the position of vice provost and dean of the Graduate School and returning to the University of Minnesota faculty as a senior member with tenure in four separate departments in three different colleges, I have had the opportunity to join my colleagues in testing just how well recent changes in the tenure code, along with new programs managed by the offices of research and graduate education, are working to support those whose research and teaching agendas routinely take them outside the domain of any individual academic department. These multiple standpoints from which I have viewed proposed reforms, and the wide disciplinary and professional reach of my university appointments—extending from very high aspirations for designing improved administrative systems to the more difficult everyday reality of implementing them in practice as a faculty member in multiple

²Core staffing for the Consortium was provided by Peggy Sundermeyer, Executive Director, Collaborative Research Services, Office of the Vice President for Research; Office of Interdisciplinary Initiatives staff Vicki Field and Char Voight; Felly Chiteng, Administrative Fellow; Gayla Marty, Director of Communications; and Executive Office and Administrative Specialists Mary Maurelli and Toby Greenwald. Doug Freeman, American Council on Education Fellow from North Dakota State University, assisted in preliminary drafts of the self-study questions. Ann Freeman provided assistance on behalf of University Relations. Lori Homer of Seattle, Washington, provided outside consulting services in the early development of the self-study framework.

³Prior to the conference, preliminary analysis of the self-study findings was carried out by University of Minnesota doctoral students Kathryn Enke and Soo Lee Kyung under the supervision of Rebecca Ropers-Huilman, Professor of Higher Education, College of Education and Human Development. After the conference, Eric Tranby and Char Voight assumed responsibility for refining the reports and augmenting the examples of promising practices included in the proceedings, after which committee chairs made final revisions to their chapters.

departments—are relevant to this introduction because they inform the analysis and interpretation of data generated by Consortium member institutions. Indeed, this is not a cause of bias per se but rather a clue about the continuing need to learn more about the direct experiences of university faculty, students, and administrators with negotiating and managing interdisciplinary inquiry if we are to really understand how well the basic administrative systems that underlie operations at research universities are actually working in practice.

Because public discussions about fostering interdisciplinarity have been so rich at the University of Minnesota ever since the start of its most recent phase of university-wide strategic positioning in 2004, the combined perspective of academic administrators, working faculty, postdoctoral appointees, and graduate students greatly helped to inform and ground discussions ultimately captured in the proceedings about what remains to be done to implement incremental as well as broader systemic reforms that will put interdisciplinary initiatives on a par with those more firmly located in individual colleges or departments. Additionally, ongoing discussions within the two-year-old NII helped to inform the conclusions presented in the final chapter of the proceedings, since the NII's leadership has been grappling with their own set of recommendations for fostering interdisciplinary activity across all of the administrative systems and academic units at the University of Minnesota. The relative ease with which the NII has successfully identified existing barriers, coupled with the changes it deems desirable and the difficult realities of implementing its proposed work plan, points to a major issue ahead, namely, the need to extend the work of the Consortium from the research and study phase all the way through the implementation process, where the best ideas can suffer disabling setbacks due to political and fiscal realities. Toward this end, the conclusion points to the possibilities for a second phase of work among the founding Consortium members and an expanded group of research universities to provide mutual support and assistance as universities struggle to implement the innovative policies and promising practices detailed in the proceedings. Otherwise, this study runs the risk of gathering dust on the shelf at the critical juncture between knowledge and action relevant to the hard work of institutional transformation.

ESTABLISHING THE CONSORTIUM ON FOSTERING INTERDISCIPLINARY INQUIRY

Membership in the Consortium was established by invitation to a set of research universities that, like the University of Minnesota, had made significant investments in interdisciplinary initiatives in recent years, especially universities that had engaged in serious internal

conversations about potential reforms in policy and practice to foster interdisciplinary research, education, and training and that shared an interest in collaborating with their peers to find new solutions to perennial problems. An effort was made to establish rough regional representation across the United States and to include both public and private institutions in the mix. In addition to the University of Minnesota, the founding Consortium members include Brown University; Duke University; the University of California, Berkeley; the University of Illinois at Urbana–Champaign; the University of Michigan; the University of North Carolina at Chapel Hill; the University of Pennsylvania; the University of Washington; and the University of Wisconsin–Madison. Each of these research universities made a commitment—at the highest level of institutional leadership—to participate in the development and administration of a shared set of questions that structure the eight sections of the self-study instrument. The self-studies were distributed to appointed leaders in each of the eight functional areas at each institutional member of the Consortium and then were assembled into a coherent institutional report, which was returned to the University of Minnesota for analysis. Consortium staff at the University of Minnesota then carried out an analysis of self-study findings to gain an understanding of the overall status of interdisciplinary activity at each member institution as well as the state of the art in each functional area across the ten participating institutions. These findings were returned to the chairs of the functional area committees for review, comments, and revisions to the analysis of findings, ultimately resulting in the reports contained in these proceedings.

Unlike past studies that have focused almost exclusively on recommendations for fostering interdisciplinary research or on amending the tenure and promotion process so that it places a higher value on interdisciplinary activity, the work of the Consortium reached into eight areas of administrative responsibility where institutional policies and practices have the potential to hinder or facilitate interdisciplinary activity. These functional areas include Academic Administration and Faculty Governance; Education and Training; Research; Development and Fundraising; Finance and Budget; Space and Capital Planning; Equity and Diversity; and Collaborative Technologies. The leaders responsible for each of these functional or administrative areas at member institutions—for the most part vice provosts and vice presidents—were tapped to participate in internal teams that cut across administrative silos within each university. The Consortium put them to work both on teams internal to each institution and on national committees with their peers at other institutions to identify barriers and promising practices with respect to fostering interdisciplinarity in their area of responsibility.

Drawing on their combined expertise, these administrators framed the critical questions that ultimately would guide self-studies conducted by each member institution, and they subsequently took the lead in coordinating institutional responses to the self-study sections, which were comprised, for the most part, of open-ended questions. As noted in the front matter, more than a dozen individuals were engaged in this complex project at each institution, and they individually and collectively helped to ensure a smooth flow of information in an ambitious distance enterprise that extended over a two-year period. This process resulted in detailed self-studies by the ten institutions that allowed for sharp comparisons in the eight functional areas. While not every institution answered every question, and while some sections of the self-study fell through the cracks during leadership transitions and at other normal moments of disjuncture at research universities, taken together the self-studies prepared by Consortium member institutions helped to build a shared understanding of the barriers and promising practices related to interdisciplinary activity at both public and private research universities.

The Consortium was founded in 2007, and work designing the self-study instrument began in that same year. Initial findings from the institutional self-studies were completed by spring 2008. The University of Minnesota's research and analytical capacity was tapped to carry out a preliminary analysis of findings, which in turn fed the preliminary reports developed by committee chairs in all eight functional areas that were presented for the first time at the November 2008 invitational conference hosted by the University of Minnesota. These presentations were further refined between June and October 2009 in an iterative process that drew upon Consortium staff access to raw data in the detailed self-studies to sharpen the presentation of findings by committee cochairs in this final published version of the proceedings.

This introduction establishes a general context for the Consortium's efforts and provides a brief overview of the findings in each of eight administrative or functional areas. It points to some of the incremental changes in academic policy and practice that are needed to develop a comprehensive approach to fostering interdisciplinary activity at research universities, offering a more proactive and systemic approach to reform as a compelling alternative to continuing present practices, which for the most part consist of administrators granting "special circumstances" exceptions on a routine basis for interdisciplinary initiatives that do not fit neatly into normative policies and practices; alternatively, research universities have pursued only very modest procedural improvements in a limited number of administrative domains to facilitate interdisciplinary

activity. Given the historical reality that university administrative systems originally were designed to optimize the flow of transactions among and between central administrators, colleges or schools, and academic departments, this study advances the precept that systemic, comprehensive reform is needed to make universities responsive to the needs of interdisciplinary entities that too often fall through the cracks within well-established bureaucratic structures that were neither intended nor designed to operate in the networked fashion that seems to characterize many, if not most, interdisciplinary initiatives.

OVERVIEW OF FINDINGS

Academic Administration and Faculty Governance

Policies and practices in the area of Academic Administration and Faculty Governance, whatever effect they have as a reward system in reality, play an important role in shaping faculty perceptions about the relative value a given research university, college, school, department, or program assigns to accomplishments that advance a specific academic discipline as opposed to the value attached to interdisciplinary pursuits. Efforts to improve working conditions for interdisciplinary faculty must begin with the recruitment and hiring process, where explicit attention to clarifying expectations about the division of labor among and between departments is needed to manage the tensions that inevitably arise for those with appointments in multiple units. While some Consortium member institutions have developed specialized agreements to govern the hiring and appointment of faculty with multidepartmental commitments, the routine use of memoranda of agreement holds much promise as a tool for proactively amending systems originally designed to accommodate faculty employment within a single academic unit, or two units at most. Cluster hiring, which constitutes another innovation reported in the self-studies, holds similar promise for advancing centralized strategic initiatives (centralized, that is, at the university or college level), since the assignment of a departmental home can be deferred until the most talented faculty have been identified.

A recurrent question related to fostering interdisciplinarity has concerned the balance of barriers and rewards structured into the tenure and promotion system of research universities, given the fundamental role of departments as appointment homes, and the privileged position of disciplinary colleagues in making assessments of their peers within tenure and promotion systems. The self-studies suggest continuing concern with the practical question of how to effectively assess the accomplishments of faculty whose intellectual contributions extend far beyond the reach of established disciplines, even while their

appointments remain fixed within departments that more often than not have disciplinary origins or boundaries. New policies and practices are emerging to address these tensions within the tenure and promotion systems at Consortium member institutions, from coordinated or expedited joint review committees to revised faculty codes that detail explicit procedures for assessing faculty whose work is self-defined as interdisciplinary. While it remains unclear whether interdisciplinary faculty are in fact disadvantaged within existing tenure and promotion systems, concern with the issue of faculty rewards is so great that it is sure to be a continuing focus of institutional reform efforts, and ad hoc arrangements for individual faculty are likely to give way to more systemic practices at research universities where a significant portion of the faculty regard their work to be interdisciplinary in character.

Education and Training

In the critical area of Education and Training, the self-studies conducted by Consortium members identified both long-standing and emerging areas of interdisciplinary study, profiled the most successful educational programs, and identified the factors that make a difference between merely surviving and abundantly thriving interdisciplinary programs. To a lesser extent, the self-studies touched on postdoctoral training and external funding of interdisciplinary training grants. The most significant issue for interdisciplinary graduate programs is that few efforts to seed and support them have translated into recurring allocations that stabilize them, put them on a par with departmental degree programs, or provide adequate resources to support an integrative intellectual core, as opposed to a patchwork of relevant offerings. So too, leadership and faculty staffing transitions have rarely been planned for in programs that originated, and were maintained, primarily as labors of love produced on the margins of the institutional economy. The common concern expressed by the administrators of interdisciplinary academic programs is that shaky institutional arrangements require managing such programs on a yearly basis rather than planning for a sustainable future, and that the loss of a key faculty member can be devastating for even the healthiest interdisciplinary academic programs since so much voluntary labor provides the engine and glue that makes them work effectively. Academic programs that do not generate a high volume of external research support are among the most endangered of species in the new economy of academic affairs. The self-studies identified cross-collegiate interdisciplinary academic programs as being at high risk of institutional neglect unless a central unit, such as a graduate school or a provost's office, was charged with the responsibility and resources needed to proactively manage them.

The self-studies revealed some of the reasons why interdisciplinary academic programs tend to be disadvantaged in assembling the institutional resources necessary for sustained operation. While colleges have access to most of the resources required for smooth academic operation, no single administrative entity controls access to the wide array of resources—from committed faculty to the necessary space—needed to assemble programs outside of departmentalized or college structures. Even the most robust graduate schools, positioned to provide funding to interdisciplinary graduate programs, may be able to offer modest administrative support or student fellowships but cannot necessarily guarantee faculty time or program office space to convene faculty and students because both remain in the purview of college deans. Programs that lack the resources inherent in permanent faculty appointments but instead rely on the voluntary contributions of departmentalized faculty typically lack a direct means to fill gaps in their curriculum, to control the direction of hiring, or to necessarily survive a transition in leadership because colleges and departments, rather than interdisciplinary programs, have the budgetary authority to decide how to define the next hire. These are only a few of the rich, detailed findings about interdisciplinary academic programs that arose from the Consortium's study. Likewise, policies and practices deemed promising were particularly rich in the arena of graduate education on account of decades of experience in mounting interdisciplinary programs.

Research

The core mission of research universities to pursue knowledge creation and discovery, and the instrumental drive to secure external funding in support of that mission, have provided inherent incentives to implement reforms that support interdisciplinary activity. Indeed, Research may be the most well-developed area of study and remedial action among the eight self-study sections since there is a solid record of established recommendations for action as a result of past studies, such as the National Academies' 2005 report *Facilitating Interdisciplinary Research*. These factors no doubt account for the widespread acceptance expressed by Consortium member institutions of the need for continuing progress in achieving reforms in institutional policy and practice to establish a climate that supports interdisciplinary research. The Consortium's study supported past reports that have called for adjusting indirect cost returns to foster and renew interdisciplinary research entities, from multicollge teams to university-wide research institutes and centers; for developing coherent and meaningful metrics to track the progress and evaluate the success of interdisciplinary research centers; and for reforming the system of faculty appointments and rewards to ensure that work on interdisciplinary ventures is not penalized by a system that

is founded on departmentally based tenure and merit review processes and that favors disciplinary contributions over intellectual citizenship in the university.

Of all the areas studied by the Consortium, Research was the one in which the compelling set of internal and external drivers of change is in place, starting with the many faculty who pursue this approach to research, with some inroads into establishing the incentives and rewards from external funders and internal university initiatives, and extending clear through to widespread recognition on the part of institutional leaders that retaining the most productive faculty requires making accommodations that sharply reduce the transaction costs associated with interdisciplinary, intercollegiate, and multi-institutional collaboration. Unlike in some other areas, where progress toward institutionalizing interdisciplinarity lags significantly, the Consortium's study found uneven but continuing progress toward adopting policies and practices that foster interdisciplinary research. This study, however, revealed that continuing progress on the research front also depends on conceptualizing and then connecting to related reforms in other functional areas, such as Space and Capital Planning and Collaborative Technologies among others, that often operate at some remove from research administration but that are critical to the success of the innovation and discovery agenda.

Development and Fundraising

One of the real gems within the Consortium's functional area studies was its work in the Development and Fundraising area. The committee's charge was to examine what does and does not work, and what could be changed to foster success in fundraising for interdisciplinary initiatives; and to shape and define a set of recommendations for development "best practices" in support of interdisciplinary fundraising. In this case, the combination of public and private research universities within the Consortium revealed a major barrier to interdisciplinary development activity in the tendency of public institutions to concentrate development officers within discrete colleges, where their primary responsibility is to raise money in support of collegiate agendas. If individual colleges "own" certain donors, despite shared strategic priorities that cut across multiple colleges, e.g., a focus on sustainability, and if colleges find themselves essentially competing with university-wide research centers and institutes to fund work on some of the most pressing questions of our time, many new conflicts and lost opportunities enter the development system. Incentives for cooperative fundraising among colleges, and alternative structures for pursuing funding for university-wide initiatives, clearly need to be instituted.

Intercollege and university-wide coordination in pursuit of fundraising for major interdisciplinary initiatives is severely hampered by the existing college-based organizational scheme, and any pitches for the largest "transformational gifts," on themes that cut across multiple colleges and disciplines, currently succeed despite the common fundraising structure of public universities rather than because of it. While elite private institutions can justify a larger and more ambitious central fundraising team in pursuit of major crosscutting initiatives, in part because the institution's overall identity and reputation trump alumni allegiance to particular departments and colleges, all research universities are currently facing the new challenge of how to frame and present interdisciplinary initiatives to their best prospects, and the development community is eager to sharpen both their conversations and understanding of promising practices in this emerging area of concern. It is just one of many arenas in which collaborative practices are needed to supplant an older organizational model premised on bureaucratic silos, local protection of information, and a competitive rather than a cooperative mode of operation.

Finance and Budget

The Consortium's findings in the Finance and Budget area are central to the entire issue of fostering interdisciplinary activity since universities historically have modeled their financial structure on the collegiate and departmental system of organization, which has posed barriers to interdisciplinary activity. Situated between academic departments and colleges or schools, interdisciplinary activity falls outside of the pathways for allocating institutional resources—particularly on a recurring basis. For that reason, financing interdisciplinary activity has generally been viewed in oppositional terms with respect to core funding for colleges and departments, raising perennial questions about the relative emphasis on new and innovative, as opposed to core disciplinary, academic activities. So too, the structural position of interdisciplinary activities outside of the routine flow of university budgets has often required special processes for allocating and distributing funds in support of interdisciplinary initiatives, drawing upon an extremely limited resource pool allocated for discretionary support by provosts, research administrators, and graduate school or collegiate deans.

Interdisciplinary activities additionally suffer within most finance and budget models by virtue of budgeting and accounting systems originally designed to account for central flows to collegiate and departmental units, as opposed to multidirectional support of crosscutting initiatives. Whether tallying cross-unit instruction, through team-teaching or joint course listings, or crediting the contributions of principal investigators

housed in multiple colleges, finance and budget officers typically have been charged with making ad hoc arrangements to direct resources to interdisciplinary initiatives that have been designated for funding and with making incremental improvements in accounting for interdisciplinary activity within systems designed to optimize flows to disciplinary entities; but as a set of institutional leaders they have yet to be tasked with making systemic revisions that put interdisciplinary entities on an equitable footing with their better established disciplinary counterparts, despite the hundreds of research centers, institutes, and educational programs that exist within any given research university. Regardless of the particular budget model at a given institution, this section of the self-study pointed to the need for sustained attention to conceptualizing and detailing the new reality of a networked system of interdisciplinary resource flows that coexists and is deeply intertwined with an older collegiate and departmentalized system.

Space and Capital Planning

Space that has neither been assigned nor programmed for use is among the rarest of commodities at research universities, which have operated in a continuing-growth mode since the end of World War II. Furthermore, like the other resources critical to starting up new initiatives, such as funding, space is a resource whose distribution has tended to follow the organizational pattern of universities into a series of individual colleges and departments, with relatively little other than classrooms remaining at the disposal of the central administration to serve the common good. The scarcity of space has not proven to be an insurmountable barrier to innovation, since temporary homes or hosts often can be secured through the start-up phase of educational initiatives and research projects, especially when they hold promise for significant return on investment. However, space eventually becomes a central issue when the question shifts from incubating to sustaining interdisciplinary innovation. At that point, the cost of allocating space on a permanent basis, often through an undefined process for making claims on space that falls outside the collegiate and departmental organizational structure of the university, puts interdisciplinary projects into a kind of limbo that needs to be addressed through new institutional policies and practices.

The self-study suggested that university strategic initiatives in the sciences, biotechnology, the arts, and other areas of interdisciplinary activity have begun to raise new questions about the form, financing, and function of new buildings intended to foster interdisciplinary collaboration. Less well recognized is the need to reform space management systems to allow interdisciplinary entities the kinds of

access to campus space routinely enjoyed by their peers engaging in collegiate and departmental enterprises. Existing space inventories presume discrete and separate functions roughly defined by field-specific activity, hence the distinctions between wet labs, dry labs, performance spaces, and offices in the sciences, engineering, the arts, the social sciences, and the humanities. Real and virtual meeting rooms of a fairly conventional sort remain the basic model for spaces where knowledge from many disciplines might converge over the course of a project or within the agenda of an interdisciplinary institute or center. The self-study pointed to the need for building new capacity within the space and capital planning administrative units of research universities to envision the kinds of spaces that will be critical to interdisciplinary knowledge creation over the course of the 21st century. Beyond broad terms such as *flexible* or *adaptable*, there is a growing need to define the specific characteristics and qualities of spaces that foster collaboration within and among heterogeneous learning and discovery communities.

Equity and Diversity

At the level of mission and values, the research universities participating in the Consortium not only share a concern with fostering interdisciplinarity but also place a high priority on enhancing their diversity as educational communities. The self-study section on equity and diversity brought these two issues, usually considered separately, into relationship with one another in the interest of understanding the mutual impact of initiatives in each area, with a goal of developing mutually reinforcing institutional strategies. Despite a focused line of inquiry, the self-study was unable to identify either formal or informal practices at Consortium member institutions to track, much less evaluate and remedy if necessary, the ways that strategic investments aimed at fueling an interdisciplinary research and education agenda have directed resources in relation to majority and minority members of the faculty, graduate, and undergraduate student body. There are indications, however, that some of the earliest interdisciplinary educational initiatives that established ethnic and women's studies programs have not necessarily benefited from more recent waves of institutional investment in interdisciplinarity, nor has accrued knowledge by those pioneers been brought to bear on more recent initiatives. Moreover, the emphasis on strategic investment in advancing interdisciplinary activity in the science, technology, engineering, and math fields has not necessarily benefited sectors of campus that have seen greater gains in the recruitment of female and minority faculty in the past few decades, leaving open questions about the direct and indirect equity implications of interdisciplinary investments.

Indeed, with diversity offices historically regarded as engines of equity in matters of student and faculty affairs, and with interdisciplinary initiatives typically located at the heart of the academic enterprise in offices of the provost, the vice president for research, or the graduate school, this section of the self-study pointed to the more profound structural question of how equity and diversity issues themselves might be reframed in terms of the knowledge and discovery mission of universities, beyond the more modest goal of increasing the representation of faculty and students of color at research universities.

Toward that end, several Consortium member institutions shared promising new practices intended to advance equity and diversity research through the establishment of new interdisciplinary centers and institutes that bring together members of the university community with scholarly expertise on that subject without regard to discipline. These institutes appear to hold promise as well for recruiting and retaining faculty and students of color across the disciplines, and women in particular fields, by building research and learning communities that bring the tools and methods of any and every discipline to bear on the many unsolved problems of our time. These institutes have the virtue of encompassing an extraordinarily broad range of issues related to gender, race, class, sexual orientation, disability, and other categories of analysis that have different manifestations but that find common intellectual ground in the wide-ranging expertise that now exists within research universities on matters of equity and diversity. While this kind of institute is only in its infancy, the self-studies captured a number of examples in varying stages of development and outlined the case for integrating equity and diversity issues into the institutional agenda for fostering interdisciplinarity.

Collaborative Technologies

Because the capacity to engage in effective collaboration is essential to fostering interdisciplinary activity, the Consortium's study focused attention on the tools and technologies of collaboration that have the potential to facilitate the process of working across disciplines and distance. Chief information officers, who were the principal respondents, reported that a mixed approach to centralized hosting and support services was in place at most institutions, and they detailed the relative benefits of central as opposed to local or external hosting of collaborative technologies as part of institutional strategies for increasing such technologies' adoption. Apart from any specific technology, more widespread adoption of the tools of collaboration were identified as critical to enhanced team communication and resource sharing. The main challenge faced by Consortium institutions as well as by other

institutions throughout higher education is how to communicate effectively with potential users about the availability of collaborative tools and their potential applications and how to train users with the skills necessary to successfully use the available technology. As multi-institutional and international collaborations become routine practices in interdisciplinary research and education, some changes in policy and practice will be needed to foster more effective collaboration in sharing data, an issue that is driven by the needs of faculty and student researchers and that is complicated substantially by risk-averse management practices.

FUTURE DIRECTIONS

Up to this point, national and international conversations about fostering interdisciplinarity in higher education have focused on identifying obstacles or barriers. The Consortium explicitly sought to advance the state of the field by moving from a knowledge of the barriers into an action agenda that incorporates some of the most promising practices for advancing interdisciplinary inquiry. So too, the Consortium operated within an action-research framework that built institutional capacity in the process of gathering data. In all of these respects, the Consortium on Fostering Interdisciplinary Inquiry extended work in this field beyond what was known previously, and it did so in a form immediately useful to participating research universities.

These proceedings of the November 2008 meeting of representatives from Consortium member institutions provide the first written release of findings from the self-studies. Hopefully, this introductory overview has hinted at the richness of the Consortium's work with respect to identifying key barriers and promising practices with respect to fostering interdisciplinary activity at research universities. The chapters that follow, authored by chairs and in most cases coauthors of each functional area committee, present the full scope of findings in all eight areas of administrative activity addressed in the Consortium's study. A book-length work, scheduled for completion in 2010, will offer a more substantial analysis and robust interpretation of findings from the Consortium's self-studies. Drawing on a wider view of the efforts of North American research universities to undertake reforms that foster interdisciplinary research, education, and training, the book will provide original recommendations for institutional action to unleash the full potential of faculty, staff, postdoctoral appointees, and students to carry out their intellectual pursuits in ways that are intellectually and methodologically rigorous but that are not inhibited by the arbitrary aspects of many administrative and bureaucratic systems.

With the study and analysis phase of the Consortium's collaborative work now nearing completion, what might be the Consortium's future? Unlike past studies and reports, which focused exclusively on the development of recommendations for action, this project was conceived in the tradition of action research, meaning that the project's design was intended to integrate research with action toward the desired goal of fostering interdisciplinary activity at research universities. In the first stage, that meant building peer relationships both within and across institutions to increase awareness, knowledge, support, and ultimately the capacity for undertaking institutional change in key functional areas typically neglected by advocates of interdisciplinarity. These relationships not only improved the quality of the questions and answers in the research phase of the project but hopefully also enhanced the ability of member institutions to take effective action by virtue of having built cross-functional leadership teams that dedicated a substantial period of time to developing a shared understanding of the history and possible future of interdisciplinary research, education, and training in higher education. Internal capacity was further enhanced by establishing a national network of peers in academic administration who can be consulted in the planning and implementation stages of any reform Consortium member institutions might contemplate.

At the next stage of this project, existing Consortium members will be invited to select one or more of the recommendations for action arising from the study as the focus of their own implementation effort, and they will be connected with leaders at other research universities who are working on related issues to provide mutual support and counsel throughout the implementation process. Moreover, other research universities, who have expressed a desire to become Consortium members, will be invited to join the Consortium contingent on their willingness to adopt one or more of the recommendations for changes in policy and practice. They will be able to draw on one another, as well as on the founding members of the Consortium, as they progress through the implementation process with a wider knowledge base than they otherwise would have access to as they undertake the reforms needed to foster interdisciplinarity. By these means we hope to translate recommendations of the Consortium on Fostering Interdisciplinary Inquiry into widespread action that transforms the landscape of higher education by bringing new constellations of talent to bear on solving some of the most intractable intellectual and social problems of our time, and by asking the kinds of questions that might not have been posed through the lens of any single discipline.

CHAPTER 2

Academic Administration and Faculty Governance

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INTRODUCTION

Universities have a variety of policies and practices related to academic administration and faculty governance that may support or hinder interdisciplinary research and education. These policies and practices cover a range of areas that affect the entire career of interdisciplinary faculty members and the lifespan of interdisciplinary research programs, centers, and institutes at the university. While universities have developed multiple strategies related to facilitating the growth of interdisciplinary research and education, there are common challenges to further progress in these areas. The 33 self-study questions developed by the Academic Administration and Faculty Governance Committee were designed to examine commonalities and variations in the academic policies and practices that impact interdisciplinary research and education. In addition to the challenges, we were interested in identifying promising and best practices to foster growth in interdisciplinary research and education.

The self-study questions were open-ended and focused on the following broad categories: faculty issues, including hiring, support and mentoring of interdisciplinary faculty, and tenure and promotion policies and practices; policies that impact interdisciplinary research and education; issues that cover the lifespan of interdisciplinary programs, centers, and institutes; and administrative responsibility for interdisciplinary research and education. The self-study was designed to be completed by a designated survey lead at each Consortium institution; however, it also contained constituency-based questions that in many instances required the survey lead to enlist input from an array of stakeholders and experts. Nine Consortium universities responded to the self-study, including Brown University; Duke University; the University of California, Berkeley; the University of Illinois at Urbana–Champaign; the University of Michigan; the University of Minnesota; the University of Pennsylvania; the University of Washington; and the University of Wisconsin–Madison.

The conference presentation and this chapter were developed from the answers to the self-study questions and from discussions in

our committee about these responses. In this chapter, we discuss issues related to interdisciplinary faculty, and policies and practices related to interdisciplinary education and training, including administrative responsibility for these activities. We also explore issues related to interdisciplinary programs, centers, and institutes, such as the criteria for establishing, reviewing, and “sunsetting” these units. We discuss common challenges to the healthy growth of interdisciplinary research and education and present some recommendations for building policies and practices that support this growth. Finally, we are also interested in examining important connections between and among the different functional areas.

INTERDISCIPLINARY FACULTY

Consortium universities have developed a variety of policies and practices related to the entire career trajectory of interdisciplinary faculty, including the hiring process, the support and mentoring of interdisciplinary faculty, and tenure and promotion. In this section, we describe some of the multiple strategies that Consortium universities use in this area. Throughout, we highlight particularly innovative, promising, or problematic strategies.

Strategies for recruiting and hiring interdisciplinary faculty

All Consortium universities advertise broadly in order to fill interdisciplinary positions by advertising to multiple disciplines through professional journals, societies, and organizations; by advertising in interdisciplinary outlets; or by placing single advertisements that note a number of interdisciplinary positions. In addition, institutions use a variety of other strategies to recruit for interdisciplinary positions, with each method used by at least one institution. One strategy is to initiate searches within interdisciplinary groups or programs, with the departmental “home” dependent on candidate preference and department fit. Some institutions compose search committees with faculty from multiple disciplines. Cluster hiring is a recruiting strategy that has been used very successfully in the past, is currently being used, or is being considered at three institutions. A related strategy is

Contributors are identified by their institutional affiliations and administrative titles as of the November 2008 Consortium on Fostering Interdisciplinary Inquiry invitational conference. Updated information is provided in the contributors’ biographical profiles.

Cluster Hiring Initiatives

Nearly a decade ago, campus leadership developed the Cluster Hiring Initiative at the **University of Wisconsin–Madison**, which pooled resources from the state, the University of Wisconsin Foundation, and the Wisconsin Alumni Research Foundation to hire a substantial number of new faculty with crosscutting, interdisciplinary research goals. University faculty were invited to submit proposals for promising research foci. Authors of those proposals, selected via a university-wide competition, were then given permission to search for two or more cross-disciplinary faculty to staff the cluster. These individuals would have disciplinary homes but would be tasked with interdisciplinary responsibilities in both teaching and scholarship. In 2006, after five competitive rounds of cluster proposal evaluations, the provost's office had approved 143 faculty lines within 49 clusters. Cluster foci cross all major disciplinary divisions on campus, ranging from "International Environmental Affairs and Global Security" and "African Diaspora and the Atlantic World Research Circle" to "Translational Research in Neurodegenerative Diseases" and "Very High Energy Astrophysics and Cosmology." The resource limits of the initiative have brought the creation of new clusters to an end, but cluster hiring continues as openings in existing clusters occur.

The **University of Michigan** has a five-year initiative to recruit 100 new junior faculty members with interdisciplinary research and teaching interests. Most of the new positions are expected to be filled by cluster hires. The search committees and the mentoring committees for these new faculty members will be interdisciplinary.

The **University of Minnesota's** new Interdisciplinary Informatics initiative will use a central cluster strategy to support a significant number of hires in this field of strategic importance to the university. Collegiate deans were asked to commit to making one informatics hire in an area relevant to their needs. There will be central coordination of the hiring process, and a significant central investment will be used to help promote the best hires and provide the substantial start-up packages necessary in this field. Central administration has made a multiyear commitment to grow and develop this initiative. This initiative has included the development of graduate programs from the start, the hiring of postdoctoral fellows to jump-start research, and multiyear support of graduate student fellowships. Because of the nature of the field, it has been critical to consider infrastructure concerns (i.e., supercomputing) from the outset. One of the innovations is that both individuals and established research groups are encouraged to apply for employment.

to make appointments across schools and colleges rather than making split appointments within the same school or college, which is the more typical practice. Some institutions allow interdisciplinary centers to collaborate with relevant departments on faculty searches, defining the positions as broadly as possible and jointly hiring faculty whose research and scholarship are tied to the strategic goals of multiple units.

Another recruiting strategy is to implement a postdoctoral program to increase diversity in fields in which this is traditionally lacking, introducing prospective faculty from underrepresented groups to the campus and to the university system. These postdoctoral fellows can then be recruited for permanent positions. The University of Michigan currently has such a system in place, as does the University of Minnesota. Finally, some institutions allow interdisciplinary institutes to apply for and receive authority to hire non-tenure track and non-regular rank interdisciplinary faculty directly into the institutes rather than channeling faculty affiliation with institutes exclusively through departments. These final two strategies stimulated substantial discussion among members of the committee on academic administration and were deemed particularly promising.

Sources of funds for interdisciplinary faculty hiring

Funding sources for interdisciplinary hiring vary widely across Consortium institutions. The initial funding for interdisciplinary faculty hiring depends greatly on the institutions' budgets and budget models. At two institutions, the hiring unit is directly responsible for the costs of searches, start-ups, and in some cases salary. At two other Consortium institutions, interdisciplinary faculty can be hired using money from grants or endowments. Either the central administration or the college funds the hiring of interdisciplinary faculty at the remainder of Consortium institutions.

Finding an academic home for interdisciplinary faculty

Three different strategies are used across Consortium institutions for assigning interdisciplinary faculty an academic home. Most institutions employ two or even all three of these strategies, depending on the specific position. One strategy is to hire a faculty member into a single department, with tenure residing in that unit but with the understanding that the faculty member will engage with other departments or interdisciplinary units in the course of his or her research and teaching. A second strategy, less often used, is to hire a faculty member into two departments—a primary department and a secondary department—with the responsibility for tenure and promotion decisions lying with the primary department. A third strategy is to jointly tenure faculty in more than one department, school, or college.

All of these strategies pose challenges related to the responsibility for faculty hiring and evaluation for promotion and tenure. The first and second strategies address this problem by designating a single department as responsible for review and evaluation. However, this raises the issue of how to value work and service performed by the faculty member outside the home department. With the third strategy, most institutions have adopted a memorandum of understanding (MOU) approach, in which a memorandum delineating the allocation of the faculty member's time and resources and outlining the standards and procedures for tenure and promotion is created and agreed to by the faculty and hiring unit or units at the time of hire.

Policies and practices related to the division of interdisciplinary faculty work

Three different strategies are used across Consortium institutions to designate how the work of interdisciplinary faculty (teaching, research, service, etc.) is divided between hiring units. At several institutions, campuswide policies and practices are in place; however, these practices often defer to the hiring unit's own policies and practices when conflicts

arise. At one institution (Brown University), distinctive policies and practices have been developed by some interdisciplinary units. The most common strategy for dividing interdisciplinary faculty work is on a case-by-case basis using a formal MOU that is negotiated with the hiring units and the faculty member at the time of hire.

Policies and practices related to tenure and promotion for interdisciplinary faculty

While all of the institutions responding to the self-study have very explicit formal policies and procedures regarding tenure and promotion for regular faculty appointments in a single department, there is far less formality regarding interdisciplinary faculty hires in particular. Three different strategies are used across institutions to make tenure and promotion decisions for interdisciplinary faculty. First, two institutions (the University of Illinois at Urbana–Champaign and the University of Michigan) have policies in place that pertain particularly to interdisciplinary faculty. Second, one institution (the University of Washington) reports that most tenure and promotion processes are developed and initiated on a case-by-case basis by the chair or

Policies Pertaining to Interdisciplinary Faculty

In the case of interdisciplinary faculty at the **University of Illinois at Urbana–Champaign**, Communication no. 23 of the Office of the Provost states that “the designated home unit has the primary responsibility for initiating and overseeing the review process, but the review should involve the participation and represent the views of all appointing units. In developing their assessment, units must cooperate in securing external evaluations. Internally, the units may use their respective regular procedures for promotion reviews, or the two units may construct an *ad hoc* joint review procedure that uses a committee comprised of members from all appointing units and jointly charged by the executive officers. The appointing units then make their recommendations to the dean(s), jointly if they are in agreement and separately if they are not. If there is a recommendation for promotion, or for promotion and the awarding of indefinite tenure, the designated home unit will have the primary responsibility for preparing the dossier, in consultation with and representing the views of all appointing units. A joint recommendation to the dean(s) will be signed by all executive officers of the appointing units and will report the separate votes of the review committees in each unit. The final section of the dossier, ‘Special Comments by the Unit Executive Officer,’ may take the form of individual statements prepared by each executive officer or a joint statement prepared collaboratively by the executive officers. In

either case, authorship of the section must be clearly identified. If the units making the recommendation are housed in different colleges, their recommendation must be acted on separately by each college following its normal procedures for promotion and tenure recommendations.” In the case of an interdisciplinary faculty member who has a 100 percent appointment in one unit, the unit head is responsible for the merit and tenure cases but may consult others as needed.

At the **University of Minnesota**, the 2007 Regents Policy on Faculty Tenure addresses interdisciplinarity in teaching and scholarship in the following way: “Demonstrated scholarly or other creative achievement and teaching effectiveness must be given primary emphasis; service alone cannot qualify the candidate for tenure. *Interdisciplinary work*, public engagement, international activities and initiatives, attention to questions of diversity, technology transfer, and other special kinds of professional activity by the candidate should be considered when applicable. The awarding of indefinite tenure presupposes that the candidate’s record shows strong promise of his or her achieving promotion to professor” (emphasis added). It is too early to determine the effect of the new tenure policy. There is not yet formal coordination of multidepartmental reviews for faculty with appointments in more than one department.

dean of the hiring unit. Third, and most common, most institutions establish criteria for tenure and promotion at hiring through the MOU approach.

Policies related to interdisciplinary faculty development

Many Consortium institutions referred to informal mentoring processes in which both junior faculty and faculty leaders are expected to initiate mentoring relationships on their own accord, but most have yet to develop formal systems. Only one institution (the University of Michigan) requires documentation of the establishment of interdisciplinary support as part of faculty mentoring. The interdisciplinary junior faculty initiative at Michigan requires that full mentoring plans be created for all faculty hired. For interdisciplinary faculty, the plans must include interdisciplinary mentoring committees with interdisciplinary-oriented senior faculty members.

Establishing provisions to ensure that departments, interdisciplinary units, and associated faculty are not penalized by faculty engagement in interdisciplinary initiatives is important to ensure that interdisciplinary faculty development is supported. Most Consortium institutions avoid penalizing faculty through the articulation of individual faculty responsibilities spelled out in an MOU. Several institutions have specific policies or practices in place to ensure that interdisciplinary work is accounted for in the review process.

INTERDISCIPLINARY PROGRAMS, CENTERS, AND INSTITUTES

Consortium member institutions have developed a range of policies that refer specifically to interdisciplinary research and education, including the development of centers and institutes. While five institutions reported no formal policy development in this area, the others have an array of policies that provide significant guidance to the academic community regarding how to support interdisciplinary research and education. These policies relate to establishing interdisciplinary centers through advisory or steering committees or grassroots efforts, sharing indirect cost recovery, and evaluating established interdisciplinary units, to cite the most prevalent examples.

Consortium institutions generally lack centralized formal policies for evaluating the potential merits of newly proposed interdisciplinary programs, centers, and institutes; for supporting their development; or for periodically evaluating established units. In fact, several institutions had no formal review process in place. However, various strategies to overcome this gap are used by one or more institutions. Evaluating

the viability of proposed interdisciplinary initiatives typically involves multiple levels of campus leadership, such as a review by special advisory committees (Brown University and the University of California, Berkeley) or an academic planning committee made up of deans, vice presidents, or provosts (four institutions).

Various institutional mechanisms have been developed to seed, nurture, and sustain interdisciplinary programs, centers, and institutes. Interdisciplinary units are often supported by special funds set aside by a dean or other senior administrators for the purpose of seeding initiatives; however, these special funds are generally not recurring. Interdisciplinary units are sometimes funded through grants or another competitive process. Most institutions have no formal plans or policies

Duke University Criteria for Evaluating Established Interdisciplinary Units

1. Intellectual contribution and integration
 - a. Continuing intellectual contribution of the center, justification for Duke University's commitment to an interdisciplinary center in this area, and distinctiveness and compatibility with similar units on campus
 - b. Level of faculty participation in the center
 - c. Center's ability to involve multiple departments or administrative units both within and outside Duke University
 - d. Integration of interdisciplinary research and teaching efforts into core departments and schools
2. Education
 - a. Level of student participation, as demonstrated by course syllabi, evaluations, and other materials for undergraduate and graduate courses; the breakdown of the number of classes offered by the unit; the number of students enrolled in those classes; and courses planned for future years
 - b. Progress toward the approval of a graduate or undergraduate certificate
3. Funding
 - a. Current and future year budget projections
 - b. Sources and amounts of internal funding
 - c. Sources and amounts (and a list of applications pending) for external funding and a detailed plan for securing future outside funding
4. Administration
 - a. Appropriate administrative reporting lines
 - b. Effective management of the unit
 - c. Effectiveness of administrative operations of the unit

in place that address sustaining funding or leadership of interdisciplinary units; rather, these issues are addressed on a case-by-case basis.

Within Consortium member institutions, there is generally little focus on evaluating or reviewing interdisciplinary units once they have been established. At most institutions, interdisciplinary units undergo a standard review process at five- to ten-year intervals. At other institutions, interdisciplinary units submit annual reports to the executive officers who supervise the unit, such as department heads, deans, vice chancellors for research, or provosts. Interdisciplinary units are typically evaluated on their academic accomplishments as well as on relevant financial data. However, the evaluation criteria for reviews often do not consider the unique needs of interdisciplinary programs, nor do they allow institutions to compare and assess which interdisciplinary programs most align with overall strategic goals.

Two institutions, Duke University and the University of Minnesota, have established review processes for interdisciplinary programs. At Duke University, interdisciplinary programs and centers are reviewed annually on a customized series of metrics chosen from a set of 47 different options, including funding sources such as extramural grants, university subsidies and budgets, and gifts; faculty achievements, including the number of faculty at various ranks, publications, collaborative publications, and outreach; fiscal efficiency; collaboration; resources, including space, funding, staff, and expenses; intramural grant activity, including proposals submitted and awarded and success rates; education, including students taught, enrolled, and graduated; and interdisciplinary activities and outreach. The process at the University of Minnesota is similar, but review criteria were still under development at the time the self-study was completed.

ADMINISTRATIVE RESPONSIBILITY FOR INTERDISCIPLINARY RESEARCH AND EDUCATION

Interdisciplinary research is a high priority across all participating Consortium institutions and is specifically represented in the strategic plans of three institutions (Duke University; the University of California, Berkeley; and the University of Minnesota). However, the primary responsibility for administering interdisciplinary research and education is highly decentralized and is distributed across many different administrative areas, although it mainly falls to the schools and colleges in which a specific unit is housed. Two exceptions to this decentralized model are Duke University and the University of Minnesota. Duke University has established a designated office at the

Central Offices for the Oversight of Interdisciplinary Units

At **Duke University**, the Office of the Vice Provost for Interdisciplinary Studies provides central organization and oversight for all interdisciplinary units throughout the university. The office helps to develop and implement policies and procedures that advance the often-unique administrative, research, educational, and practice needs of interdisciplinary groups. Interdisciplinary centers and institutes are designated as either university institutes and centers, with oversight in the Office of the Provost, or as school-based centers, with oversight at the school level.

At the **University of Minnesota**, the Provost's Interdisciplinary Team (consisting of the vice president for research, the vice provost and the dean of the graduate school, the vice provost and the dean for undergraduate education, the vice provost for faculty and academic affairs, and the assistant vice provost for interdisciplinarity) was in 2006 to play this role for the system. Working through the Office of the Provost, this team is charged with creating a systemwide strategy for developing, nurturing, and assessing interdisciplinary programs. The vice president for research has created an office for collaborative research within his unit, and the dean of the graduate school has developed an office of interdisciplinary initiatives. Similarly, the vice provost for undergraduate education will oversee the development of integrated research and education opportunities for undergraduates. These offices work collaboratively with each other.

vice provost level for the oversight of all interdisciplinary units. The University of Minnesota assigns administrative responsibility for major interdisciplinary initiatives to its senior vice presidents and the vice president for research.

CHALLENGES TO THE HEALTHY GROWTH OF INTERDISCIPLINARY RESEARCH AND EDUCATION

While universities have done a great deal to expand and support interdisciplinary research and education, substantial challenges to continued growth in these areas remain. These challenges relate to securing resources for interdisciplinary scholarship; supporting and rewarding the scholarship of interdisciplinary faculty; collecting data and evaluating interdisciplinary faculty and units; and ensuring quality and consistency during leadership transitions.

Securing short- and long-term resources for interdisciplinary scholarship

Across institutions, the challenges related to securing resources for interdisciplinary scholarship include inadequate space and infrastructure and limited access to funding streams and fundraising initiatives. Limited public money for seeding new enterprises, especially in the current era of fiscal austerity, is a major challenge. Another challenge is that many investments in interdisciplinary research are one-time expenditures aimed at seeding new initiatives, making it difficult to secure the funding needed to sustain interdisciplinary centers and programs. In addition, much of the funding for interdisciplinary research has targeted the sciences and technology, without comparable investment in the social sciences, the arts, and the humanities. Finally, interdisciplinary scholarship is viewed by some administrators, staff, and faculty as jeopardizing, rather than enhancing, the strategic mission of the university by competing with the core disciplines for scarce resources.

Supporting and rewarding the scholarship of interdisciplinary faculty

Consortium institutions identified many challenges related to how interdisciplinary faculty should be supported and rewarded, including clarifying who is responsible for mentoring and evaluating interdisciplinary faculty, especially those who hold joint appointments or who are affiliated with interdisciplinary centers. Other issues include identifying who is responsible for assessing a faculty member's progress toward tenure and promotion and for reviewing and evaluating his or her work. Members of review committees may simply lack the expertise necessary to properly review the work of an interdisciplinary scholar. Ensuring that interdisciplinary research and education is valued and rewarded in a manner equal to disciplinary work is also a challenge. Finally, in terms of tenure and promotion, challenges remain in assessing the relative value of interdisciplinary versus disciplinary work. MOUs, when properly initiated at hiring, can be useful in addressing these challenges.

Collecting data and evaluating interdisciplinary faculty and units

While metrics are increasingly important to evaluation, data collection and measurement of interdisciplinary research and teaching often pose distinct challenges. Departmentally based accounting systems unnecessarily complicate flows of revenue and "credit" to interdisciplinary programs and units. For data collected from interdisciplinary research projects, it can be difficult to map sponsored research to a particular interdisciplinary area or to report data on interdisciplinary research to

national agencies (e.g., NSF, NRC, IPEDS) and data exchanges (e.g., AAU) because most outside reporting is based on Classification of Instructional Programs (CIP) codes, which are updated only every five to ten years, most recently in 2000. The challenge is that many new interdisciplinary activities were not captured in the 2000 update, and the next CIP codes under development will inevitably miss the newest initiatives.

Ensuring quality and consistency in transitions

When key faculty members leave an interdisciplinary research program, center, or institute, ensuring continuity and coherence of the mission and research agenda can be difficult. This is due to the fact that faculty often make voluntary commitments to interdisciplinary units, and these units may have little control over or input into the replacement hire when faculty leave. It can be especially challenging when significant financial or infrastructure investments are made in a unit that is primarily driven by one faculty member. Planning for leadership transitions is assumed at the departmental and collegiate levels, which can induce a crisis within interdisciplinary units if they do not have such plans in place.

RECOMMENDATIONS FOR BUILDING ACADEMIC POLICIES AND PRACTICES THAT SUPPORT INTERDISCIPLINARY RESEARCH AND EDUCATION

Institutions can take a number of actions in order to create or refine existing academic policies and practices to better support interdisciplinary research and education. Our recommendations are related to faculty, departments, and colleges, as well as interdisciplinary units and upper level administration.

Faculty, departments, and colleges

If formal policies on interdisciplinary hiring do not exist, then faculty, departments, and colleges should develop an MOU that is consistent across hiring units. The MOU should detail what is expected of the faculty member in terms of research, teaching, and service. It should also define the responsibilities and expectations of the department or college regarding supporting the faculty member's research and teaching, as well as what is expected of the broader institution in terms of supporting interdisciplinary research and teaching. Finally, those responsible for ensuring that the MOU is followed must be clearly identified. It is very important that this revised model of MOUs be applied not solely to new hires but also to interdisciplinary faculty already at the institution who could benefit from the clarity such a document could provide.

Other recommendations stemming from our committee's responses to the self-study include identifying ways to support collaborative teaching across disciplines and reward faculty, departments, and colleges for working together on interdisciplinary research and education. Finally, networking opportunities should be provided for interdisciplinary scholars and the administrators who support them so that changes in policies and practices are grounded in the experiences of interdisciplinary faculty members.

Interdisciplinary programs, centers, and institutes

We recommend that universities establish clear guidelines and criteria for the creation of interdisciplinary programs, centers, and institutes. Because one of the main issues in this area is the failure of most universities to track or review these units, we recommend that institutions maintain a database of all interdisciplinary programs, centers, and institutes, both for internal purposes and for public information. In order to ensure adequate funding for the seeding and maintenance of these programs, centers, and institutes, we recommend that institutions develop structures that give interdisciplinary programs better access to funding streams, including fundraising support, and provide multiyear funding to allow for planning, growth, and development. Finally, it is important that institutions develop a consistent process for reviewing interdisciplinary programs, centers, and institutes with clear review criteria that provide guidelines for program development, renewability, and sustainability. The review process at Duke is a particularly good example of this and could serve as a model for other institutions.

Upper level administration

In order to ensure quality, it is important that upper level administration provide active institutional oversight and planning for interdisciplinary research and education. In particular, we recommend that universities establish a core office or group of people responsible for monitoring interdisciplinary research and education at the institutional level. Finally, it is also important that administrators set priorities in a way that allows sustained rather than one-time funding for interdisciplinary initiatives.

CONNECTIONS TO OTHER FUNCTIONAL AREAS

In conclusion, because challenges and solutions in one area are often related to those in another, we want to draw explicit connections to the other functional areas, which are described in the chapters that follow. Because of its responsibility for allocating and evaluating teaching by interdisciplinary faculty, academic administration is related to education

and training. Both areas are connected in terms of ensuring continuity and quality for students and faculty in interdisciplinary programs when a key faculty member leaves or administrative changes are made in structure or levels of financial support. Both areas recognize the need to address challenges related to developing support for interdisciplinary education and training and related to resolving debates around admitting students into interdisciplinary graduate programs.

Issues with academic policies and practices share with interdisciplinary research the common challenges related to an emphasis on interdisciplinary research in science and technology fields that may not be comparable to what is seen in interdisciplinary programs in the arts, the humanities, and the social sciences. Shared challenges also include mapping interdisciplinary research to an interdisciplinary unit, ensuring an equitable distribution of indirect cost recovery, and developing institutional support for interdisciplinary research.

Given the emphasis on the need to secure both long- and short-term funding for interdisciplinary initiatives in research and education, academic administration shares with development and fundraising personnel the common difficulty of fundraising for interdisciplinary units in an institutional context in which most development activity occurs at the collegiate or departmental level. These funding issues are also connected to challenges identified in the area of finance and budget, where we note that traditional funding streams are often limited to disciplinary units and few public dollars are available to fund interdisciplinary initiatives.

Common challenges spanning all of these areas include central administrations' dependency on one-time contributions to interdisciplinary units rather than on development of ongoing financial support, and a lack of incentives in the budgeting process for cross-college interdisciplinary collaborations.

The allocation of space and capital planning at the central, collegiate, and departmental levels impacts the stability of interdisciplinary programs, centers, and institutes. Broadening the ways that universities search for interdisciplinary faculty may help address some of the challenges raised in the equity and diversity chapter because searching and hiring in new multidisciplinary and interdisciplinary areas should yield a diverse pool of candidates. Finally, research and teaching in multidisciplinary and interdisciplinary areas should allow for a sharing of collaborative technologies, creating long-term cost savings. These issues are addressed in greater detail in the chapters that follow.

SUMMARY OF RECOMMENDATIONS

1. Develop a memorandum-of-understanding (MOU) approach that defines the nature of the appointment, expectations, evaluation, and sustainability of the interdisciplinary initiative. The MOU should include
 - (a) what is expected of the faculty member in terms of research, teaching, and service;
 - (b) the responsibilities and expectations of the department or college regarding supporting the faculty member's research and teaching;
 - (c) what is expected of the broader institution in terms of supporting interdisciplinary research and teaching; and
 - (d) identification of who is responsible for ensuring that the MOU is followed.
2. Identify ways to support collaborative teaching across disciplines and reward faculty, departments, and colleges for working together on interdisciplinary research and education.
3. Provide networking opportunities for interdisciplinary scholars and the administrators who support them so that changes in policies and practices are grounded in the experiences of interdisciplinary faculty members.
4. Establish clear guidelines and criteria for the creation of interdisciplinary programs, centers, and institutes.
5. Maintain a database of all interdisciplinary programs, centers, and institutes at the university, both for internal purposes and for public information.

CHAPTER 3

Education and Training

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INTRODUCTION

Interdisciplinary education and training include education at all levels of higher education. Most interdisciplinary undergraduate programs are found in larger universities. Professional schools are often interdisciplinary by nature. Many interdisciplinary graduate programs are found at most large universities, including interdisciplinary master's and doctoral degree programs as well as those for graduate minors and certificates. Most large universities also have training opportunities at the postdoctoral level. Interdisciplinary educational programs have a long history at various universities—two examples are the Graduate Group in Neuroscience at the University of California, Berkeley, and the Joint Doctoral Program in Social Work and Social Science at the University of Michigan.

The 27 self-study questions developed by the Education and Training Committee provided responding institutions opportunities to identify both long-standing and emerging areas of interdisciplinary study, to profile the most successful educational programs, to identify the factors that make a difference between merely surviving and thriving interdisciplinary programs, and, to a lesser extent, to describe postdoctoral training and external funding of interdisciplinary training grants. The self-study was designed to be completed by a designated survey lead at each Consortium institution; however, it also contained constituency-based questions that required the survey lead to enlist input from stakeholders and experts. Nine Consortium universities responded to the self-study questions on education and training, including Duke University; the University of California, Berkeley; the University of Illinois at Urbana–Champaign; the University of Michigan; the University of Minnesota; the University of North Carolina at Chapel Hill; the University of Pennsylvania; and the University of Wisconsin–Madison. This represents a 90 percent response rate.

One of the key findings from the self-study is that there is a long tradition of interdisciplinary activity in our universities, but while there is much to learn from this long history about the promise and challenges of

promoting this activity, little has been done to refine our understanding of what constitute best practices in interdisciplinary education. This chapter draws on the self-study responses and the conference presentation to describe the state of interdisciplinary education and to provide some best practices for meeting common challenges faced across responding institutions. We begin by describing common self-study findings across all educational levels, focusing particularly on administrative and leadership responsibility for interdisciplinary educational activities. We next describe self-study findings at each level of education, including undergraduate, graduate, and professional education. We conclude with recommendations and some best, innovative, and emerging practices in interdisciplinary education.

FINDINGS ACROSS ALL EDUCATIONAL LEVELS

Among Consortium members, there is considerable diversity in the scope of existing interdisciplinary programs, with three institutions showing relatively high concentrations clustered in the sciences and engineering (Duke University; the University of California, Berkeley; and the University of Minnesota) and with others offering a more balanced portfolio that includes connections among the arts and humanities, the social sciences, the physical and biological sciences, and engineering, as well as connections among and between professional schools, such as law and business, or across the medical professions. From the data we gathered, it is possible to map the landscape of interdisciplinary education at any institution; however, it is not immediately clear which conditions, historically and presently, account for why some sectors are thriving at some universities while others are not.

Across Consortium institutions, many colleges—especially colleges with education at their center—have been reorganized to emphasize new interdisciplinary connections. Moreover, entire fields and the colleges that contain them, such as public health, now conceive of themselves as interdisciplinary by necessity. The self-study findings suggest interdisciplinarity is relatively pervasive in the educational

Contributors are identified by their institutional affiliations and administrative titles as of the November 2008 Consortium on Fostering Interdisciplinary Inquiry invitational conference. Updated information is provided in the contributors' biographical profiles.

Two Examples of Successful Interdisciplinary Programs

The Graduate Group in Neuroscience at the **University of California, Berkeley**, has a long and distinguished record of graduate training and continues to expand and integrate disciplines to meet the challenge of training graduate students to tackle the important problems concerning the brain and behavior. Starting as a group spread across several departments in the early 1970s, the Helen Wills Neuroscience Institute (HWNI) with an attached graduate group was created in 1997 as the result of an external review of the neuroscience community. Neuroscience professors in departments across campus were invited to become faculty in the new center and graduate group program to help recruit new, core faculty and to accept graduate students into their labs for training. At the institute's inception, the campus provided administrative support for overseeing the Neuroscience Graduate Program and has already recruited twelve new faculty in the areas of human cognitive neuroscience, systems neuroscience, computational neuroscience, and molecular and cellular neuroscience, with several other faculty searches either in process or planned for the coming year. These faculty represent important new bridges to previously established departments and programs on the University of California, Berkeley, campus. Current membership in the HWNI includes a total of 45 faculty members in eight different academic departments and programs. The Graduate Group in Neuroscience is an example of a graduate group's elasticity, as well as how funding development, full-time-equivalent (FTE) allocations, administrative staff support, and space creation can enable such a group to thrive.

In the fall of 2007, the Joint Doctoral Program in Social Work and Social Science at the **University of Michigan** celebrated its 50th anniversary. It remains the only interdisciplinary program of its kind, providing a master's degree in social work with a Ph.D. in one of six allied social science disciplines: anthropology, economics, history, political science, psychology, or sociology. This program links action and professional practice with social science theory, methods, and research to address significant social and economic problems. Of the more than 300 graduates of this program, many have made significant contributions to social work knowledge, education, and practice. Among them are many deans of schools of social work, editors of social work and social science journals, and research scientists with organizations such as the Urban Institute, the United Nations, and the Centers for Disease Control and Prevention. A recent external review lauded the program as "a crown jewel of interdisciplinary doctoral training for the University of Michigan [and] a key reason for the School of Social Work's current number one ranking." The success of the program depends on good collaboration between faculty in the School of Social Work and the contributing social science departments. To build on this record, the School of Social Work is seeking to support more opportunities for interdisciplinary research involving faculty and students, to admit more students annually, to streamline the social work course curriculum, and to recruit more faculty into joint appointments with social science departments.

offerings of our institutions and the identities of our programs. However, the development of interdisciplinary programs has been staged in clusters that are more discernable in retrospect than they were at the time. They initially seemed to be "one-off" phenomena. Among the earliest interdisciplinary educational programs were those in area studies, such as the focus on Latin American studies at the University of California, Berkeley (1931), or on American studies at the University of Minnesota (1945). Humanities and social scientific fields were not the only ones that developed interdisciplinary graduate educational programs early on. Indeed, relatively narrow and discrete fields of scientific inquiry began to cluster with related or emerging disciplines and to become freestanding new educational programs as early as the 1930s, most notably the Graduate Group in Microbiology at the University of California, Berkeley. The sciences have been so favorably

disposed to spinning off subfields and forging new merged fields that the distinctions between disciplinary and interdisciplinary can be finer than in colleges of arts and sciences. The fields of biochemistry, molecular biology, evolutionary biology, and astrophysics suggest an acceptance of paradigm change as a normal process in the hard sciences. In more recent times, women's studies, American ethnic studies, the neurosciences, and the biological sciences have been at the forefront of interdisciplinary educational program development. More recently, environmental studies and informatics are emergent fields of interdisciplinary study at research universities. Indeed, new areas of strategic research investment at the forefront of interdisciplinarity, such as informatics at the University of Minnesota, are developing in tandem with attendant graduate programs.

ADMINISTRATIVE AND LEADERSHIP RESPONSIBILITY FOR INTERDISCIPLINARY EDUCATIONAL ACTIVITIES

Only three schools have a single administrative unit charged with advancing interdisciplinary activity. Duke University coordinates all interdisciplinary efforts through a vice provost for interdisciplinary studies and is the only Consortium institution to have a dedicated administrative unit. This vice provost's office helps to develop and implement policies and procedures that advance the unique administrative, research, education, and practice needs of the interdisciplinary programs. The University of Minnesota has a dedicated cross-administrative team that provides leadership for interdisciplinary innovation across the many bureaucratic domains of the university. The graduate schools at the University of Minnesota and the University of Michigan have provided critical leadership for interdisciplinary educational programs. At no other Consortium university are there even faculty committees whose explicit responsibility is to ensure that educational policies and practices foster interdisciplinarity. The University of Minnesota's Network of Interdisciplinary Initiatives provides a loose network of faculty, postdoctoral fellows, staff, and students to advance advocacy for interdisciplinary initiatives, but its purpose is not limited to education. Instead, education is just one area of focus in the network's structure of working groups that originates policy reform proposals.

The absence of formal administrative leadership for interdisciplinary education has two direct consequences. First, interdisciplinary programs and related educational units navigate a range of institutional barriers, including negotiations with multiple departments regarding faculty time, administrative support, and graduate assistantships, as well as the often-disparate units in charge of additional funding, physical space, and communication technologies, all at a high transactional cost in terms of time and effort. Second, policies that are intended to achieve one educational goal, such as shortening the time to completion for undergraduate or doctoral degrees (reported by the University of California, Berkeley, and the University of Washington), may inadvertently hinder interdisciplinary inquiry because interdisciplinary students, even those getting multiple degrees, are not necessarily allowed additional normative time to complete those degrees. The lack of designated "watchdogs" means that the implications of policy decisions for interdisciplinary programs, faculty, and students are not systematically and routinely considered, leading to unanticipated impacts. One of the most significant remaining questions is how to best institutionalize the critical advocacy and review functions to ensure that interdisciplinary education does not just rely on well-placed

individuals to notice, comment on, and even advance the cause of interdisciplinary activity. Moreover, there are open questions around the issue of centralizing responsibility for interdisciplinary activities versus diffusing responsibility and advocacy among programs or committees, an omnipresent dilemma in academic structure. The best answer to these sorts of dilemmas usually is that both centralized and diffused responsibility are needed to ensure careful stewardship.

INTERDISCIPLINARY UNDERGRADUATE EDUCATION

There are long-standing traditions of multidisciplinary or interdisciplinary undergraduate training and education, including those in the social sciences and the humanities, such as race and ethnic studies, gender studies, area studies, communication and media studies, and American studies. Newer activity in the domain of science and engineering includes such areas as neuroscience and cognitive science; biology and society; and the environment and society. However, with the exception of the Undergraduate and Interdisciplinary Studies program at the University of California, Berkeley, the language of interdisciplinarity is rarely used in discussions of what Consortium institutions are doing in undergraduate education.

All Consortium members were asked, in the education and training self-study, to name the units explicitly assigned administrative leadership responsibility for interdisciplinary leadership in educational programs. Interestingly, the typical response by eight of the nine responding institutions was to name their graduate schools, an ad hoc committee, or a formal university-wide committee as the unit with that responsibility. While each of the Consortium member institutions has its own name for the leading unit with responsibility for undergraduate education, only the University of California, Berkeley, explicitly identified interdisciplinarity as a key undergraduate educational concern. Berkeley also detailed, at a finer grain, the kinds of undergraduate initiatives that have been the focus of institutional innovation and investment; undergraduates have been particularly enthusiastic about Berkeley's emerging interdisciplinary options in the cognitive and environmental sciences. Berkeley's development of an undergraduate degree in interdisciplinary studies emerged as a promising practice.

The lack of emphasis on interdisciplinarity in undergraduate education can be traced to administrative priorities at the undergraduate level. Administrative leadership in undergraduate education has tended not to put a high priority on interdisciplinarity. Of the many undergraduate educational agendas across Consortium institutions—including

Best-Enrolled Interdisciplinary Majors and Minors Across Institutions

University of California, Berkeley: *Majors*—Mass Communications; American Studies; Interdisciplinary Studies; Cognitive Science; Political Economy of Industrial Societies; Peace and Conflict Studies; Development Studies. *Minors*—Creative Writing; Global Poverty and Practice.

Duke University: *Certificates*—Energy and the Environment; Global Health.

University of Michigan: *Majors*—Brain, Behavior, and Cognitive Sciences; Communication; Movement Science; Neuroscience; Environment. *Minors*—Environment; Gender and Health; Asian Languages and Cultures.

University of Minnesota: *Majors*—Global Studies; Biology, Society, and Environment; Environmental Design. *Minors*—Design; Youth Studies; Family Violence Prevention; Sustainability Studies.

University of North Carolina at Chapel Hill: *Majors and minors*—International Studies; Entrepreneurship; Asian Studies.

University of Wisconsin—Madison: *Majors*—Women’s Studies; various area and ethnic studies programs.

preparing students for potential career paths, engaging students in service learning, and developing learning communities—most have tended to focus on student engagement in the educational process or the community.

Undergraduate students are nevertheless very interested in interdisciplinary education, even if administrators have tended not to be. This interest is indicated by the rapid growth in the pursuit of multiple majors, minors, and certificates, with students using such avenues to navigate institutional boundaries and create their own interdisciplinary educational programs. Students appear to be ahead of Consortium institutions in the curricular sense. But, while they “make it work” using multiple majors, students may do so at high cost, especially where institutional barriers limit the time to degree completion, make it difficult to register across department lines, or present other obstacles. Moreover, because custom-designed interdisciplinary academic programs are not institutionalized, undergraduates may fail to understand the

interdisciplinary options that are available to them, and upperclassmen who have multiple majors may fail to grasp what is distinctive and important about the integrative dimensions of truly interdisciplinary learning.

INTERDISCIPLINARY GRADUATE EDUCATION

The model of a central graduate school with administrative responsibility for all Ph.D., M.A., and M.S. degrees prevails among Consortium institutions. These central graduate schools have become increasingly active in administering and championing interdisciplinary graduate programs. The University of Michigan’s graduate school has been a national leader on this front, and the University of Minnesota has caught up recently. At all Consortium institutions, 20 to 50 interdisciplinary graduate programs exist side by side with departmentalized and disciplinary ones under the auspices of graduate schools. Increasingly, graduate school deans and their staffs have taken on new leadership responsibility for advancing interdisciplinarity, and this role has been part and parcel of the shift from graduate schools as the regulators of common standards to their emerging role as stewards of interdisciplinary innovation.

At most institutions, interdisciplinary graduate programs have grown up organically at the initiative of faculty whose teaching and research interests gravitate to themes relevant to more than one discipline. Only recently have top-down, rather than bottom-up, initiatives been launched as a result of central leadership decisions to invest in new and emerging fields of knowledge. Indeed, this may be the most telling difference between yesterday’s formation of ethnic and women’s studies programs, today’s nanotechnology initiatives, and tomorrow’s investments in interdisciplinary informatics: the process of institutional strategic planning has added a new layer of central priorities for investment in terms of educational and research initiatives, which in past times were driven by faculty, often those who perceived themselves to be at the margins of what was considered legitimate scholarly inquiry in the departments where they held appointments.

The richest and most productive findings from the self-studies had to do with the characteristics of successful interdisciplinary graduate programs and the common barriers to success. Common features of successful programs include periodic review; dedicated and ongoing fiscal, institutional, and administrative support; a focus on the student experience; and consistent expectations regarding faculty time, commitments, and the review of their performance for tenure and promotion purposes.

Measuring success

It is important for institutions to establish criteria and metrics for assessing the success of interdisciplinary graduate educational initiatives to ensure that resources invested in programs are effectively stewarded and that they meet the strategic goals of the university. However, as stated above, relatively little has been done to date to refine knowledge about what constitute best practices in interdisciplinary graduate education. Moreover, few of the participating institutions have robust mechanisms in place to fully implement this recommendation. At most institutions, interdisciplinary programs undergo a standard review process at five- or ten-year intervals. Currently, few review processes explicitly address the unique needs of interdisciplinary programs, nor do they allow institutions to compare and assess which interdisciplinary programs align most clearly with broad strategic goals. As detailed in the previous chapter, two institutions, Duke University and the University of Minnesota, have established formal review processes for interdisciplinary centers, and their approaches have unexplored relevance for the periodic review of interdisciplinary academic programs. More could be done to specify the types of experience that are relevant to the review of interdisciplinary programs, since disciplinary experience is the universal standard used in the external review process.

Fundamental resource issue

There has been a proliferation of new interdisciplinary programs, centers, and institutes across institutions, even in institutions with long-established programs. Many of these new programs are supported by seed money from the home institution or by external funding. However, the fundamental resource issue for interdisciplinary graduate programs is that few of these efforts to seed new programs have led to sustained funding of successful interdisciplinary programs. Moreover, once implemented, few institutional mechanisms are in place to ensure proper “sunsetting” of funding for self-sustained programs, those that no longer align with institutional goals, and those that have lost faculty and student support.

The self-studies are unambiguous about the lack of sustained funding for many, if not all, interdisciplinary educational programs, but interpreting the data is more an act of closely reading the language choices that constitute a common theme in responses. The frequent use of the term *seed funding* and the near absence of the term *sustained funding* in responses to questions specifically asking how institutions “seed, support, and sustain” educational investments may not constitute absolute evidence that little university funding is sustainable, but it, combined with near-universal agreement in discussions among graduate school

deans, indicates that we are far from institutionalizing commitments to interdisciplinary educational programs. For many such programs, it is more of a patchwork or makeshift effort at maintaining a rough sort of equilibrium on a year-to-year or even a term-to-term basis.

Beyond some isolated success stories of sustained resources for particular interdisciplinary programs, the general lack of sustained funding for interdisciplinary educational units often means that administrators of interdisciplinary programs and initiatives have to scramble and beg for resources. This phenomenon is rooted in existing budget structures, particularly tuition attribution models that track to departmental rather than to program-based activity. This is particularly true because many interdisciplinary programs and centers provide no undergraduate courses and depend on home departments or faculty for teaching assistantships and on faculty grants for research assistantship appointments. This can lead to contentious negotiations between departments and the interdisciplinary programs or the administrative unit responsible for them regarding allocations of faculty time, administrative support, and graduate assistantships. Additional negotiations must take place with the disparate units in charge of additional funding, physical space, communication technologies, or administrative support. Where there is a central unit in charge of administering new or sustained funding for interdisciplinary programs, the funds are always competitively distributed in an environment of scarcity. In sum, interdisciplinary programs and units navigate a range of institutional barriers at a remarkably high transaction cost, particularly given the large number of interdisciplinary educational programs in research universities.

Administrative support

In addition to the challenges associated with ensuring adequate fiscal, infrastructure, and other resources, administrators of interdisciplinary programs lack the administrative support they need to operate effectively. Interdisciplinary programs—like many resources—are frequently organized on a scarcity model, relying on existing staff and reorganizing them without an overlay of administrative support, leading to a mismatch of the strategic purposes and potential of interdisciplinary programs and the administrative needs of the units. Moreover, even with adequate administrative support, more work is needed to convey and build the special set of administrative skills needed for effective administration of interdisciplinary programs. The skills of interdisciplinary and collaborative leadership are only rarely an official part of the professional development programs that universities now routinely offer to administrators and comprise a distinct skill set for interdisciplinary program directors as compared with department

chairs. This is particularly true for interdisciplinary program directors, many of whom are academic faculty unprepared for the administrative work required to build and sustain successful interdisciplinary programs, including training in budget and financial management, leadership, succession planning, and conflict management.

Graduate student experiences

Graduate students in interdisciplinary programs do not have the same access to developmentally appropriate experiences as graduate students in traditional departments. This is because interdisciplinary graduate programs often lack a corresponding undergraduate base, so few built-in opportunities for graduate teaching assistantships exist. This lack of access to steady teaching assistantships is the primary fiscal difficulty faced by interdisciplinary graduate students. Moreover, a lack of teaching assistantships or instructorships means that interdisciplinary graduate students are not receiving sufficient training in the distinctive pedagogy of interdisciplinary teaching, nor are they developing competencies communicating core interdisciplinary concepts to undergraduates or nonspecialists. Cobbled-together teaching assistantships do not ensure developmentally appropriate experiences and may leave graduate students with unstable support from term to term.

Beyond the issue of teaching assistantships, interdisciplinary graduate students face additional difficulties and barriers to success. In some disciplines and departments, research assistantships are directed to students in a home department and away from students who participate in interdisciplinary programs. Interdisciplinary graduate students are sometimes unable to enroll in courses they need within departments because the first priority goes to the department's own students. A review of the remaining policy and practice barriers faced by students in interdisciplinary educational programs reveals many common problems across two or more Consortium member institutions. For example, interdisciplinary graduate students, even those getting multiple degrees, cannot register across collegiate lines and are not entitled to additional normative time to complete their degrees, or the budget model is structured in a way that disparately impacts students pursuing interdisciplinary work, usually by charging departments or programs for students regardless of course work. The lack of customization for interdisciplinary graduate students, who may require additional course work and additional time to degree completion, may unintentionally discourage graduate students from pursuing interdisciplinary degrees. Moreover, interdisciplinary graduate students rarely have a stable intellectual community where they can easily interact with other

students and faculty from the major due to a lack of common meeting space or shared offices. Graduate program offices can migrate as directors of graduate studies with homes in different departments or colleges change. This loss of continuity can be unsettling and provide less-than-optimal conditions for mutual learning outside of the classroom.

Other barriers faced by interdisciplinary graduate students include those related to attaining multiple graduate degrees. This has become a trend across the landscape of higher education, with increasing numbers of students attaining multiple degrees, such as a master's degree in a second subject and a doctoral degree in a "home" discipline. The needs of these students are particularly pressing because they are the next generation of interdisciplinary scholars and will further efforts to create an interdisciplinary environment. However, because the trend for multiple degrees is being driven by students and is not part of an explicit curriculum design by faculty, the intellectual connections among and between degrees is rarely fully explored or articulated. Moreover, these students can face barriers related to mixing faculty from different departments and orientations on their committees. This leads to potential problems related to methodological, political, ideological, and other differences among and between advisers, mentors, and committee members, especially if graduate students become pawns in battles between faculty members with different ideologies or research methodologies. Even if faculty conflicts never reach this point, interdisciplinary graduate students may find it difficult to meet differing expectations among advisers, thesis reviewers, and committee members. Beyond graduate school, interdisciplinary graduate students do not have the same access to professional development opportunities as students in traditional disciplines and do not have specialized opportunities that meet their special needs, including professional presentations, fellowships, and preparation for the job market. All of these elements might be explicitly addressed in the design of interdisciplinary graduate programs.

Interdisciplinary faculty

Interdisciplinary faculty face a variety of barriers, and recommendations for removing those barriers are found in many areas and thus in other chapters of these proceedings. Some recommendations are detailed in the previous chapter and mentioned in the next, but here we discuss sustaining faculty interest and engagement in interdisciplinary academic programs, barriers related to assigning credit for interdisciplinary teaching, and the effect of interdisciplinary work on faculty undergoing review for tenure and promotion.

Maintaining long-term faculty interest is crucial for sustaining interdisciplinary academic programs. While initial faculty leadership and commitment may be strong at the formation of a new interdisciplinary graduate program, circumstances can diminish the quality and consistency of leadership and participation over time. Ambitious faculty who launch new interdisciplinary programs are often highly enterprising leaders with a vision of what they want the program to accomplish; translating this vision into strategic planning, policies, and procedures and providing for continuity of leadership past the foundational generation is necessary if a new interdisciplinary graduate program is to achieve its potential. In the absence of careful planning, underlying structural issues inherent in an interdisciplinary program that straddles administrative boundaries, including opposition from departments, the departure of key faculty, and lack of recurring funding, can undermine the program, especially when there is a failure to build faculty interest in the program beyond a few original leaders. However, it may also be that a lack of faculty interest in a program is not due to a failure of leadership or careful planning but rather to the fact that a program's time has passed and the program eventually merits closure. Absent a systematic review process that establishes criteria and metrics for assessing the success of interdisciplinary graduate programs and their value to the university, as described above, it can be impossible to determine which programs need additional support to maintain faculty participation and which should be reduced in scope or closed.

Across the Consortium institutions, there are many barriers to collaborative teaching. Because interdisciplinary research and training tends to be a collaborative process, there is a need for interdisciplinary faculty either to teach in interdisciplinary programs without another departmental home or to engage in "team teaching" or collaborative teaching. However, allocating credit for teaching in interdisciplinary programs and other forms of accounting for the collaborative aspects of interdisciplinary programs and operations is a difficult process, since teaching assignments are almost the prerogative of the departments that are the administrative homes of faculty. This can make it difficult to staff interdisciplinary courses that involve multiple departments. Moreover, a tuition-driven budget model that includes charges on space and student count, along with minimum enrollment requirements, tends to discourage collaborative and interdisciplinary teaching because courses with low enrollment ultimately will be cancelled, and cotaught courses are often expected to enroll double the number of students, all of which is counter to the best practice of graduate seminars. Therefore, it is important that Consortium institutions create procedures and policies that allow faculty to receive full credit for teaching interdisciplinary

courses and that reduce minimum enrollment requirements and charges on space and student counts.

The final barrier to faculty success is perhaps the most widely discussed across institutional surveys and the various chapters of these proceedings. All institutions that responded to this survey reported that interdisciplinary faculty members are genuinely concerned that in many departments, interdisciplinary research and teaching, especially in a collaborative form, is not given as much value as research and teaching within a home department or discipline. Additionally, there is a concern across institutions that multiple or cross-departmental appointments are becoming increasingly common but that issues related to exchanging faculty time, effort, and expectations continue to be custom-designed for each individual. There is, however, broad consensus as to the best practices for dealing with these barriers.

INTERDISCIPLINARY PROFESSIONAL EDUCATION

The self-studies generated far fewer findings regarding barriers or challenges to interdisciplinary professional education because professional education is almost by definition interdisciplinary. Professional schools are designed to produce practitioners responsible for solving problems that are often multidisciplinary in character. Therefore, professional schools are often highly interdisciplinary, and many have developed curricular innovations that provide students with experience in collaboration and teamwork to advance interdisciplinary problem solving.

Two trends in interdisciplinary professional education are notable from the self-studies. There is a trend toward student-, alumni-, and practitioner-driven expansion in joint- or dual-degree offerings. These joint or dual degrees may include the combination of a professional degree with a graduate degree (an M.D. with a master's degree or Ph.D.) or one professional degree with another. Joint degrees are being offered across nearly all professional schools, even in older professional programs such as those in law and medical schools. Because these degrees tend to be student driven and vary substantially, students across institutions face substantial administrative and financial barriers to obtaining multiple degrees.

The second notable trend is the proliferation of highly interdisciplinary emerging professional schools and programs in fields such as public policy, informatics, communication studies, and the health sciences. These schools and programs are generating substantial interest in

interdisciplinary education. However, because they are often grafted onto existing administrative and budget structures and typically straddle established departmental lines, faculty and students face the same barriers as do interdisciplinary graduate students and faculty, along with new ones related to differential tuition and course scheduling.

RECOMMENDATIONS

We closely examined barriers in each of the areas described above, as well as the efforts to overcome them, at Consortium member institutions. From our findings and subsequent discussion among members of the committee, we developed recommendations likely to overcome some, but by no means all, of the challenges.

Interdisciplinary Professional Schools and Programs Developed in the Last Ten Years

University of California, Berkeley: *College of Engineering—Nanoscale Science and Engineering; Communication, Computation, and Statistics. Berkeley School of Law—Diversity and Democracy; Educational Policy Collaboration Research Approach. School of Public Health—Diversity and Health Disparities Cluster. Haas School of Business—Center for Energy and Environmental Innovation; Management of Technology; Berkeley Energy and Resources Collaborative. Goldman School of Public Policy—Politics, Economics, Psychology, and Public Policy.*

University of Michigan: *School of Public Health—Life Sciences and Society; Center for Law, Ethics, and Health. College of Engineering—Energy Systems Engineering.*

University of Minnesota: *College of Education and Human Development, Academic Health Center—Center for Health Interprofessional Programs; Academic Health Center Learning Commons; Health Careers Center; Center for Interprofessional Education.*

University of North Carolina at Chapel Hill: *Department of Allied Health Sciences—Human Movement Science; Occupational Sciences. Biological and Biomedical Sciences Program—Bioinformatics and Computational Biology. UNC-Chapel Hill and North Carolina State University—Department of Biomedical Engineering.*

University of Wisconsin—Madison: *Schools of Medicine and Public Health, Nursing, Veterinary Medicine, and Pharmacy—Clinical Investigation.*

To ensure that institutions are able to mount effective interdisciplinary graduate programs, we recommend that Consortium members establish criteria and metrics for assessing the success of interdisciplinary graduate educational initiatives. This will ensure that resources invested in programs are effectively stewarded and that programs continue to be aligned with institutional goals. A related recommendation is that institutions conduct a university-based assessment of interdisciplinary programs to determine their value to the university and, if the programs are determined to have sufficient value, identify the resources necessary to institutionalize and sustain the innovation beyond an initial funding period.

One of the key issues for interdisciplinary education and training is that no one entity controls access to the wide array of resources needed to assemble programs outside of departmentalized or college structures. Even the most robust graduate schools, which may be positioned to provide funding to interdisciplinary graduate programs on the same basis as departmental offerings, do not control the space needed to cluster and convene faculty and students. Therefore, we recommend that institutions coordinate or assemble the wide array of resources needed to support interdisciplinary academic programs under central authority. A related recommendation is that Consortium institutions provide professional development opportunities for faculty, staff, and students involved in interdisciplinary graduate education programs, interdisciplinary centers and institutes, and other arenas of interdisciplinary research, education, and training to enhance their collaborative leadership skills.

As described above, Consortium institutions often do not provide developmentally appropriate experiences for all interdisciplinary graduate students that prepare them for subsequent academic or industry employment. Therefore, we recommend that Consortium institutions create interdisciplinary workshops, classes, and other professional development and networking opportunities to ensure that doctoral students have adequate support for developing their writing, research, and thinking in relation to interdisciplinary topics in ways that prepare them for the professional job market. We also recommend that institutions provide opportunities for highly deserving graduate students to engage in interdepartmental collaborations. Fellowships provided to these advanced graduate students may engender interest in multidisciplinary activities among the undergraduate population, support new collaborations among faculty members in different units, and provide additional training for outstanding graduate students seeking jobs in academia. Perhaps most importantly, we recommend that institutions review policies and practices to ensure that they do not penalize students for engaging in interdisciplinary scholarship (e.g.,

Collaborative Leadership Development Series at the University of Minnesota

The Collaborative Leadership Development Series at the University of Minnesota is a professional development series for faculty, staff, postdoctoral fellows, and graduate students engaged in interdisciplinary research, teaching, training, and creative endeavors. The series provides participants with opportunities to gain the leadership skills needed to successfully navigate the challenges of working in interdisciplinary teams; to launch and sustain cross-disciplinary collaborations; and to advocate for the institutional changes needed in order to foster all forms of interdisciplinary inquiry. The series was developed as a cooperative initiative between the Graduate School's Office of Interdisciplinary Initiatives, the Office of the Vice President for Research, and the Office of the Senior Vice President for Academic Affairs and Provost in recognition that many of the skills needed to effectively engage in collaborative and interdisciplinary activity are not routinely taught within the academic and professional curriculum. Effective leadership of collaborative research teams often requires considerable attention to group dynamics, the professional development of team members, negotiating the division of labor and credit, and managing conflict. Interdisciplinary initiatives that have received central funding through the budget compact process have been asked to send key administrators, staff, faculty, and students to this professional development series in the effort to enhance the effectiveness of their teams.

forfeiture of fellowship opportunities because of lengthened time to degree, added costs for auditing courses, inability to cross-register, lack of meaningful teaching assistantships, inability to register for disciplinary courses because students with the discipline's major are a priority, difficulty in finding fellowships). Finally, for professional education, we recommend that institutions streamline the process for creating joint degree opportunities.

PROMISING PRACTICES

The self-study revealed several promising practices that can help institutions overcome barriers and implement recommendations from the study. These practices include advancing interdisciplinary undergraduate education, the role of graduate schools in promoting interdisciplinary graduate education, the role of graduate groups for fostering interdisciplinary graduate student success, and use of the memorandum of understanding (MOU) for ensuring the success of interdisciplinary faculty in the tenure and promotion process.

Emerging practices for interdisciplinarity in undergraduate education

The University of Wisconsin–Madison has developed Freshman Interest Groups in 30 areas that introduce more than 600 first-year students to interdisciplinary education in their first semester. Similarly, Duke University has instituted the Focus Program, an opportunity for first- and second-year students to be exposed to ideas from the vantage point of different disciplines across the humanities, the sciences, and the social sciences. It includes interdisciplinary seminar-course clusters around a common theme, small-group seminars, shared housing, and integrated experiential and community learning experiences. The University of Minnesota offers at least four undergraduate individualized degree options, all of which provide students with ample opportunity to design interdisciplinary and multidisciplinary degrees, and is planning the University Course, a new course that will use an interdisciplinary approach to deal with a major global issue. Each of these courses will be taught by three professors from different disciplines who will be charged with making the leap from team teaching to real, collaborative, interdisciplinary teaching. The University of Michigan is changing its university budget model to encourage collaborative and interdisciplinary teaching, so that 50 percent of undergraduate tuition will be returned to the unit of enrollment and 50 percent to the unit of instruction in order to better align financial support with levels of enrollment and instructional activity and to create incentives by providing resources to units for offering additional interdisciplinary teaching.

Innovative practices for graduate schools

The University of Minnesota has created and strengthened the infrastructure to support interdisciplinary initiatives and graduate programs mainly by providing mechanisms for building social and intellectual connections. Major initiatives have included developing a network of participants and leaders in interdisciplinary research, creative work, education, and training initiatives at the University of Minnesota to serve as a stakeholder and advocacy group for institutional transformation; developing graduate groups that recognize members' intellectual interest and expertise in an area of specialization deemed emergent in terms of research, education, or training; creating a faculty network of fellows to form an interdisciplinary intellectual community for the purpose of developing best practices in interdisciplinary graduate research, teaching, and writing at the University of Minnesota; and creating a series of interdisciplinary conferences, initiatives, and development workshops for faculty, staff, postdoctoral fellows, and graduate students engaged in interdisciplinary research, teaching, training, and creative endeavors in order to nurture academic work across the disciplines and find new connections between the university and the broader community.

A promising practice for ensuring graduate student success: Graduate groups

Graduate groups at both the University of California, Berkeley, and the University of Pennsylvania have a long history of ensuring graduate student success (the University of Minnesota is beginning to institute them). These groups work similarly across the two institutions, with some differences. In general, a graduate group is an interdisciplinary academic unit comprised of core faculty from two or more existing departments. It offers a doctoral or master's degree in a new method of inquiry or new field of study that has been approved by some competitive review mechanism involving faculty and administration (see above for emerging practices for reviewing interdisciplinary programs). The graduate-group structure provides the adaptability necessary to mount graduate programs in new developing areas of intellectual endeavor or to phase out programs in areas of declining vigor without disturbing the underlying structure of the traditional disciplinary departments and schools.

Since groups generally have no dedicated faculty full-time equivalents (with very rare exceptions), administrative funding, or space allocation of their own, one or more established departments must “host” the graduate group by providing funding and space for administrative support. Graduate groups help ensure graduate student success by providing a steady home base for students, administrative support, and better professional development opportunities. Graduate students in groups are eligible for the same fellowship opportunities as students in departments in the same sector. Research assistantship opportunities tend to be the same in graduate groups as in traditional departments. Finally, the disadvantage of not having an undergraduate base in the graduate group in order to provide teaching assistantships is somewhat offset by the opportunity to teach in more than one traditional discipline.

Consensus best practice for review of interdisciplinary faculty

There must be more explicit flexibility in promotion and tenure procedures for interdisciplinary faculty because the contributions of these faculty need to be evaluated differently from those of other faculty. Toward this end, MOUs should be regularized to guide the review of faculty throughout their careers. Intellectual and disciplinary diversity among the voting members of promotion and tenure committees is also necessary, either by adding “outside” members to establish promotion and tenure committees or by creating separate committees, which would extend the venue for review outside of the department.

While there is broad consensus at the institutional level about how to deal with these concerns and barriers, substantial unevenness remains in departmental adherence to these practices. Thus, institutions may want to experiment with alternatives to department faculty-member homes that allow more flexibility to reallocate faculty, given that some departments are reluctant to “count” interdisciplinary work, that many faculty feel isolated due to a high degree of specialization in some departments, and that there is a great need for adaptation over the course of a faculty member's career. We are reluctant to provide a recommendation in this regard because many interdisciplinary programs and centers are and will continue to be fluid, so these settings may not make sense as tenure homes. It may be more useful to think about departments as administrative categories instead of as distinct intellectual communities.

SUMMARY OF RECOMMENDATIONS

1. To ensure that institutions are able to mount effective interdisciplinary graduate programs, we recommend that Consortium members establish criteria and metrics for assessing the success of interdisciplinary graduate educational initiatives. Institutions should also conduct a university-based assessment of interdisciplinary programs to determine their value to the university and, if the programs are determined to have sufficient value, identify the resources necessary to institutionalize and sustain the innovation beyond an initial funding period.
2. We recommend that institutions coordinate or assemble the wide array of resources needed to support interdisciplinary academic programs under central authority. Often, no one entity controls access to the

SUMMARY OF RECOMMENDATIONS *continued*

diverse resources needed to assemble programs outside of departmentalized or college structures. Even the most robust graduate schools, which may be positioned to provide funding to interdisciplinary graduate programs on the same basis as departmental offerings, do not control the space needed to cluster and convene faculty and students.

3. We recommend that institutions provide professional development opportunities for faculty, staff, and students involved in interdisciplinary graduate education programs, interdisciplinary centers and institutes, and other arenas of interdisciplinary research, education, and training to enhance their collaborative leadership skills.
4. To ensure the success of interdisciplinary students, we recommend that Consortium institutions create

interdisciplinary workshops, classes, and other professional development and networking opportunities to ensure that doctoral students have adequate support for developing their writing, research, and thinking in relation to interdisciplinary topics in ways that prepare them for the professional job market. We also recommend that institutions provide opportunities for highly deserving graduate students to engage in interdepartmental collaborations. Perhaps most importantly, we recommend that institutions review policies and practices to ensure that they do not penalize students for engaging in interdisciplinary scholarship. Finally, for professional education, we recommend that institutions streamline the process for creating joint degree opportunities.

CHAPTER 4

Research

Frances Lawrenz, Associate Vice President for Research, University of Minnesota

Interdisciplinary research is well established and widely accepted across universities. All institutions in the Consortium have effective interdisciplinary centers, extensive internal funding programs to support interdisciplinary research, many long-term and successful research collaborations, and interdisciplinary faculty research positions. In total, interdisciplinary research has been around longer, is more well established in the university and broader academy, and is the subject of less resistance, than interdisciplinarity in the other functional areas. However, challenges remain to encouraging and supporting interdisciplinary research, including creating effective systems for securing and sharing funding for interdisciplinary research, especially in the areas of sharing of credit, indirect cost return, and costs; organizing and tracking interdisciplinary research programs and accomplishments; creating equitable and fair promotion and tenure systems for interdisciplinary research faculty; and encouraging student involvement in interdisciplinary research. The eleven self-study questions developed by the Research Committee were designed to gain information about the success of interdisciplinary research at universities, how universities have addressed any challenges related to interdisciplinary research, and what remains to be done to facilitate interdisciplinary research.

The self-study questions addressed the institutional definition of interdisciplinary research; whether the university has interdisciplinary research faculty positions and how they are assigned; the university's infrastructure for producing and enhancing large interdisciplinary grant applications; the allocation of overhead return and scholarly credit for grant awards at the university; the policies in place for cost sharing among academic departments; how the university involves students in interdisciplinary research; institutional efforts to foster interdisciplinary research; successful interdisciplinary research collaborations or centers; and the general attitude toward interdisciplinary research at the university. Seven Consortium universities responded to the self-study: Duke University; the University of California, Berkeley; the University of Illinois at Urbana–Champaign; the University of Minnesota; the University of Pennsylvania; the University of Washington; and the University of Wisconsin–Madison.

The conference presentation and this chapter were developed from the self-study responses and from discussions in our working group about these responses. We focus, in particular, on the self-study reports, challenges, and best practices in the following areas: definition of and attitudes toward interdisciplinary research; the current state of interdisciplinary research; funding interdisciplinary research; organizing and tracking interdisciplinary research programs; interdisciplinary research faculty; and student involvement in interdisciplinary research.

DEFINITION OF AND ATTITUDES TOWARD INTERDISCIPLINARY RESEARCH

While many responding universities do not have an institutional or official definition of interdisciplinary research, the informal definitions reported in the self-studies are largely consistent across responding universities and typically correspond to the definition offered in the 2005 National Academies report *Facilitating Interdisciplinary Research*. This report defines interdisciplinary research as “a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a discipline or field of research practice.”¹

Attitudes toward interdisciplinary research are also generally quite positive among responding universities. However, there remains substantial concern at some universities that interdisciplinary research may be rising in value as an end unto itself instead of as a means of solving important problems that cannot be addressed within a single discipline. Moreover, there is also a concern that an overemphasis on interdisciplinary research can lead to an erosion of excellence in the disciplines. These concerns, unmanaged, can lead to tensions between interdisciplinary and disciplinary researchers. While most institutions, at a central level, take a balanced view of disciplinary and interdisciplinary research that values both types of research, these concerns, and the resistance that comes from them, are present among some faculty and

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¹Committee on Facilitating Interdisciplinary Research, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, *Facilitating Interdisciplinary Research* (Washington, DC: National Academies Press, 2005). 26.

Attitudes Toward Interdisciplinary Research Across Universities

School	Attitude
Duke University	"Interdisciplinary research is highly valued. The focus on interdisciplinary research is invigorating for faculty, helps in the recruitment of distinguished faculty, and creates novel programming for students."
University of California, Berkeley	"Interdisciplinary research is a means, not an end. Care is exercised that interdisciplinary research does not become a legitimating strategy which leads to the erosion of excellence in the disciplines. Faculty are the true creators of meaningful interdisciplinary research, while the institution provides support in terms of resources and infrastructure to facilitate grassroots initiation of interdisciplinary research programs."
University of Illinois at Urbana-Champaign	"The general attitude toward interdisciplinary research is quite positive. The central campus administration has devoted considerable resources to promoting interdisciplinary research. Success in interdisciplinary research is recognized, for example, in the awarding of chaired professorships or the selection of recipients of campus honors and awards. There is general recognition that participation in interdisciplinary research may have negative impact on the tenure cases of junior faculty."
University of Minnesota	"The attitude toward interdisciplinary research is mixed. The attitude is that all research is important, both interdisciplinary and disciplinary. Researchers and the administration see the important problems of the times as requiring multiple perspectives to achieve solutions, as witnessed by the failure of singly focused research solutions in the past. Concurrently, interdisciplinary research is believed to be the 'wave of the future' in terms of sponsored funding. Additionally, the idea of single-disciplinary strength is seen as critical to effective interdisciplinary work."
University of Pennsylvania	"Supports interdisciplinary research at the highest levels. The university embraces three guiding principles: integrated knowledge across disciplines; increased access to education; and local and global engagement. The university strongly believes that excellent interdisciplinary research and teaching can only occur in an environment that supports outstanding and interactive discipline-specific efforts as well."
University of Washington	"Disciplines are the foundation of the university's educational and research missions, and interdisciplinary programs provide the bridges that keep the disciplinary programs interactive, responsive, and strong. Therefore, interdisciplinary research is seen as mission-critical and is not seen as taking away from disciplinary research, but as enhancing it. As more and more high-visibility/high-impact problems require interdisciplinary approaches, the prestige of doing this work increases."
University of Wisconsin-Madison	"Most faculty, staff, and administrators judge the campus' interdisciplinary research activities to be worthy. These activities are not separated, conceptually, from the larger research enterprise, so they are not judged independently of that. But there is plenty going on to suggest that the campus is moving toward greater interdisciplinary efforts over time."

administrators across institutional settings. Therefore, it is important that universities foster and facilitate positive relationships across all fields of intellectual inquiry, regardless of their disciplinary nature or character. To be effective, these efforts cannot be seen as top-down but rather must be driven by faculty interest and collaboration. However, universities can facilitate the development of positive relationships by establishing shared space for collaboration, by holding public seminars (weekly on-campus, monthly with invited guests, or annually with large international symposia) to stimulate intellectual energy, and by a commitment that interdisciplinary research and teaching augment, rather than supplant, disciplinary excellence.

THE STATE OF INTERDISCIPLINARY RESEARCH

Given the broad support behind interdisciplinary research and the generally positive attitudes toward it, it is not surprising that examples of successful long-term interdisciplinary research centers and programs can be found throughout the Consortium's membership. Three examples are the Institute of Translational Health Sciences at the University of Washington, the Institute on Community Integration at the University of Minnesota, and the Center for Information Technology Research in the Interest of Society at the University of California, Berkeley. It is important to note that these are just three examples out of literally dozens provided by responding institutions.

Three Successful Interdisciplinary Research Institutes or Centers

The Institute of Translational Health Sciences (ITHS) at the University of Washington. The ITHS is a multi- and interdisciplinary research "collaboratory" funded by the National Institutes of Health to advance translational research. Translational research takes medical discoveries from the laboratory into the clinic and out into the community. The goal of the ITHS is focused on making a positive impact on human health locally and globally. To achieve this goal requires the collaboration of many groups: academia, industry, nonprofit agencies, government, and most important, the community. The ITHS is a dynamic and interactive organization with a mission to create, enable, and sustain innovative translational research and research collaborations across disciplines and professions with the goal of accelerating the development of concepts and tangible products that will improve human health. ITHS programs and resources fall into one of three categories: (1) innovative research partnerships, which are programs to develop partnerships and research links with many types of communities as well as commercial, private, and governmental partners; (2) research resources, which are programs to provide critical research resources needed by translational researchers, from basic science to clinical outcomes to research; and (3) educational and career development, which consists of programs to provide education in all aspects of translational research as well as formal degree-granting programs with an emphasis on translational research.

The Institute on Community Integration (ICI) at the University of Minnesota. ICI is a federally designated University Center for Excellence in Disabilities, working to improve community services and social supports for persons with disabilities, persons at risk of developing disabilities, and their families through carrying out four core activities: (1) interdisciplinary training for preprofessional students from more than a dozen disciplines, as well as

professionals in the field; (2) applied research that improves policies and practices in education, human services, and other fields from local to national levels; (3) capacity-building technical assistance to local, state, and federal agencies and organizations; and (4) dissemination of leading-edge knowledge and practices. ICI employs more than 130 faculty, staff, and students who are involved in the work of its 60-plus projects and six affiliated centers that address needs across the lifespan. It carries out its core activities by collaborating with members of more than twenty departments, centers, and colleges across the university and with nearly 100 community partners. Its total annual budget (fiscal year 2009) is nearly \$13 million, with external funding through grants, contracts, and cooperative agreements from more than twenty private, local, state, and federal agencies. ICI also successfully secures a substantial base of financial support from external sales of resources and training (nearly \$1.2 million in fiscal year 2009) and from university sources.

The Center for Information Technology Research in the Interest of Society (CITRIS) at the University of California, Berkeley. The California legislature has granted CITRIS \$100 million in capital projects and operational funds for the construction of new CITRIS facilities. On the campus, the new CITRIS headquarters building will add approximately 141,000 square feet of space that will house research laboratories, including a large microfabrication laboratory; the administrative center for the CITRIS program; a distance learning facility; laboratories for collaborative research; offices; a 149-seat auditorium; conference rooms; and a student activity lounge and cybercafe. The building was completed in early 2009 and was dedicated on February 27 of that year. The unique space programming of this building fosters lively interdisciplinary interaction among academic researchers as well as with industry partners.

These examples highlight the relative success that Consortium institutions have had at developing, funding, and supporting interdisciplinary research. All institutions reported that promoting interdisciplinary research has been among the major themes of the central administration for several years, or even decades. Moreover, several institutions also reported that the most successful and long-lasting interdisciplinary research projects grow up organically out of faculty interests and societal needs. Thus, the promotion and legitimacy of interdisciplinary research is part of the institutional culture at all levels of the institution.

In terms of particular achievements, Consortium institutions reported broad success in mobilizing large, effective interdisciplinary teams to compete for external resources. The Center for Information Technology Research in the Interest of Society at the University of California, Berkeley, is a prime example. In addition to external resources, most reporting institutions also had extensive systems of internal support for funding interdisciplinary research, either by individual researchers or by groups of researchers. Connected to the funding of interdisciplinary research, all Consortium institutions reported the development and success of many cross-department and cross-college research projects and centers, as described above. These centers are well distributed across the sciences, the social sciences, and the arts and humanities. Finally, many responding institutions have been willing to take a risk on large-scale experiments to promote interdisciplinary research, such as the various cluster hiring initiatives described in previous chapters.

In sum, the self-study responses in this functional area were largely positive and emphasized that there are relatively low barriers to interdisciplinary research but that there is still room for improvement. In the next sections, we detail some of these areas for improvement, the reforms institutions have adopted, and the issues that still need to be addressed in this area.

FUNDING INTERDISCIPLINARY RESEARCH

While there has been broad success at promoting interdisciplinary research, there remain some challenges. Securing adequate and substantial funding to support interdisciplinary research is a challenge for many programs and across universities. A key issue raised in the self-studies is that institutions need clearer guidelines and modified policies for the distribution of indirect cost returns. Moreover, securing recurring funding is always an issue, with interdisciplinary centers often needing to expend large amounts of time and energy to get small sums of money to bridge the gap between large grants or for sustained administrative

support. Recurring funding is particularly difficult to secure because fundraising and grant structures for many kinds of research are discipline or department centered. The typical collegiate organization of grant infrastructure creates challenges for interdisciplinary grants in that each unit involved in a grant may not have access to all relevant information and the supporting units may be unequally situated with respect to supporting resources. Related to this point, while the ad hoc nature of cost sharing seems intrinsic to the process of interdisciplinary work, as those who have the funds need the opportunity to assess and then decide how to respond to those who want the funds, this can make securing adequate resources an uncertain and inconsistent endeavor. Additionally, faculty members have expressed a strong interest in a more equitable distribution of overhead across interdisciplinary units with which they are affiliated. Finally, because most resources follow collegiate and departmental lines, there has generally been a lack of funding for appropriate interdisciplinary research space and equipment, which can also impede success.

There is a great need to reduce or remove funding impediments for interdisciplinary research. In particular, it is important for universities to facilitate more-effective interdisciplinary grant applications and management by standardizing administrative, fiscal, and scheduling support for grants across departmental and collegiate units. One important avenue for doing so is by facilitating faculty efforts to craft large interdisciplinary grant applications at the very earliest stages of those efforts by creating assistance units. Only one of the seven universities that participated in this portion of the self-study, the University of Minnesota, has such an office, but four other universities report that they are considering or would like to develop a similar entity. The Office of Collaborative Research Services (CRS) at the University of Minnesota provides assistance in identifying, preparing, and submitting large interdisciplinary grants.

It is also important for universities to revise and standardize systems of indirect cost return, overhead return, and cost-sharing arrangements to make them simpler, explicit, and more equitable. Several universities have developed systems that can be considered promising practices in this area. In particular, the University of Washington has standardized policies for overhead and indirect costs, which direct deans and colleges to give back a significant fraction of these cost returns to the interdisciplinary programs that generated them. Duke University has standardized cost-sharing policies that direct all participating units to share in the costs of a grant unless there is a written agreement between all parties to do otherwise. Three other universities report that they wish

to simplify and make more equitable their cost-sharing process. Simple cost-sharing procedures such as these should be widely implemented. A key element of standardizing these systems and mediating the inevitable disputes that arise about them may be the appointment of a campus ombudsman or other administrative official to help set standards and arbitrate disputes. While no participating university has established this sort of position, two universities are considering or have expressed interest in creating such a position. Moreover, it is recommended that universities establish indirect cost-return mechanisms that ensure that research administration costs are appropriately allocated to the unit bearing the cost.

ORGANIZING AND TRACKING INTERDISCIPLINARY RESEARCH

Closely related to issues of funding interdisciplinary research are issues related to organizing interdisciplinary research programs and centers. In particular, fragmentation and duplication of effort can result from the creation of interdisciplinary research programs. Moreover, there is a tendency for interdisciplinary research centers and institutes to proliferate beyond coherence and beyond the capacity of universities to support them. The main cause of this fragmentation, duplication, and proliferation appears to be an inability of many participating institutions to effectively track and communicate about interdisciplinary researchers, programs, and centers. As an example, the University of Minnesota reports its relevant data in an electronic grants management system that, while useful, is difficult and cumbersome to access and does not allow the tracking of coinvestigators, making it difficult to discern who is involved in large grants and how to assign credit for interdisciplinary research activity. Three other participating universities also reported difficulties in organizing and tracking information about interdisciplinary researchers, programs, and centers.

Indeed, universities could and should do more to effectively track and organize researchers, programs, and centers. A key component of any plan to track and organize researchers, programs, and centers is internal and external communication about the presence of interdisciplinary research in order to reduce the possibility of duplication and proliferation. There are a number of ways to do this, including instituting better tracking systems for interdisciplinary research programs, maintaining a searchable directory of all interdisciplinary research programs, streamlining processes for setting up and managing subcontracts in interdisciplinary grants, avoiding significant processing delays, and modifying grants and contracts systems to allow assignment of projects to coinvestigators. Finally, and perhaps most important, systems should

be adopted that assign “credit” for interdisciplinary grants to multiple departments and centers in order to more equitably reflect the way that work is distributed. Unfortunately, no university has reported a way of doing the above that could be considered a promising practice, much less an exemplar to be followed.

A related issue is the absence of a routine mechanism for assessing the performance of interdisciplinary research programs and centers. Such a mechanism needs to establish metrics of success, be applied uniformly across the university, and be used to “sunset” unsuccessful centers or programs. As detailed in the previous chapters, two institutions, Duke University and the University of Minnesota, have established formal review processes for interdisciplinary centers that can be used as best practices in this area.

INTERDISCIPLINARY RESEARCH FACULTY

A substantial number of findings in this section overlap with the preceding two chapters. Interdisciplinary faculty across all participating institutions continue to be concerned about getting full credit for their contributions to interdisciplinary research, especially when it comes to the perceived value of their work in the hiring process and in reviews for promotion, tenure, or merit increases. In particular, there is considerable variation across universities in how interdisciplinary faculty members get and share credit for interdisciplinary and, especially, collaborative interdisciplinary work. Additionally, there is a concern across institutions that multiple or cross-disciplinary appointments are becoming increasingly common but that solutions related to exchanging faculty time, effort, and expectations continue to be custom-designed for each individual rather than institutionalized in a common set of university policies and practices, and standardized as a form of routine administrative transactions. Finally, there is a great need to be able to link teaching to the research agenda.

There is a broad consensus at the institutional level about how to deal with these concerns, particularly by creating more explicit understanding and flexibility in promotion and tenure procedures for interdisciplinary faculty, given the need to evaluate the contributions of interdisciplinary faculty somewhat differently from the contributions of departmentally based and disciplinary-focused faculty. Toward this end, memoranda of understanding (MOUs) should be regularized to guide the review of faculty throughout their careers. There also must be intellectual and disciplinary diversity among the voting members of promotion and tenure committees, either by adding outside members to established promotion, tenure, and salary committees or by establishing separate

committees, which would extend the venue for review outside of the department in interdisciplinary configurations customized to match the expertise of individual faculty. An issue of particular concern for interdisciplinary faculty is getting credit for interdisciplinary research. Three institutions report that they have made interdisciplinary research a formal part of the review process for all departments and have directed departments to give equal weight to interdisciplinary research in that process. However, substantial unevenness remains in departmental adherence to these practices.

To circumvent such unevenness, it may be necessary to rethink the notion of a tenure home by allowing interdisciplinary faculty to be tenured in centers, colleges, or universities more broadly. Such a broadening of the notion of a tenure home would allow universities to regularize the hiring and promotion, tenure, and salary process and give credit for interdisciplinary work as a routine practice. Evidence, rather than anecdote, remains surprisingly thin on the question of whether interdisciplinary faculty actually face discrimination or bias in tenure and promotion reviews conducted by their departmentally based colleagues. In response to widespread faculty concern on this issue, provosts' offices are now beginning to collect evidence about the tenure-and-promotion rate of interdisciplinary faculty, a practice that has long been in place to address related fears about discrimination against women and faculty of color. A recent evaluation of faculty hired under the cluster initiative at the University of Wisconsin–Madison indicates that these interdisciplinary scholars are being tenured at the same rate as disciplinary peers. At least in this case, reforms that have provided new alternatives for tenure homes seem to have contributed to positive tenure and promotion outcomes.

STUDENT INVOLVEMENT IN INTERDISCIPLINARY RESEARCH

Substantial portions of this section overlap with the preceding two chapters. Students, especially graduate students, increasingly tend to gravitate toward departments, programs, or centers that offer interdisciplinary research and training, due to increased interest and funding in these areas. However, finding such opportunities can be challenging, especially on the large campuses of research universities, where students often construct their academic and research experience principally through the departments with which they are affiliated. Moreover, students doing interdisciplinary research within more traditional disciplines can face substantial barriers to doing so in terms of getting credit for it.

Toward this end, it is important that interdisciplinary research opportunities be communicated more clearly to students by maintaining a searchable directory of all interdisciplinary research programs, as recommended above. One best practice for graduate students at the University of California, Berkeley, is the use of a Ph.D. minor program called a designated emphasis, defined as a specialization, such as a new method of inquiry or an important field of application, that is relevant to two or more existing doctoral degree programs. Students are required to complete the academic work in the area of interdisciplinary specialization and all the requirements of the doctoral program. They must be admitted to the designated emphasis before taking the qualifying examination. The graduate division has also established a procedure by which students may elect to design an interdisciplinary major.

CONCLUSION

As described above, interdisciplinary research is now well established and widely accepted at research universities, with many long-term and successful research collaborations and interdisciplinary faculty research positions reported by members of the Consortium. However, Consortium institutions face additional and increasing pressure to foster interdisciplinary research arising from demand by faculty researchers and extensive collaboration across the larger scientific and scholarly community and as a result of intentional stimulus by granting and funding agencies.

Some of the barriers toward fostering interdisciplinary research were described in this chapter, as well as some recommendations for overcoming them. However, the main requirements for fostering interdisciplinary research are sustaining the numerous successful research collaborations that exist within and across many universities; promoting new, innovative, and productive research collaborations; and sharing effective strategies for doing both of these among and between universities. Toward this end, Consortium institutions should consider promising practices at other institutions as detailed in this and other chapters to determine which might be most effectively adapted to fit into their specific institutional context, and should consider ways to create synergies between research and the other functional areas addressed in the Consortium's studies.

SUMMARY OF RECOMMENDATIONS

Overall, the responding institutions were very similar, and any differences were more ones of degree rather than of kind. All of the institutions had some mechanisms in place for supporting interdisciplinary research, but no institution had them all. Thus, it is recommended that institutions examine how interdisciplinary research is being supported at other institutions in the Consortium and determine how viable that approach would be at their own institution. Potential best practices include brokering win-win situations where there are incentives to participate, everyone gains something, and everyone shares costs and rewards. We recommend

that institutions develop a central administrative office or appoint an academic leader to champion interdisciplinary research across the institution and to facilitate the crossing of collegiate borders by researchers. Additionally, we recommend that financial and administrative support be provided to develop and administer large, complex interdisciplinary research projects. Recommendations for the long term include restructuring space to promote cross-fertilization, expanding the notion of tenure home, and conducting research on which approaches to promoting interdisciplinary research are most effective.

CHAPTER 5

Development and Fundraising

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INTRODUCTION

Successful development and fundraising efforts are fundamental to interdisciplinary research and education because a substantial amount of funding to support them comes from external sources. Development and fundraising efforts also serve as essential tools for communicating with potential donors about the crucial role of interdisciplinary research in solving contemporary social problems and how faculty expertise within major research universities can address these complex problems. However, there are significant challenges to raising funds for interdisciplinary projects. These include identifying funding sources; developing and articulating institutional priorities; structural barriers to cross-campus communication and collaboration; and challenges related to communicating with prospective donors. At the same time, there are many examples of successful initiatives across the Consortium institutions that serve as models for best practices in future fundraising and development efforts.

The Development and Fundraising Committee developed 28 self-study questions to identify the challenges to fostering successful fundraising for interdisciplinary initiatives as well as to examine promising and best practices in this area. Our goal was to shape and define a set of recommendations for development best practices in support of interdisciplinary fundraising at Consortium institutions. The self-study contained primarily open-ended questions in order to encourage in-depth responses and to provide an array of specific examples of policies and practices from the participating institutions. The questions evolved as committee members took part in vigorous discussions about fundraising for interdisciplinary programs at each of their institutions. Questions in the self-study focused on the following broad areas: the development model at the institution; the role of university administration; policies and processes of the development office; marketing and communications efforts aimed at stakeholders; interdisciplinary development collaborations across multiple universities; and suggested best practices for fundraising for interdisciplinary initiatives. The target audience for the self-study was development

professionals at Consortium institutions. However, in completing their responses, development officers also consulted with and sought input from the academic leaders at their institutions who are responsible for setting university-wide strategic priorities (e.g., provosts, vice presidents of research) as needed.

All ten Consortium member institutions actively participated in crafting the questions for the development and fundraising self-study, and nine submitted responses. Respondents included Duke University; the University of California, Berkeley; the University of Illinois at Urbana–Champaign; the University of Michigan; the University of Minnesota; the University of North Carolina at Chapel Hill; the University of Pennsylvania; the University of Washington; and the University of Wisconsin–Madison.

This chapter was developed from the self-study responses, discussions in our committee, and our conference presentation. We would like to note that our committee worked particularly well together in developing the self-study and in analyzing the results largely due to the practice among development officers of collaborating and communicating across institutions. In many respects, our discussions about the self-study were an extension of ongoing conversations among development professionals seeking to find ways to better support fundraising efforts for interdisciplinary activities.

In this chapter, we discuss differences in development structures across Consortium institutions, followed by the four key challenges in the development and fundraising area and recommendations that stem from these challenges. Next, we identify the particular action steps that institutions can take to ameliorate challenges and move toward adoption of key recommendations. In order to facilitate implementation of these action steps, we discuss emerging best practices, using detailed examples from select institutions. We conclude by identifying a set of issues for future consideration as we seek to improve interdisciplinary fundraising and development efforts.

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DEVELOPMENT STRUCTURE

Although this chapter focuses on development and fundraising strategies, we believe it is useful to first explain differences in the organization of development offices across institutions because these structural differences often lead to different approaches to interdisciplinary development efforts. There are three main types of development structures among Consortium members, as detailed in the table below. The first is a decentralized structure, in which the institutions have a very strong development function that is mainly located in the colleges, although there is a central development office, either within

the university or the foundation, that provides administrative and support services. Decentralized institutions include Duke University, the University of Minnesota, and the University of North Carolina at Chapel Hill. Centralized organizations have a separate and strong 501(c)(3) foundation with responsibility for the majority of development strategies and decision making institution-wide, though the central unit may assign some development activities to the colleges. The University of Wisconsin–Madison is the only Consortium member with a centralized development structure. Hybrid institutions have a combination of both structural types.

Development Structures

University	Structure Type	Description
Duke University	Decentralized	Strong central development component oversees departments that raise money for all schools and units; the central component includes administrative and support departments.
University of California, Berkeley	Hybrid	Structure includes large central staff and more than 30 development operations across campus; more than 300 advancement professionals and staff are involved in the fundraising and external relations enterprise on campus.
University of Illinois at Urbana–Champaign	Hybrid	Foundation oversees centralized operations for three campuses; the Office of the Vice Chancellor for Institutional Advancement (VCIA) on each campus coordinates college- and unit-based development offices.
University of Michigan	Hybrid	This structure is weighted toward the decentralized end of the continuum and includes 450 development staff across the university; the Office of University Development provides core fundraising and support services for the entire university.
University of Minnesota	Decentralized	Foundation office provides value-added centralized functions in support of colleges, campuses, and units; constituent units’ development efforts are administered under the direction of the respective leadership (e.g., deans); focus is on the cultivation and solicitation of leadership gifts.
University of North Carolina at Chapel Hill	Decentralized	All schools, and some institutes and centers, have their own development operations, which report to their respective deans or directors; the central office provides development services, including a gift-processing service, to schools and units across campus.
University of Pennsylvania	Hybrid	Centralized development and alumni relations office focuses on the priorities of the president, the provost, and the overall university; seventeen school- or center-based development offices focus on fundraising for their own school or center priorities; schools and centers have separate operating budgets, and each contributes financial support to the central office.
University of Washington	Hybrid	This structure’s strength is its delicate balance between school, college, and program goals and institutional vision, maintained through trust and transparency; this model encourages creative collaboration between units.
University of Wisconsin–Madison	Centralized	Foundation assigns or dedicates staff to the university’s major school or college units.

Regardless of structure, centralized development functions at all institutions have offices that actively fundraise for schools and units and provide administration and support services for various development activities, including annual fund programs; donor relations and stewardship; planned giving administration and management; and research and donor record keeping. Some central development offices have regional offices in which central staff work on behalf of all of the institution's colleges. These development officers then refer prospects to the appropriate campus units. The University of Illinois at Urbana–Champaign and the University of Michigan have aggressive and strong regional programs. The University of Minnesota, on the other hand, focuses much of its efforts within the state due to the fact that 80 percent of its alumni and donor population live in the local area.

KEY CHALLENGES

The four key challenges associated with development and fundraising for interdisciplinary activities are (1) identifying funding sources to support interdisciplinary initiatives; (2) developing and articulating clear and consistent institutional priorities; (3) structural barriers within the institution; and (4) challenges related to communicating with prospective donors. All of these challenges were cited, either directly or indirectly, by all participating institutions.

Identifying funding sources

There are three challenges that related to identifying funding sources for interdisciplinary research and education. First, it is often difficult to identify external prospects who may have an interest in a specific interdisciplinary initiative. Development officers typically adopt a conventional approach to donor prospecting that is based largely upon an individual's collegiate affiliation at the time he or she was a student. This includes his or her academic department or college and the extracurricular activities in which he or she participated. However, this approach fails to recognize that an individual's interests grow and change over time. The expanded interests of donors as they age are more likely to resonate with broader institutional priorities that extend beyond collegiate boundaries. Additionally, older donors are more likely to be in a financial position to make major gifts.

While institutions have increasingly sophisticated databases available to assist with donor prospecting, these databases have existed for roughly only twenty years. Information on alumni who graduated before 1990 may be outdated, incomplete, or nonexistent and therefore may not allow institutions to identify viable prospects.

A second challenge is the extensive competition for high-end donors who may not be affiliated with a particular institution. One emerging solution to this problem may be interinstitutional interdisciplinary development initiatives in which multiple institutions work collaboratively on major initiatives.

Finally, because the timelines for interdisciplinary research projects oftentimes are fluid, it can be difficult to know which donors to approach in support of specific projects based on the donor's interest, timeline, and type of gift he or she wishes to make. Long-term and short-term projects may require different types of donations. For example, long-term projects often need endowments that will ensure a steady income stream over time. On the other hand, short-term projects often need an infusion of substantial cash in order to launch an initiative. Expectations regarding how the potential donor's funds will be used to support the interdisciplinary initiative must be made explicit from the outset so the donor is clear about the impact of his or her gift on achieving a particular strategic goal.

Developing and articulating priorities

Frequent changes in institutional priorities can have a significant impact on the ability to raise private support. There are two main barriers in this area. First, the short tenure of senior leadership at institutions of higher education, coupled with the reorientation of institutional focus that often occurs under new leadership, leads to frequently shifting priorities. This in turn can make it difficult to target and retain donors who believe they are supporting the institution's most important priorities. Second, within any single institution, there are often numerous competing and overlapping initiatives. When accompanied by a lack of focus on any one initiative as a strategic institutional priority, this can pose serious challenges to development efforts. For example, a potential donor might approach a development officer and express an interest in supporting interdisciplinary initiatives focused on environmental sustainability. The development officer may be aware of four or five university-wide interdisciplinary initiatives dealing with sustainability as well as several collegiate programs on the same issue. In the absence of clearly defined and articulated strategic priorities, the development officer should turn to senior leaders for guidance in how to direct the donor's interest to best meet institutional goals.

Structural barriers to cross-campus communication and collaboration

There are significant structural barriers to fundraising for interdisciplinary research projects, all related to the fact that the fundraising goals of

development officers are largely tied to departments or colleges rather than cross-unit, cross-campus interdisciplinary projects. In most cases, development efforts on behalf of interdisciplinary activities are add-ons to the existing responsibilities of raising funds for departments and colleges. Another challenge is when there are development offices in various colleges charged with raising funds for a campuswide interdisciplinary program. This often leads to difficulties in assigning responsibility for developing the fundraising plan, overseeing the execution of the plan, and developing a proposal and promotional material. There are also challenges related to increasing the workload of development officers and to assigning credit for securing the gift, which is as important to development officers as credit for interdisciplinary research is to faculty.

Communication with prospective donors

Because of the breadth of interdisciplinary research projects on Consortium campuses and given that fundraising for interdisciplinary activities is relatively new, development officers face particular challenges in communicating with donors about interdisciplinary research and education efforts. It is imperative that interdisciplinary researchers be able to articulate the impact that interdisciplinary inquiry can have on society in ways that excite and ignite the passions of potential donors. Development officers also must communicate the types of support that are needed for both long-term and short-term interdisciplinary research projects.

RECOMMENDATIONS

The committee closely examined the challenges, as well as the efforts across Consortium institutions to overcome them, and developed a set of recommendations to address each of the four challenges. The responses from the self-study indicate that each institution strongly believes that there is potential to achieve positive change related to setting priorities and establishing more-effective communication strategies. Because relationship building is a fundamental characteristic of the development profession, the committee believes that development officers can play an important role in identifying donors and encouraging support for interdisciplinary research and education.

Consider the changing nature of funding sources

It is important for development officers to remember that prospect pools are infinite and may include any person or organization passionate about a particular project or research area, thus making the potential donor pool much broader than if an institution relied solely on its alumni base. Development officers must begin to capture and record areas of interest of alumni and friends for many reasons, not the least of which is being able to share information on projects that may be

of interest to prospective donors. They also need to devise strategies that would allow them to leverage support among private donors (individuals), corporations, foundations, and government agencies. In particular, development officers must engage donors in ways that lead to an increased understanding of donors' interests. For example, a donor who expresses interest in the environment can be introduced to and involved in a meaningful way with environmental programs and outreach at an institution. Through that experience, the development officer can better identify the potential donor's particular passions.

Collaboratively develop and clearly articulate interdisciplinary priorities

Interdisciplinary development priorities tend to come from central university leadership, whose responsibility it is to articulate changes in institutional priorities. In particular, central leadership must identify and focus on those projects that will have the greatest impact and must openly champion them as institutional priorities. They must be creative in establishing ways to provide institutional support for complex interdisciplinary research collaborations and create a culture that nurtures innovation and cross-academic collaboration. Senior leadership must clearly identify the units involved in interdisciplinary projects of strategic importance, collaborate with development leadership to identify the opportunities for private support, and help development officers clearly define their role in support of interdisciplinary priorities. Similarly, it is the responsibility of the senior development leadership to provide advice on the viability of raising private support for specific interdisciplinary projects.

Consider structural changes to enhance cross-campus communication and collaboration

One way to enhance cross-campus communication and collaboration to improve support for interdisciplinary activities is by ensuring that donors are active participants in helping to shape major ideas and by involving development officers in assessing the potential private funding component of key initiatives. Because development officers build relationships with prospects and have insight into the types of programs donors are interested in supporting, officers are key in helping to assess whether private support is viable for a particular initiative and, if so, which if any specific donors should be invited to help shape the vision for the initiative. It is also important to develop a system that rewards collaboration but maintains centralized coordination and leadership of development activities. Finally, it is important to assign development staff to work on behalf of campuswide interdisciplinary initiatives.

Adapt communication with prospective donors to fit interdisciplinary development needs

Development officers need to be able to articulate a strategic vision that leverages the unique academic strengths of the university and defines the research outcomes of the interdisciplinary research project. In particular, development officers and academic leaders must be able to articulate in a powerful, inspirational way why donors should invest in a particular initiative. Development officers recognize these as the “Why here?” and “Why now?” questions. To do this effectively, it is important that development officers know the senior administration’s vision for interdisciplinary work and that they are able to reinforce this vision in their interactions with prospective donors. Outcome-based research themes are also particularly important for inspiring private support for interdisciplinary activities. We need to engage donors in discussions about existing and emerging research opportunities and enlist faculty to champion interdisciplinary research and energize natural networks of support. Finally, it is very important to train development officers to listen for and capture donor interests.

ACTION STEPS

There is a broad consensus among Consortium member institutions that the funding picture for higher education is changing rapidly. However, there are internal actions that can be taken in order to respond to the external environment. The following are the Development and Fundraising Committee’s recommendations for next steps that institutions should take to respond to the current environment. These action steps are based on specific examples of actions that have been taken or are being considered at one or more institutions that responded to the self-study.

Action step: Develop structures to better allocate fundraising credit and reward collaboration between development officers and university administrators. The University of Illinois at Urbana–Champaign reports that it is close to initiating a new tracking system for fundraising credit for all gift officers who are involved in securing a gift for an interdisciplinary project. A similar tracking system could be used to credit and reward deans and faculty who are actively involved in developing and launching these initiatives.

Action step: Develop a system to share information about prospective donors across the university. An important feature of this system would be the ability to tag and identify the connections between donor interest areas and current institutional priorities. For example, the University of Minnesota suggests a system that could foster regular communication

among development officers about interdisciplinary initiatives associated with institutional priorities. Within the donor database, this system would employ a drop-down menu that enables development officers to quickly check donor interest boxes that correspond to a university’s top interdisciplinary priorities. Such a system could be programmed to automatically generate a message to the development officer charged with fundraising for that interdisciplinary initiative, prompting collaboration among colleagues as well as an immediate follow-up with prospective donors by the responsible development officer.

Action step: Provide training for development officers to enable them to meet the needs of interdisciplinary program development. Specifically, development officers must be trained to tell the story of interdisciplinary research and education in ways that prospective donors can understand. They must have the necessary skills to partner with academic units to identify research and educational activities that can garner substantial support as well as opportunities to nurture these partnerships. Development officers also must clearly understand their role in fostering cross-campus collaborations. The conventional fundraising approach has focused development officers’ attention almost exclusively on private support, which typically comes in the form of gifts or grants. However, support for interdisciplinary initiatives is far more likely to combine a range of funding sources that include government support, whether it is at the federal, state, or local level. An example of clearly defining the development officer’s role comes from the University of Wisconsin–Madison, where a 30-percent-time development director worked over a thirteen-year period with an interdisciplinary faculty member and lead major donor to develop and communicate a compelling story that could attract positive attention in multiple forums. This successful collaboration ultimately led to the successful launch of the HealthEmotions Research Institute at the University of Wisconsin School of Medicine and Public Health.

Action step: Establish long-standing interdisciplinary priorities in consultation with development officers. Priorities must be articulated clearly and communicated explicitly to development staff. Priorities also must remain relatively constant in order to allow development officers to identify and cultivate relationships with strong prospective donors over time. Finally, priorities should be developed in collaboration with development officers who understand the potential donor support for particular interdisciplinary efforts. An example of this comes from Duke University, where development officers and academic leadership are working to identify both priorities and fundraising potential among proliferating interdisciplinary efforts. Their goal is to collaborate to

provide a clearly defined and articulated method for determining funding sources and the role of philanthropy for the long-term financial viability of those initiatives.

EMERGING BEST PRACTICES

The self-study revealed several best practices that have been adopted by all or most of the responding institutions. Adopting these practices can help institutions overcome challenges, implement best practices, and take the action steps described above.

Best Practice Example: Aligning Development Efforts With Academic Goals

The **University of Michigan** detailed how the development plan for its interdisciplinary Life Sciences Institute (LSI) clearly aligned with the goals and priorities defined by then president Lee C. Bollinger (1996–2001). In May 1999, the university Board of Regents approved creation of a new interdisciplinary science unit, the LSI. The ideas for the LSI grew from a report of a commission tasked by President Bollinger to plan bold steps for the life sciences at Michigan. The regents approved the construction of a new \$100 million open-design wet-lab building and dedicated an additional \$130 million for the institute’s start-up and endowment funding. Included in this planning was a goal of \$32.5 million in additional endowment funding to be raised during the Michigan Difference Campaign, which began in 2000 and went public in 2004. Construction on the institute began in September 2000 and was completed in September 2003. Fundraising for the LSI has had much more active involvement from the Office of University Development and the president because of its high interdisciplinary priority. Out of 34 schools, colleges, and units that established goals for the Michigan Difference Campaign, fifteen established goals between \$20 million and \$40 million. It is fair to say that this interdisciplinary unit was treated on a par with many of the university’s schools and colleges in terms of fundraising priority. The LSI is independent of any particular school or college but works in partnership with all the deans and chairs of relevant academic units to recruit faculty and build programs and resources. The institute is led by a director who reports directly to the president and the provost. It is guided by an executive committee defined by regental bylaw and represents the scientific leadership on the campus.

Best practice: Align development efforts with academic goals and priorities. All nine of the development offices at responding institutions align their fundraising agenda with the strategic priorities defined by their institutional leadership (e.g., president, chancellor, or provost), whether or not these priorities are interdisciplinary. For example, the University of Washington aligns its development work with the academic agenda and employs an informal weighting process so that development officers may more effectively prioritize their work. One of the features of the University of Washington’s hybrid model is that, when prioritizing large, interdisciplinary programs, central staff members work collaboratively with decentralized staff members to pool resources in support of those programs. Another example of successful alignment is the Life Sciences Institute at the University of Michigan.

Best Practice Example: Excerpts Exemplifying a Supportive Culture

University of California, Berkeley: “Because of the breadth of academic excellence at UC Berkeley, faculty and students are naturally inclined to establish research partnerships to further innovation and discovery across disciplines.”

University of Michigan: President Mary Sue Coleman clearly articulated the importance of fostering an interdisciplinary culture: “I know, as a scientist and a university president, this achievement occurred only because of the interdisciplinary setting of the Life Sciences Institute and the interdisciplinary culture of Michigan. . . . Great universities like Michigan must transcend disciplines to be truly effective in addressing societal needs.” (“Five Years Forward: An Address to the University of Michigan Community,” November 15, 2007)

University of Pennsylvania: “There are no incentive plans in place (or being created) at Penn for deans, directors, and faculty to form interdisciplinary partnerships. Similarly, there are no institutional incentives for working collaboratively on interdisciplinary fundraising efforts. In many respects, such incentives have not been needed since the ‘culture’ of Penn has always prided itself on encouraging interdisciplinary work.”

University of Washington: “The provost at the University of Washington sets expectations of all deans to be collaborative, and fortunately, faculty naturally gravitate to interdisciplinary teams.”

Best practice: Ensure that institutional culture and reputation support the interdisciplinary agenda and encourage collaboration. In particular, when asked about institutional incentives to encourage interdisciplinary partnerships, some Consortium universities identified key funding or infrastructure support set forth by the provost that nurtured interdisciplinary collaboration. However, an institution's inherent culture and academic reputation were also named as additional incentives that heavily drive collaboration.

Best practice: Track donors by their interests. All nine responding institutions have some type of infrastructure to track data on donor interests, although not all do so yet. Alumni surveys and census data

can be particularly helpful when questions target philanthropic passions or interests, and they can provide an important starting point from which to identify prospects from outside the traditional alumni pools. For example, the University of Minnesota incorporated a section on “community involvement,” with questions targeting respondents’ philanthropic interests and priorities, into its recent alumni survey. Respondents were given interest choices that included interdisciplinary themes, such as the environment and health care, which are also strategic institutional priorities.

Best practice: Secure lead gifts to ensure successful projects. Six of the nine responding institutions indicated that a lead gift directly resulted in the fundraising success of a specific interdisciplinary project. In the six examples highlighted here, the compelling nature of the possible research outcomes and their potential to change society captured the attention of a major donor who was inspired to give a transformational gift to see the project through to its conclusion.

Best Practice Example: Securing Lead Gifts

Duke University: A donor was so passionate about research on the early identification of cancer risk that he made a \$600,000 gift to support the work as part of the Institute for Genome Science and Policy.

University of California, Berkeley: The Blum Center for Developing Economies was launched with a single eight-figure gift from a high-profile lead donor.

University of Illinois: The Center for Environmental Science and Policy is being established through a \$900,000 estate gift.

University of Michigan: The university has secured about 60 percent of the goal of \$32.5 million in private support for the Life Sciences Institute (LSI), including a gift of \$5 million from a key volunteer and several significant estate gifts.

University of North Carolina at Chapel Hill: The campuswide Carolina Entrepreneurial Initiative was launched with an initial grant from the Kauffman Foundation in 2004.

University of Wisconsin–Madison: The HealthEmotions Research Institute within the Department of Psychiatry in the School of Medicine and Public Health was founded to scientifically explore the link between mental health and physical health. The strengths of this project were significant and include (1) a popular concept, that one’s physical well-being is related to one’s attitude and outlook; (2) key faculty in related disciplines who respected each other and were in agreement and in harmony about pursuing the idea; (3) leaders in different schools willing to support the faculty initiative; and (4) the presence of an anchor donor.

ISSUES FOR FUTURE CONSIDERATION

We want to conclude with some issues for future consideration and observations about what development and fundraising can contribute to interdisciplinary research and education.

First, universities should consider whether it is possible for them to assign a development officer to specific interdisciplinary initiatives. Only three responding institutions (Duke University; the University of California, Berkeley; and the University of Illinois at Urbana–Champaign) currently assign development staff to serve an interdisciplinary program or institute. Another three institutions (the University of Michigan, the University of Minnesota, and the University of Pennsylvania) have identified staff contacts for specific interdisciplinary initiatives at the central level. The three remaining institutions do not have any immediate plans to hire interdisciplinary staff.

Development officers can play an important role in helping to shape the “big ideas,” or institutional vision, related to interdisciplinary activities in higher education institutions. In particular, development officers can contribute key information about external constituencies and connect with donors who may ultimately play an important role in helping to shape this vision. Development officers are well positioned to assess the feasibility of private support for various initiatives and should be called on to provide advice in this area.

Finally, development offices, and universities in general, must become more creative in how they approach fundraising for interdisciplinary programs and projects. They need to establish systematic methods to track and assign gift credit for interdisciplinary collaborations that recognize the contributions of everyone involved in launching these initiatives. They must ensure good stewardship of interdisciplinary

gifts. Finally, the fundraising model at major research universities must expand beyond securing gifts for specific departments and colleges to include raising funds in support of interdisciplinary programs. Successful fundraising for interdisciplinary programs will ensure that our universities will continue to serve the myriad needs of our society.

SUMMARY OF RECOMMENDATIONS AND ACTION STEPS

Recommendations

1. It is important for development officers to remember that prospect pools are infinite and may include any person or organization passionate about a particular project or research area, thus making the potential donor pool much broader than if an institution relied solely on its alumni base.
2. Senior leadership must clearly identify the units involved in interdisciplinary projects of strategic importance, collaborate with development leadership to identify the opportunities for private support, and help development officers clearly define their role in support of interdisciplinary priorities.
3. One way to enhance cross-campus communication and collaboration to improve support for interdisciplinary activities is by ensuring that donors are active participants in helping to shape major ideas and by involving development officers in assessing the potential private funding component of key initiatives.

4. Development officers need to be able to articulate a strategic vision that leverages the unique academic strengths of the university and defines the research outcomes of the interdisciplinary research project.

Action Steps

1. Develop structures to better allocate fundraising credit and to reward collaboration between development officers and university administrators.
2. Develop a system to share information about prospective donors across the university.
3. Provide training for development officers to enable them to meet the needs of interdisciplinary program development.
4. Establish long-standing interdisciplinary priorities in consultation with development officers.

CHAPTER 6

Finance and Budget

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INTRODUCTION

Universities are large, complex organizations with equally large and complicated budgets. No single individual or office is familiar enough with all of the units within a university to be able to develop appropriate budgets for each one. Like all large organizations, universities have addressed this problem by developing budget systems that allocate funding from the central administration down through the various levels of the university, with increasing levels of local budgetary authority appearing as funding cascades downward within the organization.

Universities tend to use their administrative structure as a financial structure for the allocation of funds. The provost allocates funding to schools and colleges, collegiate deans then allocate funding to departments, and department chairs allocate resources to different functions and subunits within their departments. At each stage of this process, a certain amount of funding is withheld for discretionary purposes, with the provost controlling discretionary funding for university-wide priorities and with deans and department chairs allocating such funds for collegewide and departmental priorities, respectively.

As shown in the figure, interdisciplinary activities and units—represented by the light gray box—are situated between departments and colleges (or schools). Interdisciplinary activities involve faculty and students from multiple units and focus on topics that cross departmental and collegiate boundaries. Because they are not clearly located within the administrative structure along funding-allocation lines, ensuring that interdisciplinary activities and units are adequately funded is a fundamental resource challenge.

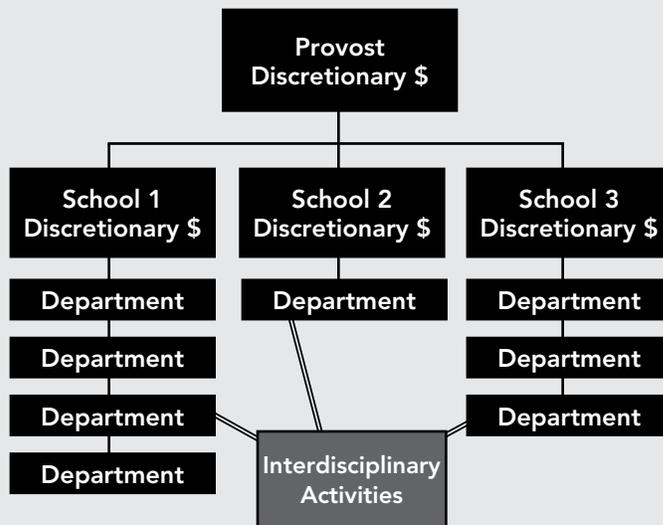
The Finance and Budget Committee developed 37 self-study questions to identify and understand the policies and practices regarding the financial support of interdisciplinary education and research at Consortium institutions and the extent to which these policies and practices address the fundamental resource challenge described above. The self-study contained questions about the financing of interdisciplinary instruction,

interdisciplinary graduate education, and interdisciplinary research. It also included questions that sought responses from three perspectives: central administrative, cross-collegiate, and collegiate. Designated leads from the finance and budget area at each institution were the principal self-study respondents. However, these leads also sought input as needed from an array of stakeholders and experts on each campus to respond to constituency-based questions.

Eight Consortium universities responded to the self-study: Brown University; Duke University; the University of California, Berkeley; the University of Illinois at Urbana–Champaign; the University of Michigan; the University of Minnesota; the University of Pennsylvania; and the University of Wisconsin–Madison.

Interdisciplinary Units in the University Structure

Resources flow to administrative units in the budget model, not directly to interdisciplinary activities (light gray box). How do we get resources to interdisciplinary activities?



Contributors are identified by their institutional affiliations and administrative titles as of the November 2008 Consortium on Fostering Interdisciplinary Inquiry invitational conference. Updated information is provided in the contributors' biographical profiles.

Our comments in this chapter are based on our committee’s review and discussion of the self-study responses and comments and discussion about the preliminary results presented in November 2008 at the Consortium’s invitational conference. We describe the various budget models, including models of discretionary support, across Consortium institutions. We also describe the specific issues related to the financing of interdisciplinary instruction, research, and scholarship. Finally, we conclude by returning to the fundamental resource challenge related to interdisciplinary activities—the difficulty in securing adequate funding—and offer a set of recommendations to begin to address this challenge.

BUDGET PROCESS

At all large universities, funds are distributed throughout the institution using two methods of allocation, the budget model and discretionary support. Budget models are used to develop unit budgets. More formally, a budget model is a set of rules or clearly defined practices used to allocate funding that is not withheld for discretionary purposes. Due to the complexity of major universities, approximately 95 percent of funding is allocated using the budget model, while only a small portion—about 5 percent—of the overall budget is allocated as discretionary funds. Three types of budget models operate within Consortium institutions. The first is an incremental budget model, in which units (e.g., colleges or schools, departments) receive the same percentage of funding from year to year and any remaining funds are allocated for discretionary support. In the incentive budget model, in which budgets are based in large part on the level of activities in which a unit is engaged, funding

can fluctuate from year to year. Finally, a mixed model combines aspects of the first two.

Under the budget model system, interdisciplinary activities and units are not directly supported because a budget model, which is a set of rules and practices, cannot determine whether a particular program or activity is interdisciplinary. Instead, interdisciplinary activities are supported through cross-unit reciprocity, or the sharing of costs and revenue between units engaged in the same activity. We should keep in mind that, while interdisciplinary activities fall into this category of support, so do many other activities that are not interdisciplinary. Each of the three budget models provides different types of financial incentives or disincentives for interdisciplinary units and activities. However, across all budget models, interdisciplinary units are situated between departments and thus may experience difficulty securing the resources needed to support their efforts. The incremental budget model in particular supports the status quo and therefore provides little incentive to seed new interdisciplinary initiatives, to eliminate obsolete activities so as to make new sources of funding available, or to provide appropriate ways to assign credit for interdisciplinary activities and faculty effort.

Universities also provide support for various activities, initiatives, and programs through the allocation of discretionary funds. Because leaders have more decision-making control over the distribution of discretionary funds compared with the more inflexible budget model, discretionary funds tend to be a primary source of support for interdisciplinary activities. However, as mentioned previously, discretionary funds controlled at various levels of the university (provost, college, department) are quite small relative to the overall budget and tend to be one-time allocations (e.g., funding to seed a new institute or launch a new initiative). While discretionary funds can potentially be used for ongoing support, this can occur only if the funds are dedicated and replenished on an ongoing basis.

Examples of discretionary support directed to interdisciplinary activities at Consortium universities include interdisciplinary cluster hiring at the University of Wisconsin–Madison, the University of Michigan, and the University of Minnesota.¹ At the University of Michigan, the

Budget Models

Incremental	Incentive-based	Mixed
University of California, Berkeley	University of Michigan	University of Illinois at Urbana–Champaign
Duke University	University of Minnesota	
Brown University	University of Pennsylvania	

¹ These cluster hiring examples have been described in greater detail in earlier chapters.

Discretionary Support Used for Interdisciplinary Units

At the **University of California, Berkeley**, a pool of funds has been set aside to foster interdisciplinary inquiry. In fall 2003, the executive vice chancellor and provost launched a process to identify and fund a number of interdisciplinary academic initiatives. Five centers were identified to receive funding. These funds are modest, though they include both operational funds and ongoing support for tenure-track faculty positions. The funds for full-time-equivalent (FTE) faculty are recurring, but the operational money was intended to be one-time, to serve as seed money while the programs developed their own sources of funds. However, the campus has learned that the need is ongoing, so annual allocations have been provided to these units since inception. The original proposal tied permanent funding to enrollment growth (full-time students) in the five new interdisciplinary programs. Funds are used both for faculty positions and basic operating support. Strategic initiative center directors designate the use of the operating funds, while faculty-support funding is directed from the central administration. The vice provost for academic planning and facilities provides central administrative oversight for the interdisciplinary centers. Interdisciplinary schools are reviewed by the executive vice chancellor and provost.

In fall 2005, the president of the **University of Michigan** dedicated \$2.5 million in funding to support team-taught and multidisciplinary courses and degree programs at the undergraduate level. The funds are being used to support several initiatives that lead to new, high-enrollment courses or course sequences, as well as new cross-unit degree programs. In order to promote sustainable courses and programs, substantial support will be dedicated to developing these courses and degree programs, followed by diminishing levels of support as home units absorb the costs of these activities. In 2008 the president and provost at the University of Michigan approved funding to hire 25 new junior faculty members in the initial phase of a five-year, \$30 million initiative to add 100 junior tenure-track positions in areas that advance interdisciplinary teaching and research. The Multidisciplinary Learning and Team Teaching Initiative one-time investment of \$2.5 million is considered modest, while the investment of \$30 million for junior faculty would be considered substantial. The junior faculty initiative includes \$10 million in base funds and \$20 million in one-time funds.

president also designated funds for an initiative to develop and launch new interdisciplinary courses. At the University of California, Berkeley, the provost allocated discretionary resources to provide operational funds and ongoing support for tenure-track faculty positions at five interdisciplinary centers. Finally, the University of Minnesota provides central support in the form of discretionary funding from the provost to university-wide interdisciplinary centers and institutes.

FINANCING INTERDISCIPLINARY INSTRUCTION

In this section, we describe the process of financing interdisciplinary education and the challenges in this process. Specifically, we discuss issues related to financing the cost of and distributing the revenue for courses with students from multiple colleges and schools (cross-unit and interdisciplinary instruction), courses staffed by instructors affiliated with multiple units across multiple schools (especially team-taught courses), and courses associated with degree programs that do not fall within a single college or school. Our primary focus in each of these areas is to identify and eliminate financial disincentives and provide suggestions for appropriate incentives to foster interdisciplinary instruction. However, it is critical to keep in mind that the academic

value of interdisciplinary instruction must always be the primary motivator for developing and offering new courses. We do not want to offer financial incentives that are so compelling that they encourage increased interdisciplinary instruction with no clear academic value.

Costs and revenues associated with interdisciplinary instruction

The costs of interdisciplinary instruction and, more generally, of cross-unit instruction are assumed by two distinct units: the unit of instruction (the unit in which the course is offered) and the unit of enrollment (the unit in which a particular student is enrolled). The unit of instruction bears all of the costs associated with offering the course, including curriculum development, compensation for the instructors, and charges for such things as facilities and technology or equipment. Costs are obviously higher for team-taught courses, which are more common for interdisciplinary and cross-unit offerings. A less widely acknowledged set of costs charged to the unit of instruction is overhead costs associated with student enrollment. These include the cost of student services (e.g., advising, student support, health insurance) as well as the cost of unit-based financial aid, and these costs tend to be higher for graduate students than for undergraduates due to differences in the costs of various student benefits such as health insurance.

Tuition is the primary revenue source supporting education and instruction. According to our self-study, Consortium institutions with incentive-based or mixed budget models use a variety of tuition attribution formulas to attempt to align tuition revenues with the instructional costs described above, while those with incremental budget models do not attribute tuition. Generally, these tuition attribution formulas attempt to attribute a portion of the student credit-hour costs to the unit of instruction and a portion of these costs to the unit of enrollment. The formulas then generally distribute tuition revenue generated from courses to the school of instruction, the unit of instruction, and the unit of enrollment. There are multiple formulas and no “right” formula for attributing tuition. Rather, the decision as to which formula to use depends largely on the value placed on interdisciplinary instruction by the university, which will in turn determine the level of financial incentives deemed appropriate to encourage interdisciplinary and cross-unit instruction. The “right” formula for a given institution will also depend upon how costs are attributed within that institution. Reexamining existing attribution formulas at institutions, which many Consortium members have done recently, could help determine

whether we are applying formulas in ways that undercompensate units and therefore limit the number of interdisciplinary, cross-unit course offerings. Finally, it is important to note that interdisciplinary programs or units are often not considered as either units of instruction or units of enrollment and as a result generally receive no tuition revenue.

Team-taught courses

It is useful to highlight courses taught by multiple instructors (team-taught courses) because they often have a high value for students and are likely to stem from an interdisciplinary hiring initiative. However, several financial challenges are associated with these courses. First, team-taught courses are costly to develop, largely because more than one faculty member is involved in curriculum development and the process itself tends to require more faculty time. The instructional costs of team-taught courses are higher because multiple instructors must be compensated. Team-taught courses can also be difficult to sustain over the long term due to shifting faculty interests over time and faculty turnover. Finally, it can be difficult to accurately compensate the various “home” units of the faculty members involved in team-

Reconsidering Tuition Attribution Formulas

At the **University of California, Berkeley**, student credit hours are credited to the home department offering the course, while credit for full-time student enrollments is allocated to the home department of the instructor, which may be an interdisciplinary center.

At the **University of Illinois at Urbana–Champaign**, tuition credit is assigned to a unit based on the college of enrollment and the location of the course. The current model provides equal weight to the two factors and, the campus believes, discourages interdisciplinary instructional activity. Beginning in fiscal year 2010, the University of Illinois will more heavily weight the instructional units. This will more closely match costs with activity and therefore better support interdisciplinary efforts. Some programs are also considering a minor fee to support these programs.

The **University of Michigan** recently reconsidered the tuition attribution model. Previous to 2008, 25 percent of the revenue went to the unit of instruction and 75 percent to the unit of enrollment. There was significant evidence that this model undercompensated the unit of instruction, so these units were reluctant to develop courses that would serve students across the university. In order to study how to rectify this, the university calculated actual instructional costs plus 50 percent overhead for the twenty

courses that had the largest cross-unit enrollment and sampled other upper division courses. The study revealed that, depending on the course, the actual cost per student credit hour ranged from about 30 percent to 50 percent of actual tuition for the courses sampled. So the university reset the tuition attribution formula so that 50 percent went to the unit of instruction and 50 percent went to the unit of enrollment. The goal of this reconsideration was to cover the actual costs of instruction and provide a little bit of incentive for units to serve students in other schools.

In the past, the distribution of teaching revenue at the **University of Pennsylvania** was perceived as a barrier to interdisciplinary teaching. It was possible to split revenue, but the process was cumbersome, with a lot of manual effort. In 2007 the University of Pennsylvania introduced a new tuition distribution system that allows far greater flexibility for the assignment of the teaching school. The former twenty-plus-year-old system could not easily accommodate joint teaching or unusual allocations of effort. Now, for example, a course can be team-taught by three different schools, with one getting 50 percent of the teaching school revenue, the second 35 percent, and the third 15 percent. The system essentially eliminates the prior mechanical barriers to interdisciplinary instruction.

taught courses because Consortium institutions lack standard formulas that govern the calculation of a faculty member's effort devoted to developing and teaching a course. Two Consortium institutions (the University of Pennsylvania and the University of Michigan) are addressing these issues through central funding programs to support team-taught courses, while academic leadership at another institution (the University of Minnesota) is contemplating a move toward crediting the faculty member directly for tuition revenue in courses he or she teaches, regardless of the departmental location of the course.

Interdisciplinary degree programs

Interdisciplinary degree programs that are not housed within a single college or school face a number of financial challenges, including which units should be responsible for the start-up and ongoing costs of these programs. Discretionary support is often too unstable to provide sustained funding for intercollegiate interdisciplinary degree programs, but these programs are also not part of the budget model in most institutions, particularly those with an incremental budget model. Determining where these programs should be administratively housed is another challenge. Interdisciplinary graduate programs are often housed in graduate schools, but there is no logical administrative home at most institutions for interdisciplinary undergraduate programs. The final challenge related to interdisciplinary degree programs concerns how best to allocate tuition revenue. Consortium institutions have a variety of strategies for attempting to deal with these challenges. However, the self-study responses indicate that current strategies appear to be largely ineffective. Most institutions are planning to change or revise their approach to this issue, but there is insufficient detail in the self-study responses to describe these new approaches and how they will be implemented.

FINANCING INTERDISCIPLINARY SCHOLARSHIP

This section describes the processes and challenges related to financing interdisciplinary scholarship and research and particularly explores issues related to funding interdisciplinary programs and institutes. Next, we examine the evaluation of interdisciplinary units in relation to finance and budget issues. Finally, we address issues related to sponsored research, focusing particularly on policies governing indirect cost return.

Funding interdisciplinary programs and institutes

A common method of supporting interdisciplinary research and scholarship across Consortium institutions is through the creation of interdisciplinary institutes and centers. These units are freestanding

bodies in the university structure with the mission of supporting and enhancing interdisciplinary and collaborative research within a particular area. There are many issues related to financing interdisciplinary institutes and centers, including securing start-up and ongoing funding, evaluating progress toward achieving goals in order to determine funding levels, and managing the closure, or “sunsetting,” of these units.

The main challenges associated with funding interdisciplinary institutes and centers and cross-collegiate interdisciplinary academic programs are associated with ensuring ongoing support. Discretionary funds are the most common source of support for these units. These funds tend to be targeted toward providing start-up or seed funding for interdisciplinary institutes and centers, and this is often determined on a case-by-case basis in an unstructured manner. Centers and institutes typically supported with one-time discretionary funding face major challenges in securing ongoing funding from within the university to sustain their activities. They are often expected to attract sufficient external resources to be self-sustaining. This is certainly the expectation among the majority of Consortium institutions. Cross-collegiate academic programs often face the difficult task of negotiating for collegiate contributions on an ongoing basis. Of Consortium members who responded to the self-study, only the University of California, Berkeley, has a systematic support model in place that offers some degree of central operational support for each research unit and earmarks a portion of interdisciplinary endowed chair payout for programmatic support.

Evaluation of interdisciplinary programs, institutes, and centers

Another challenge associated with the funding of interdisciplinary programs, institutes, and centers is the difficulty in deciding how, and at what level, to provide continuing funding following an initial start-up period. Deciding whether or not to continue support can be difficult because institutions do not have adequate methods for measuring the impact of interdisciplinary activities or the extent to which a unit has successfully stimulated interdisciplinary collaboration. It can be difficult to know what level of interdisciplinary activity might have occurred in the absence of a particular unit; thus, measuring the specific contribution of a center to current activities is challenging.

Decisions to close, or “sunset,” interdisciplinary units are rare across Consortium institutions. Academic stakeholders are left without the option to fund promising new activities because the limited discretionary funds needed to support these new initiatives remain tied to existing

units, even when these are not deemed highly successful. Financial directors lack appropriate metrics from the academic sector upon which to base their funding model calculations.

In order to deal with these challenges, institutions need to develop a better mechanism for evaluating the contributions of interdisciplinary units. Examples from two Consortium institutions seem to be especially promising in this area. As described in Chapter 2, “Academic Administration and Faculty Governance,” Duke University has well-defined processes in place employing a range of useful metrics to evaluate initial proposals to launch new interdisciplinary centers and programs and decide what level, if any, of continued funding should be allocated to existing units. In addition, Brown University has separate processes that consider academic merit and financial requirements when evaluating the start-up proposals for new units.

Distribution of indirect cost return

After an initial start-up period, interdisciplinary research units are often funded through sponsored research awards. The main financial challenge associated with these awards is the distribution of indirect cost return. Multiple models for the redistribution of indirect cost return exist among the Consortium institutions. However, regardless of the model in use, all Consortium institutions report that disputes about indirect cost return are problematic for interdisciplinary work. This issue is particularly challenging because some colleges or departments have built indirect cost return into the cross-subsidizing of other activities within the unit, making it difficult to redistribute or reallocate the indirect cost return to support other activities.

Evaluating Interdisciplinary Research Centers

At Brown University, the approval process for new research centers begins with a proposal sent to a committee known as the Academic Priorities Committee, which is chaired by the provost. This committee, which has faculty and administrative representatives, vets proposed new initiatives on their academic merits and recommends to the provost which proposals ought to move forward. Securing funding is a separate endeavor that is lodged in the provost’s annual budget process. The provost receives an annual budget allocation from the university for new initiatives and provides funding for approved projects from that budget.

RECOMMENDATIONS

The fundamental resource challenge for interdisciplinary initiatives across institutions is ensuring that interdisciplinary activities and units receive adequate ongoing funding, a challenge that arises from the fact that these units are often not located within the conventional administrative funding structure based on the budget model. In order to overcome this challenge, we must recognize the crucial role that discretionary support from provosts, deans, and department chairs plays in funding interdisciplinary activities and strive to ensure that these resources are adequate in order for interdisciplinary activities to flourish. Because discretionary resources represent a small portion of the overall institutional budget (less than 5 percent in many institutions), we recommend that universities either create a mechanism to increase the base support for discretionary purposes by reallocating funds from the budget model or that they provide systematic support for interdisciplinary activities within the budget model itself. One means of providing this support is by creating equitable tuition attribution and indirect cost

Method of Indirect Cost Return at Five Consortium Universities

University	Method of Indirect Cost Return (ICR)
University of Pennsylvania	The majority of ICR is distributed to the school where the principal investigator has his or her primary appointment.
University of Michigan	One hundred percent of ICR is distributed to the unit holding the grant, and there is systematic use of subcontracts to distribute ICR to units where work is conducted.
University of Illinois at Urbana–Champaign	The university is moving to a system that splits ICR among the central administration, the vice president of research, the principal investigator’s home unit, and the unit from which the grant originated.
University of California, Berkeley	One hundred percent of ICR is distributed to the central administration.
University of Minnesota	One hundred percent of ICR is distributed to the colleges; the percentage of principal investigator effort on the grant determines splits between colleges.

return models that return revenue directly to the unit that bears the cost burden of the interdisciplinary activity.

Because the impact of interdisciplinary teaching, scholarship, and research is difficult to evaluate and track, we recommend that Consortium institutions develop systematic procedures and metrics for evaluating the potential and ongoing contributions of interdisciplinary units. We also recommend that universities create flexible information systems that accurately account for the costs associated with interdisciplinary teaching and research to guide how enrollment and tuition revenue, sponsored research dollars, and development and fundraising funds

are distributed in relation to these costs. We also recommend that institutions standardize rules regarding revenue and cost sharing for interdisciplinary units.

Finally, in order to remove financial disincentives for interdisciplinary instruction and scholarship, we recommend that institutions diffuse the extra costs of interdisciplinary teaching across units, ensure that faculty and staff are compensated equitably for all work, and ensure that graduate student pay, hours, and access to research and teaching opportunities are equitable across disciplinary and interdisciplinary programs.

SUMMARY OF RECOMMENDATIONS

1. Move funding of interdisciplinary activities into the institution's budget model whenever possible rather than seeking funding through discretionary support. This allows interdisciplinary activities to receive consistent annual attention in the institution's budget process rather than forcing these activities to annually justify funding through often-changing discretionary processes.
2. Regularize institutional policies on shared instruction, team teaching, and the division of tuition revenue (if applicable). Formulation of principles to guide the sharing of workload, and templates of agreements to share course instruction and revenue can reduce barriers to interdisciplinary teaching.
3. Formulate consistent expectations with regard to research as a part of faculty workload and, especially, determine the use and distribution of indirect cost returns to reduce barriers to interdisciplinary cooperation. While it is unlikely that the many cultures of a major research university will be able to settle on a single rule set regarding the financing of research activities, the availability of any common principles and assumptions will be valuable.

CHAPTER 7

Space and Capital Planning

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"We shape our buildings; thereafter they shape us."

~ Winston Churchill

"The interdisciplinary paradigm could not be realized without a concurrent change in the institution's physical space."

~ Michael S. Harris and Karri Holley, 2008

INTRODUCTION

At Consortium institutions, interdisciplinary work often occurs without dedicated physical space and with suboptimal infrastructural support. Changes in space and capital planning policies and practices are clearly needed in order to foster interdisciplinary research and education. We would note that changes are also needed in how we build, manage, and utilize space in general, as these practices clearly impinge on available space and resources for any new initiative.

We divide the development of space and facilities over time into distinct temporal phases: past, present, and future. In the past, facilities were built to support disciplinary projects, and disciplines and departments controlled the majority of campus space. Capital planning for facilities was often aligned with departmental goals. At present, campus facilities are developed and built largely in school- or collegiate-based zones and are primarily collegiately controlled spaces aligned with collegiate goals. In the future, we anticipate that, as universities increase their efforts to facilitate interdisciplinary research and education, facilities will be built in academic neighborhoods with buildings that support related disciplines and interdisciplinary work clustered together. The allocation and design of this space will be driven by the needs and demands of interdisciplinary initiatives and will be collaboratively controlled by the various partners engaged in joint interdisciplinary endeavors. We also anticipate that investments in future facilities will be better aligned with institutional rather than departmental, school, or collegiate strategic goals.

The Space and Capital Planning Committee designed 25 self-study questions to understand the current state of the art in facilities planning and design in support of interdisciplinary education and research across Consortium institutions. We included questions about campus space dedicated to interdisciplinary activities as well as the barriers caused by the limitations of existing available space. We also asked questions intended to assess each institution's potential for and experience with retrofitting existing spaces or developing new spaces for interdisciplinary activities, as well as questions concerning the nature of funding arrangements for new and existing interdisciplinary spaces. Finally, we were interested in the process of designing interdisciplinary spaces at different Consortium institutions and asked respondents to describe models or examples of spaces that foster interdisciplinary collaboration and interaction on their campuses.

Constructing Academic Facilities: Past, Present, and Future

Past	Present	Future
Project and construction focused on the individual project	Planning and construction focused on the individual project and the impact on physical zones	Planning and construction focused on creating and extending academic neighborhoods
Projects impact a single discipline or department	Projects impact an entire college or school	Projects impact interdisciplinary research and training
Department-controlled space	College- or school-controlled space	Collaboratively controlled space
Space aligned to department goals	Space aligned to collegiate goals	Space aligned to institutional strategic goals

Contributors are identified by their institutional affiliations and administrative titles as of the November 2008 Consortium on Fostering Interdisciplinary Inquiry invitational conference. Updated information is provided in the contributors' biographical profiles.

In most instances, the self-study was completed by a designated institutional lead person experienced with space and capital planning issues in higher education. However, we also included questions that in some instances required the lead respondent to seek input from individuals in facilities management and programming, university architects, directors or managers of interdisciplinary facilities, and capital planning decision makers. Eight Consortium universities responded to the self-study: Duke University; the University of California, Berkeley; the University of Illinois at Urbana–Champaign; the University of Michigan; the University of Minnesota; the University of Pennsylvania; the University of Washington; and the University of Wisconsin–Madison.

As cochairs, we developed this chapter based on Consortium institutions' responses to the self-study questions and our committee's further analysis of these responses. Our personal experience with capital planning also informed this chapter. We incorporated comments and discussion from the November 2008 Consortium on Fostering Interdisciplinary Inquiry conference. In this chapter, we seek to discuss the demand for interdisciplinary spaces across universities as well as the barriers and challenges to meeting this demand. We also touch on issues related to the management of interdisciplinary space and the design elements necessary to support interdisciplinary activities in both new and retrofitted buildings. Finally, we conclude by providing recommendations for institutions to mitigate and overcome the barriers and challenges to interdisciplinary activities posed by space and capital planning issues.

BARRIERS AND CHALLENGES

Across Consortium institutions, there are multiple barriers and challenges to what appears to us to be an unpredictable but rapidly growing demand for interdisciplinary space. These challenges include the scarcity of funding sources and appropriate spaces to support the needs of interdisciplinary research and education. Problems associated with using grant funding and strategic planning to support new facilities is also a pressing concern, as is the limited space on campus for new construction. It can be a challenge to support different research needs in the same space, a challenge often exacerbated by competing departmental and collegiate priorities, which often trump new investments in interdisciplinary facilities on campus.

Funding sources

The self-study responses indicated that the single greatest barrier to developing any space, and particularly interdisciplinary space, on all

Consortium campuses is a lack of funding to support space needs. In particular, disciplinary and interdisciplinary programs and initiatives directly compete for limited resources, including space and funding. At present, disciplinary-based initiatives and goals often prevail because financial and political resources are concentrated at the level of departments, colleges, or schools in the form of gifts, return of tuition at institutions with responsibility center budgeting (in which budget authority is decentralized to departments, colleges, or schools within some well-defined parameters), indirect cost recovery, and membership on key university committees. Interdisciplinary educational programs often face difficulties in securing funding for designated space because they have a relatively new alumni base, if any, compared with established disciplinary programs, which hampers their ability to raise private funds. Raising money for rapidly changing frontiers of interdisciplinary knowledge is harder than obtaining funds that reward past performance and that are for a known entity with which donors have long and personal ties. Interdisciplinary units funded through sponsored research also have difficulties directly funding their own space because their indirect cost returns are often distributed to other units rather than returning to the interdisciplinary unit for reinvestment in facilities and other infrastructure. Current university budget models do not provide predictable and recurring sums of money to support long-term capital investments for interdisciplinary programs. Without a major institutional strategic commitment from the president and provost, the building of interdisciplinary facilities is overly dependent on opportunistic one-time major infusions of money and resources in response to economic, political, and societal needs and pressure. But we note, and strongly, that this rather serendipitous approach to funding has resulted in enormous investments in research facilities, which often have interdisciplinarity as a basic premise. Indeed, the most expensive and ambitious buildings constructed on Consortium campuses in recent years fall into this category.

Last, interdisciplinary buildings, especially in the sciences, are inordinately expensive. As a consequence, facilities that are needed to compete in the most promising research areas could be underbuilt or simply not be competitive with those currently being constructed or completed by peer institutions. The current state-funding situation further exacerbates this problem for public universities and is unlikely to change anytime soon.

The dilemma of grant funding

A major problem with obtaining grants to support interdisciplinary research is that units that require new or reassigned facilities to support

research in a particular area are viewed as less competitive and are therefore less likely to be awarded grants. This is especially true in science and technology fields. In response, some institutions have built new facilities with the hope of successfully attracting grants that will in turn provide new financial and human resources to support interdisciplinary activities and result in increased institutional prestige and recognition. This strategy requires that universities make substantial investments in facilities to support interdisciplinary research agendas that are, as yet, untested and that may or may not attract significant grant monies in the future.

The obverse is to build interdisciplinary facilities in order to compete in a research area too late in an external funding cycle. While interdisciplinary research is in all likelihood enduring, particular interdisciplinary research areas are likely to be time dependent and fleeting, relative to the life of a building. Universities that require a decade to identify areas of research, plan for them, raise funds, and then design and construct buildings for them are often on a fool's errand. If the facility is built on the assumption that the external research dollars will still be there, the chances are good they will not be. The answer to this dilemma is obvious. An institution needs an inventory of readily available, quickly adaptable space with which to successfully compete in a timely manner for external grants. The "capacity frontier" must advance ahead of specific needs, which is the only way real needs can be met in a timely way. And this means a radical change in a "scent-marking culture" that treasures indefinite and visible control of space and wishes to fill all available space.

Space limitations

All of the institutions responding to the self-study reported that space on their campuses is limited and that finding available facilities and new building sites to support interdisciplinary initiatives is problematic. In the absence of the ability to build new facilities, allocating space for interdisciplinary research generally means taking space assigned to other programs and reassigning it to interdisciplinary initiatives, creating a climate of competition. Moreover, retrofitting old spaces to suit the demands of new interdisciplinary initiatives is challenging because the aging infrastructure of older facilities is not suitable to meet the demands of new teaching paradigms or the complicated research laboratory configurations required by new interdisciplinary fields. And in some instances, retrofitting an existing building runs into historical preservation issues. In many cases, existing facilities simply cannot be restructured in a cost-effective manner to fit the contours of interdisciplinary space needs to incubate emerging interdisciplinary

collaborations. Finally, it can be difficult to identify appropriate space for specific interdisciplinary activities due to the need to centrally locate facilities in close proximity to the primary contributing disciplines. As interdisciplinary activities increasingly cross departmental and collegiate boundaries, this becomes more challenging, particularly in an environment where space is limited.

Different research needs in the same space

Because of the changing nature of interdisciplinary teaching and research, it is extremely important that its facilities be flexible and modular in their design and construction. Interdisciplinary facilities must be designed to support the intensive and varied infrastructure demands required by specific types of scientific research (e.g., fume hoods for chemists, laser labs for computer and electrical engineers). In other words, interdisciplinary buildings must be able to support the needs of a variety of researchers working together as well as different configurations of collaborative teams over time. This can be challenging in existing buildings, which were often designed with a specific purpose in mind and tend to be very inflexible as a result. And the problem becomes compounded if the future users of the space do not share a common vision of space design and utilization.

Consensus about the importance of interdisciplinary facilities

There is a lack of consensus about the relative priority of developing interdisciplinary facilities, especially at the expense of departmental needs and ambitions. Some departments welcome opportunities to work across units and to share research infrastructure, contributing space and finances to interdisciplinary projects and using creative approaches to engage in interdisciplinary collaborations. Other departments are more reticent about interdisciplinary facilities, and some actively work to hinder support for interdisciplinary space and to obstruct planning negotiations for these spaces. One strategy for overcoming this challenge is to build spaces that are perceived and accepted as supporting institutional strategic goals and with an explicit understanding that tenancy will be based on continuing to meet institutional strategic objectives.

DEMAND FOR INTERDISCIPLINARY SPACE

All Consortium institutions are investing heavily in interdisciplinary facilities, and the demand for interdisciplinary space is increasing across institutions. Most of the pending or recently completed projects on this front are in the areas of life sciences, environmental studies, and engineering. However, institutions responding to the self-study also reported plans for digital media, social science, and humanities

Requested, Pending, or Recently Completed Interdisciplinary Space

University	Interdisciplinary Space
Duke University	Five requests for new or expanded space requiring less than half a building. Requests are from the Duke Global Health Institute, the Kenan Institute for Ethics, the Social Science Research Institute, the Franklin Humanities Institute, and the Duke Institute for Brain Sciences.
University of California, Berkeley	One building complete (Stanley Hall); two buildings under construction (Center for Information Technology Research in the Interest of Society and the Li Ka Shing Center); three buildings in the planning stage.
University of Illinois at Urbana–Champaign	Five requests for new buildings, one request for part of a building.
University of Michigan	Six requests for new buildings in the following areas: dance; art and design; mechanical engineering; nanotechnology; molecular, cellular, and developmental biology; engineering student projects; neuroscience; pathology; cardiovascular research; energy research; information technology; communication studies; film and video; residence; and living and learning.
University of Minnesota	Eight new buildings from the six-year capital plan, including several buildings devoted to interdisciplinary use.
University of Washington	Pending space requests in digital arts, nanotechnology, NEPTUNE (North East Time-Integrated Undersea Networked Experiments), the College of the Environment, and the Department of Global Health. Interdisciplinary space will be included in the Molecular Engineering Building and the South Lake Union Phase 3.
University of Wisconsin–Madison	Recently completed projects include the Microbial Sciences Building, the Waisman Center, and the Biotechnology Center. Five additional projects in planning or design.

buildings that would be interdisciplinary in nature. Requests for space often initiate with the president or provost, but projects at some of the participating institutions have originated with deans or even the faculty.

MANAGEMENT OF INTERDISCIPLINARY SPACE

The management of interdisciplinary space is an evolving practice in Consortium institutions. In the past, space was often “owned” and managed by specific schools or disciplines. However, we are moving toward a model where space is controlled by the deans of specific colleges or schools. In addition, some interdisciplinary buildings have a designated manager or a committee that assigns and manages space, with the provost or a member of his or her staff as arbiter. This is particularly true for facilities that house faculty from multiple colleges or schools. In order to maintain the flexible use of interdisciplinary space and to be able to meet space demands when new centers or institutes are formed, Duke University and the University of California, Berkeley, have adopted “sunset” policies and practices to manage the closure of existing institutes and centers. Centers and institutes that fail to meet

agreed-upon academic or financial goals are closed and their space reallocated to new or more promising initiatives.

Another consideration is the naming of facilities. We would encourage new facilities to be named in ways that do not identify them too closely with a particular discipline. Naming a building with a departmental name lends itself to a teleological argument that all things that are designed were preconceived, intended, purposed, or contrived with that department in mind. When it comes to interdisciplinary space, the administration needs to use an Aristotelian argument that a building’s design exists outside of the natural laws of the university and its academic departments and is exempt from that predefined structure.

DESIGN ELEMENTS OF INTERDISCIPLINARY SPACE

There are common trends across Consortium institutions in the design elements of interdisciplinary space for new or retrofitted buildings. In particular, we are seeing greater emphasis on creating public spaces and gathering areas to support social interaction among researchers, students, and even the public. These spaces include atria, corridors,

lounges, study nooks, and easily accessible “breakout” areas. There is also a growing emphasis on designing assignable space that is flexible and can be rearranged according to the specific needs of the users. Increasingly, these public spaces are not designated for specific colleges or schools but rather for a range of anticipated uses over time. Common design elements for flexible assignable space include more open space, fewer fixed walls, and shared laboratories. Although both social and assignable spaces have real advantages for fostering interdisciplinarity, planners should be aware that there could be a conflict between the need for both types of space within a single building. Increasing the social space in a facility lowers the percentage of available assignable square footage. Therefore, when designing interdisciplinary facilities, we must carefully weigh the need for space that fosters social interaction against what is needed for teaching, research, and offices.

One example of a facility that demonstrates promising practices in interdisciplinary space design and use is the Wisconsin Institutes for Discovery (WIDS) at the University of Wisconsin–Madison. WIDS has a number of compelling design elements to support interaction and collaboration that we believe should be emulated. These elements include a changeable layout that can respond to wide-ranging and time-sensitive needs. Throughout the building, physical and visual barriers in the interior work areas have been minimized. Draws (e.g., coffee bars) have been strategically placed to increase the likelihood of chance encounters between building occupants. In addition to the primary interior public spaces, social interaction space has been included on research floors. Throughout the building, multiple disciplines share physical and social space, and teaching labs have been embedded within the research environment. Although the facility will not open

The Wisconsin Institutes for Discovery at the University of Wisconsin–Madison

The Wisconsin Institutes for Discovery (WIDS) building, to be completed in late 2010, is a purpose-built interdisciplinary research center and will house the public Wisconsin Institute for Discovery and the private Morgridge Institute for Research in a single, four-story facility constructed on the entire 1300 block of University Avenue on the University of Wisconsin–Madison campus.

The building will serve as a hub for interdisciplinary research that spans biotechnology, nanotechnology, and information technologies and that will lead to the development of new biomedical treatments and technological applications aimed at improving human health and welfare. It will contain approximately 106,000 assignable square feet of research space, including wet and dry laboratories, research support areas, core facilities, and offices.

As a gateway to campus for the public, the building also will be home to teaching labs, designed as “dream” collaborative learning environments. The labs will host a wide range of education programs for K–12 and college students, science teachers, and the public.

The interior of the building has been designed with care and imagination to deliver on the promise of collaboration and research leading to a better world. The ground floor will house a vibrant “Town Center” for use by scientists, the university community, and the community at large. It will include a restaurant, a soda fountain, and a bakery with a coffee bar; “breakout” rooms for meetings and outreach events; and a round forum in the middle, designed for flexible use.

Floors 2 through 4 will house research laboratories. Each floor will include a research pod (work space) dedicated to the private Morgridge Institute, a research pod for the public Wisconsin Institute for Discovery, and an integrated pod for scientists from both institutes. The lower level also will house specialty laboratories that may require more-complex utilities and high ceilings. An atrium on either side of the building (one to the north and one to the south) will insulate the research labs from traffic noise, provide ample natural lighting from skylights, and offer views of the Town Center below.

Other features of the building include the following:

- Straight halls are nonexistent; spaces are flexibly open to encourage interaction and accommodate collaboration.
- Common areas will invite large- and small-group discussion and discovery.
- “Communicating stairs,” open and wider than utilitarian stairs and with room at the landings for people to pause for conversation or to enjoy a view of the outdoors, will bring people together.
- Electronic whiteboards and flat-screen televisions/monitors will be close at hand.
- Labs are being designed so they can be changed to match wet or dry research needs and provide flexible long-term use.
- The building will be constructed with a geothermal heating system.

Modified from <http://discovery.wisc.edu/home/discovery/facility/facility.cmsx>.

until December 2010, planning has already begun to program events for the primary interior public spaces in order to draw the public into the facility.

RECOMMENDATIONS

In order to overcome the challenges and barriers described above, we advise Consortium institutions to implement the following recommendations related to funding strategies for interdisciplinary space, designing flexible spaces, facilitating trust among units, informing planners about interdisciplinary space needs, and strategically articulating the campus vision that supports interdisciplinary research.

Rethink funding strategies for interdisciplinary spaces

We recommend that institutions rethink how different funding mechanisms could be used to unite multiple units and create incentives to pursue interdisciplinary research and education. Such funding mechanisms should combine financing from multiple sources (e.g., the state, major donors, alumni foundations, private funding agencies) to build facilities that exceed what could be achieved using a single funding source. These funding mechanisms should also provide incentives for units to share space and equipment and should include support for administrative infrastructure and ongoing maintenance and operations as part of the total-cost budget when planning interdisciplinary spaces. Finally, in order to avoid conflict and ensure ongoing funding, it is important that institutions clearly define the financial and logistical roles and responsibilities of all affected units for supporting shared or interdisciplinary space and the requirements for ongoing occupancy.

Design flexible space

We recommend that institutions make flexibility in the design of space and furnishings a guiding principle in all academic building projects in recognition of the fact that campus facilities represent significant long-term investments and must meet evolving needs over a substantial lifespan. We should construct spaces that can be easily converted to meet future demands. It is also important to consider the social aspects of facility use in the planning and design process and include social spaces to promote interaction in research areas as well as in the primary interior public spaces. We should also remember that the outside spaces surrounding the facility can be used to foster interaction and interdisciplinary collaboration. There are also a series of very specific construction considerations that must be taken into account in order to build successful interdisciplinary spaces, e.g., ensuring that utility ducts are large enough for long-term flexibility in accommodating changing technologies and that designers balance laboratory bench space with laboratory support space and core space.

Facilitate trust among units

Planning, design, and construction of interdisciplinary facilities, while difficult, are easy compared to the task of facilitating joint governance and cross-disciplinary relationships based on trust. In order to achieve this when planning and building facilities, we recommend that institutions encourage cross-collegiate partnering on large capital projects and that representatives from all contributing disciplines be included in planning and design discussions from the outset. However, it is very important to keep in mind that interdisciplinary activity is more important than interdisciplinary facilities. The existence of interdisciplinary facilities does not ensure that interdisciplinary teaching or research will occur or that the teaching or research that might occur will be of high quality. In addition, many faculty members are successfully engaged in interdisciplinary activities even in the absence of interdisciplinary space or buildings. Therefore, it is equally important, or perhaps even more so, to advance interdisciplinarity in the other functional areas represented in the Consortium self-study in order to facilitate the relationships that interdisciplinary space can enhance but not replace.

Inform planners about interdisciplinary needs

In order to create outstanding facilities, we recommend that Consortium institutions ensure that facility planners are informed of the issues associated with designing for interdisciplinary activities. In particular, it is important to provide managers of space and capital construction with a basic understanding of issues related to the development and design of interdisciplinary facilities as well as the importance of interdisciplinary programs to the strategic goals of the institution so that they are able to design and develop the space in ways that further the university's mission. However, we should remember that much work has already been done, and we must take advantage of available resources to assist us in further progress. We recommend that institutions commission planning studies, hire architectural firms, and employ professional consultants who have designed model buildings for interdisciplinary activity on other campuses and are on the leading edge of campus design in this area.

Be strategic in space and capital planning

In order to best allocate scarce resources and maximize the return on investment, we recommend that institutions clearly articulate the campus vision supporting interdisciplinary progress. We also recommend that institutions focus on broader institutional goals and needs, as well as the needs of individual units, when searching for ways to cluster similar needs in the process of planning major capital projects. We recommend that institutions strategically plan events for the primary interior public spaces of interdisciplinary facilities in order to foster public engagement

with research and education. Finally, we recommend that, when designing new buildings, designers should minimize physical and visual barriers in interior work areas to allow collaborators to see each other's

work and should strategically place draws to increase the likelihood of chance encounters between building occupants.

SUMMARY OF RECOMMENDATIONS

1. In order to avoid conflict and ensure ongoing funding, it is important that institutions clearly define the financial and logistical roles and responsibilities of all affected units for supporting shared or interdisciplinary space and requirements for ongoing occupancy.
2. We recommend that institutions rethink how different funding mechanisms could be used to unite multiple units and create incentives to pursue interdisciplinary research and education. Such funding mechanisms should combine financing from multiple sources (e.g., the state, major donors, alumni foundations, private funding agencies) to build facilities that exceed what could be achieved using a single funding source.
3. We recommend that institutions make flexibility in the design of space and furnishings a guiding principle in all academic building projects in recognition of the fact that campus facilities represent significant long-term investments and must meet evolving needs over a substantial lifespan. It is also important to consider the social aspects of facility use in the planning and design process and include social spaces to promote interaction in research areas as well as in the primary interior public spaces.
4. We recommend that institutions encourage cross-collegiate partnering on large capital projects and that representatives from all contributing disciplines be included in planning and design discussions from the outset.
5. In order to create outstanding facilities, we recommend that Consortium institutions ensure that facility planners are informed of the issues associated with designing for interdisciplinary activities. In particular, it is important to provide managers of space and capital construction with a basic understanding of issues related to the development and design of interdisciplinary facilities as well as the importance of interdisciplinary programs to the strategic goals of the institution so that they are able to design and develop the space in ways that further the university's mission.
6. We recommend that institutions commission planning studies, hire architectural firms, and employ professional consultants who have designed model buildings for interdisciplinary activity on other campuses and are on the leading edge of campus design in this area.
7. In order to best allocate scarce resources and maximize the return on investment, we recommend that institutions clearly articulate the campus vision supporting interdisciplinary progress. We also recommend that institutions focus on broader institutional goals and needs, as well as the needs of individual units, when searching for ways to cluster similar needs in the process of planning major capital projects.

CHAPTER 8

Equity and Diversity

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INTRODUCTION

The rise of interdisciplinary activities across Consortium institutions has been problematic in relation to equity and diversity. Investments supporting interdisciplinary research and education have largely targeted the science and technology fields, where women and people of color are substantially underrepresented. By investing in fields with the least diversity, top research universities have shortchanged diverse scholars and diversity research and also have, in effect, contravened their formal strategic commitment to equity and diversity. The investment disparity at large research universities puts efforts to advance institutional equity and diversity goals at odds with support of interdisciplinary initiatives—when in fact the two should be inextricably linked. The result is that pioneering interdisciplinary programs such as ethnic studies and gender and women’s studies, where there are higher concentrations of women and faculty of color, are losing ground, especially in difficult economic times; and diverse faculty are harder to recruit and retain in all fields.

Consortium members are engaged in activities designed to advance the diversity of faculty and students in science and engineering fields—for example, through participation in National Science Foundation-supported ADVANCE and related programs—but their institutions as yet have few systematic processes in place to directly address the intersection of interdisciplinarity with equity and diversity. The Consortium’s work provided one of the first systematic inquiries into this issue. An NSF-supported ADVANCE meeting, organized by the Columbia University Earth Institute in November 2007, also provided a groundbreaking examination of women, minorities, and interdisciplinarity focused on the research enterprise.

However, without recognition of and investment in diversity as a core value that permeates the academic enterprise, interdisciplinary structures now evolving might simply replicate existing, traditional models that make diversity not integral but incidental. In our efforts to advance equity and diversity as an important “functional area,” we may unintentionally be perpetuating by default a system that marginalizes

and delegitimizes diversity research and scholarship in the academy. Within such a system, diversity will not be sustainable.

The twelve self-study questions developed by the Consortium’s Equity and Diversity Committee were designed to explore how equity and diversity efforts and initiatives do or do not intersect with interdisciplinary research, teaching, and learning within and across institutions of higher education. The survey asked participating institutions to look at diversity as an institutional priority, to address the representation of minorities in interdisciplinary units, and to identify any diversity goals that are included in interdisciplinary initiatives. We asked respondents what, if any, institutional strategies are in place for recruiting faculty in either diversity or interdisciplinary units and how successful they have been in these efforts, as well as what institutional investments have been made in interdisciplinary areas to further diversity goals. Respondents were also asked about the status of diversity research at their institutions, including opportunities and rewards for engaging in diversity research. Finally, we asked Consortium institutions to share any concerns regarding efforts related to developments in policy and practice pertaining to interdisciplinarity and diversity and to provide recommendations for how these concerns might be addressed in the future.

The equity and diversity self-study survey was designed to be completed by a designated survey lead, such as a chief diversity officer or other individual with leadership responsibility for equity and diversity at the institution. Six Consortium universities responded to the self-study, including Duke University; the University of California, Berkeley; the University of Illinois at Urbana–Champaign; the University of Minnesota; the University of Washington; and the University of Wisconsin–Madison. This represents a 60 percent response rate to the survey.

This chapter draws from responses to the self-study and conversations among committee members, as well as discussions following the

Contributors are identified by their institutional affiliations and administrative titles as of the November 2008 Consortium on Fostering Interdisciplinary Inquiry invitational conference. Updated information is provided in the contributors’ biographical profiles.

presentation of preliminary material on equity and diversity at the November 2008 Consortium conference. In this chapter, we describe the barriers and challenges related to equity and diversity in interdisciplinary work and offer recommendations to address them. In addition, we propose some specific actions that institutions can take to foster equity and diversity in relation to interdisciplinary activities. Finally, we identify a set of issues for future consideration as we continue to explore diversity as an essential component of the academic and research agenda of universities.

BARRIERS AND CHALLENGES TO INCREASING EQUITY AND DIVERSITY IN INTERDISCIPLINARY WORK

The barriers and challenges at the intersection between equity and diversity efforts and interdisciplinary activity can be grouped into three broad categories: establishing the legitimacy of interdisciplinary diversity research, recruiting and retaining diverse interdisciplinary faculty, and funding new initiatives.

Establishing the legitimacy of interdisciplinary diversity research

The primary issue related to diversity research reported by Consortium institutions concerns its perceived legitimacy. Employing nontraditional theoretical approaches and methodologies that are fundamentally interdisciplinary, much research related to diversity has long sought the benefits of utilizing models of inquiry and analysis from multiple disciplines as a way to overcome the limitations, biases, and blind spots of traditional models. Those responsible for new faculty hires in both emerging and traditional fields can be reluctant to fill those positions in a manner that meets both interdisciplinary and diversity goals. This has been an issue with interdisciplinary approaches to research and scholarship in general, since potential hires can be viewed as outsiders to the disciplinary mainstream. The problem becomes even more acute with regard to diversity research, where the legitimacy of the subject of study itself is often questioned. In the latest National Research Council rankings, many of the areas with concentrations of diverse faculty, such as ethnic studies and women's studies, were excluded because they were determined to be too outside the mainstream for inclusion, and thus insufficiently legitimate. These same legitimacy issues may also play out in the tenure or promotion process, where diversity research remains suspect because it is presumed to be advocacy work as opposed to "objective scholarship" and because it is inherently interdisciplinary and thus often presumed to lack the intellectual and methodological rigor of disciplinary scholarship. This sort of double jeopardy obstructs

the career trajectories of scholars who work at the intersection of interdisciplinary and diversity research.

Recruiting and retaining diverse interdisciplinary faculty

When the legitimacy of interdisciplinary diversity research is questioned, recruiting and hiring diversity scholars is more difficult. The absence of a critical mass of minority faculty members—a core group of faculty to offer support, mentoring, and opportunities for collaboration—can also seriously hamper recruiting efforts. Faculty who do accept positions at institutions lacking this diverse core group may not be successfully retained over time because they find themselves isolated and unable to locate others with whom to build a robust intellectual community. Moreover, those who are most productive are subject to raids from better located and more prestigious peer institutions, whose competitive offers include as a key factor an opportunity to belong to one or more diverse and supportive intellectual communities.

One of the more stubborn barriers to overcome is institutional inertia. As is true with efforts to foster interdisciplinarity in general, traditional departmental structures and norms tend to replicate existing structures along existing disciplinary and collegiate lines. This tendency impedes growth in new areas of research and lines of inquiry, including diversity research. All Consortium institutions have well-established departments that have been interdisciplinary since their inception, such as area studies; women's studies; American studies; ethnic studies; gay, lesbian, bisexual, and transgender (GLBT) studies; and disability studies. And yet, despite these fields' long histories of introducing interdisciplinary approaches into the academy, their contributions are rarely recognized as examples or models in emerging areas of interdisciplinary research and teaching, and the expertise of such departments' faculties and students in fostering best practices and new models of interdisciplinary inquiry remains unacknowledged.

Funding new initiatives

Finally, troubled state budgets and legislative resistance to supporting an interdisciplinary diversity research agenda at many levels of academe have impeded the development of interdisciplinary diversity initiatives across institutions. Moreover, there is little sustained institutional support for diversity scholarship and diversity-related educational programs across institutions. When budgets shrink, interdisciplinary diversity programs are some of the first to feel the pinch. In these times of escalating diversity across the United States, support for diversity research needs to increase, not decline. But the funding practices of higher education institutions have paid insufficient heed to those demographic realities.

RECOMMENDATIONS FOR INCREASING EQUITY AND DIVERSITY IN INTERDISCIPLINARY WORK

The committee closely examined each of the challenges above, as well as efforts to address them at Consortium member institutions, and developed the following set of recommendations to address each of the challenges.

Establishing the legitimacy of interdisciplinary diversity research

To establish the legitimacy of interdisciplinary diversity research and foster intellectual community among diversity scholars, several

institutions have begun to establish interdisciplinary centers that focus specifically on diversity research. The University of California, Berkeley; the University of Minnesota; and the University of Washington have diversity centers or institutes, and several other institutions reported that they are considering developing such centers. These initiatives can be built on the foundations established by preexisting academic programs and research centers devoted to particular aspects of diversity with compatible missions (e.g., women's and gender studies, African American studies, Native American studies, GLBT studies). Nonetheless, because they are relatively new entities, the extent to which these centers will prove to be effective in establishing the legitimacy of interdisciplinary diversity research is yet to be determined.

Interdisciplinary Centers Focused on Diversity Research

The Berkeley Diversity Research Initiative (BDRI) at the **University of California, Berkeley**, focuses on racial and ethnic diversity, supporting research into the nature of multicultural societies and the ways in which such societies flourish. The central campus has provided salaries for an initial six faculty full-time equivalents (FTEs) and small seed funds to this enterprise. Faculty hiring is ongoing. One major goal is to generate more understanding of similarities and differences among multicultural societies and to identify factors that contribute to their success. Another goal is to generate specific prescriptions for changes in policy and practice that are likely to draw upon the strengths and assets of a diverse community and reduce ethnic and racial disparities that are of concern to the state of California and the nation. The foci of the center were selected to (1) foster collaborations across disciplines, schools, and colleges; (2) incentivize faculty thinking on new areas of interdisciplinary research; (3) create new faculty positions that would tap a broader pool of interdisciplinary researchers; and (4) provide a more active platform on which diversity research could be carried out on campus, giving current researchers more contacts, colleagues, and resources.

The Equity and Diversity Research Institute (EDRI) at the **University of Minnesota** is a place where equity and diversity scholars can collaborate in innovative and groundbreaking ways across disciplines, departments, colleges, and campuses. One of the first of its kind in the nation, this institute, once fully established, will provide intellectual space at the University of Minnesota for equity and diversity scholars and diverse faculty to produce transformational scholarship on equity and diversity. The collaborative work of the institute will generate innovative

solutions to some of the most urgent social issues of our time and play a key role in transforming the university's approach to equity and diversity. The EDRI will be an intellectual hub for diversity scholars and scholars of color. It will bridge the institutional distances that currently separate them. It will function as an inclusive, integrative space where they will be invited to work together, to learn from each other, and to join forces across their own differences to discover new paths of inquiry. Faculty affiliated with the EDRI will work closely with others who affirm and support their work and share their interests, values, and concerns. With institutional support at the highest level, the EDRI will be constituted to make these intellectual and cultural collaborations a sustainable and permanent part of the university's infrastructure. As such, the collaborations will not only generate exceptional scholarship but also make the university a more welcoming and supportive place for diverse faculty and graduate students. Ultimately, the university's growing reputation as a hospitable place for diversity scholars and scholarship will help it recruit and retain faculty who have historically been underrepresented and marginalized.

The Diversity Research Institute (DRI) at the **University of Washington** was developed in 2004 by the Office of Minority Affairs and Diversity and focuses on generating new, interdisciplinary knowledge about diversity, social justice, and institutional transformation. The DRI currently hosts an annual research conference and an invited lecture series and supports a number of diversity-related events across the university. In addition, the DRI works closely with other research centers on campus that encourage and support faculty research on underserved, understudied, and underrepresented communities.

Recruiting and retaining diverse interdisciplinary faculty

A number of strategies for recruiting diverse interdisciplinary faculty across institutions have a proven record of success. The single most effective approach is to post a position that is specifically interdisciplinary on a topic in diversity research. Once candidates are on campus for interviews, it is important that they meet with as many potential research partners as possible during the recruitment process. Another successful strategy is cluster hiring, which is also recommended as a promising practice by committees in other functional areas. The general approach in cluster hiring is to identify an interdisciplinary area and encourage multiple hires in that area at roughly the same time. Such recruitment in preestablished research groups is a recognized strategy for advancing the work of institutes and centers in general, but it has yet to be applied to clusters of faculty who collaborate on diversity research.

We also recommend that universities implement a number of strategies for supporting diverse faculty and faculty engaged in interdisciplinary diversity work. What this requires is a reframing of what constitutes

desirable and exemplary work, and also a rethinking of reward systems to include both diversity and interdisciplinarity as key measures of excellence. In implementing these new models, we need to include strategies such as seed funding for interdisciplinary diversity research as well as conference and publication support, not only for individuals but also for groups of interdisciplinary researchers. Because most diversity faculty have joint appointments, it is also crucial that they be mentored in managing the complexities of such appointments. Equally essential are clear agreements (e.g., memoranda of understanding [MOUs]) regarding the standards of evaluation for research, scholarship, and teaching outside of traditional disciplines for the purposes of tenure and promotion reviews. These agreements should establish collaborative research and teaching arrangements that do not disadvantage faculty in any of the units or departments in which they are affiliated, and they should ensure that faculty members are awarded appropriate credit for research, service, mentoring, and teaching activities related to their interdisciplinary work on diversity. The methods and criteria for recognizing and measuring the value of these activities in the tenure

Educational Initiatives Focused on Diversity and Interdisciplinarity

The Berkeley Edge program at the **University of California, Berkeley**, is a recruitment, retention, and advancement program designed to increase the number of underrepresented minority students who acquire doctoral degrees in the science, technology, engineering, and mathematics (STEM) fields. The program hosts an annual conference, which brings underrepresented minority students who are competitively eligible for Ph.D. programs to the Berkeley campus. The conference introduces prospective students to faculty in the science, mathematics, and engineering departments. It offers students the opportunity to tour campus research facilities and national laboratories. It provides pragmatic advice about Berkeley's graduate program application process and the process for winning fellowships. For current students, the Berkeley Edge program has a year-round peer mentorship program, a luncheon seminar series, a retreat where students can socialize and engage in professional development, and a summer fellows program. The Berkeley Edge program provides extensive networking opportunities.

Freshman Interest Groups (FIGs) at the **University of Wisconsin–Madison** consist of groups of 20 first-year students who live in the residence hall or “residential neighborhood” and who also enroll in a cluster of three classes together. Each FIG cluster of courses has a central theme; the central or “synthesizing” course integrates content from the other two classes. Being in a FIG allows

new freshmen to meet other students with similar interests. FIG students also get to connect with faculty in a small-seminar environment. Working and studying together allows students in FIGs to share ideas, discover new insights, and develop lasting friendships. The integration of the courses within each FIG helps students discover how disciplines relate to one another, thus creating a richer educational experience. Example FIGs include *Race, Place, and Story: Arts Against Oppression*; *Race, Ethnicity, and Inequality in American Education*; *Cultural Issues for Health Care Professionals*; and *Sex and Gender in Twentieth-Century French Literature*.

The Provost's Postdoctoral Program at **Duke University** is a competitive postdoctoral research appointment program. The goal of the program is to increase the diversity of scholars who have the potential for becoming tenure-track faculty at Duke University or peer institutions, particularly in fields where there are fewer women or underrepresented minorities. Postdoctoral awardees are expected to devote their full efforts to research and may teach a maximum of one course per year. Duke University awards two two-year fellowships each year. This program recognizes that diversity at the university best prepares students for a global world and that a robust learning environment can occur only when people of different backgrounds, races, ethnic groups, and experiences are brought together to exchange ideas.

and promotion process should also be clearly delineated in collegiate and university-wide tenure and promotion review policies and procedures.

Funding new initiatives

Several Consortium institutions have invested heavily in attracting students from underrepresented groups into interdisciplinary institutes, centers, and programs. This has generally been achieved with the assistance of central funding. Examples include undergraduate scholarships, predoctoral summer programs, graduate student fellowships, and postdoctoral fellowships at most responding Consortium institutions. These programs have the potential to strongly link diverse scholars who are working to produce new knowledge about diversity and equity with interdisciplinary research, education, and training programs that support their intellectual ambitions and that in turn are transformed by their discoveries. Broadly, such programs are part of an overarching strategy to fill the pipeline to graduate education and into the professoriate.

ACTION STEPS

Based on the challenges we have outlined in this chapter, it is clear that Consortium institutions are struggling with the questions of how best to increase diversity in the interdisciplinary collaborations that have become such high priorities within their strategic agenda. While we provided some recommendations based on what Consortium institutions are currently doing, many of the efforts cited here are new and emerging practices. As such, they offer much promise, but their effectiveness for advancing interdisciplinary diversity research and diverse faculties remains unproven.

The action steps that follow stem from our deep involvement as cochairs and institutional leaders on issues of equity and diversity and also from our belief that implementing these actions will help universities make diversity a central element in their mandate to advance knowledge creation and dissemination at the edges and intersections of the disciplines as well as within established disciplinary domains. These action steps are grounded in our conviction that we need to think of interdisciplinary inquiry as bridging and embracing not only different academic subjects and disciplines but also, critically and fundamentally, diverse identities, cultures and cultural perspectives, and thought traditions. We recognize that academic diversity work is fundamentally interdisciplinary and also that diverse cultural perspectives are fundamental to interdisciplinary inquiry.

Action step: We recommend that institutional strategic visions acknowledge the ability of both diversity and interdisciplinarity to solve social problems and fuel knowledge breakthroughs; that they acknowledge the value and centrality of diversity to excellence and innovation in all academic work, including interdisciplinary inquiry; and that they reframe their understanding of interdisciplinary work, explicitly recognizing that collaborations across cultures and identities that embrace the histories and perspectives of historically marginalized people are as integral to academic inquiry and innovation as are intellectual collaborations across both traditional and emerging fields of study. Incorporating such statements will help to establish the legitimacy of interdisciplinary diversity research and give us the standing to translate concepts and commitment into actions. For a model, see the University of Minnesota's Reimagining Equity and Diversity.

Action step: We recommend that institutions create and implement inclusive definitions related to diversity. We found no clear definition of diversity across campuses and that the lack of one often leads to unproductive debates that hinder rather than advance progress in this area. We understand diversity as embracing multiple and complex identities, including internationals, new immigrants, and historically underserved and underrepresented U.S. groups, the last of which we understand to include domestic populations that have encountered

Reimagining Equity and Diversity at the University of Minnesota

Reimagining Equity and Diversity is a framework produced by the Office of Equity and Diversity at the University of Minnesota that outlines a vision for transforming the university through the movement of equity and diversity work into the core of the university's teaching, research, and outreach. To achieve this transformation, the framework recognizes that all access and diversity goals, values, and practices are interconnected and interdependent and that everyone shares the responsibility for equity and diversity. This framework is a holistic model that calls for coordinated efforts and resources, agreement on common paths, focused but flexible strategies, and a collective effort to transform the university. In sum, the framework reimagines a university transformed by diversity where diversity is the driving force of innovation.

The full framework for Reimagining Equity and Diversity can be found at http://www.academic.umn.edu/equity/pdf/ReimaginingED_Dec2009.pdf.

barriers based on historical institutional and systemic inequities and bias. Internationals, new immigrants, and historically underserved U.S. groups all have different needs and require different approaches. For purposes of this chapter, our focus is on historically marginalized U.S. populations.

Action step: We recommend that decisions on faculty hiring and evaluation take into consideration the marginality and innovation inherent at the intersection of interdisciplinarity and diversity.

Action step: We recommend that institutions systematically collect both quantitative and qualitative data associated with diversity in interdisciplinary initiatives. Currently, most institutions do not collect such data, which makes it impossible to measure the extent and nature of minority faculty participation in interdisciplinary initiatives, to know what and where the barriers are, and to set future aspirational goals.

Action step: Recognizing that diversity is not just about numbers, we recommend that concerted attention be paid to issues of campus climate that affect recruitment and retention of diverse faculty, that climate issues rise to the top of the strategic agenda in every department and collegiate unit and at all levels of institutional leadership and authority, and that all units be held accountable for addressing these issues.

Action step: We recommend that attention be paid to the graduate school pipeline, which requires concerted efforts to ensure a steady flow of diverse students, beginning in K–12 and continuing through undergraduate programs. There is much richness of faculty expertise in the area of diversity at research universities, but significant gaps remain. Faculty diversity has remained flat and will continue to remain flat as long as diversity in the pipeline to the graduate school remains flat.

ISSUES FOR ADDITIONAL CONSIDERATION

We conclude with some issues for future consideration and some observations about equity and diversity in interdisciplinary work. First and most important, while diversity is presented as a functional area in this report alongside seven other programmatic areas, we want to reiterate our concern that this conceptual approach to diversity hinders both its legitimacy and its potential sustainability. Instead, we believe that institutions must think of diversity not just as another functional area but as a core institutional value or fundamental principle that permeates an institution's every action. Moreover, institutions need to envision interdisciplinary inquiry as bridging and embracing not only

different subjects and disciplines but also, critically and fundamentally, different cultures and identities, and as reaching beyond the master narratives to include the histories and voices of historically marginalized people.

In addition, as cochairs we are concerned that the structures now evolving for interdisciplinary research, teaching, and learning might replicate existing models that do not view diversity as integral but rather as incidental, perpetuating a system that marginalizes and delegitimizes diversity research and scholarship in the academy. We also believe that, in many respects, institutions are forgetting the rich history and models for interdisciplinary work embodied in gender and ethnic studies departments. In the 1960s and 1970s, interdisciplinary programs like African American studies, Chicano studies, American Indian studies, and women's studies—all of which grew out of social activism around issues of bias and exclusion—began transforming the academy. These departments are precursors of and models for the types of interdisciplinarity and civic engagement that are now staples of academic life at universities throughout the country. Yet these departments have fought an uphill battle for legitimacy, in part because they have often been considered political rather than educational endeavors.

We are also concerned that the push toward global education has inappropriately eclipsed diversity as an institutional priority. In particular, words like *multicultural* and *diversity* are increasingly understood to embrace 21st-century global and U.S. diasporic cultures without recognizing the very different circumstances and needs of domestic populations that have historically experienced bias, discrimination, and exclusion in the United States. Domestic diversity studies and international studies are distinct and discrete fields of study and student support. They complement each other but should not compete for resources or have their agendas conflated or compromised relative to one another. International programs do not meet the needs of diverse domestic populations, in part because aside from the language differences, there are significant class differences. The needs and circumstances of international students are more in line with the majority U.S. population in terms of their academic preparation and their economic and social status in their home countries. Moreover, international students bring strong national and cultural identities and close ties to their home countries. Finally, most have not experienced the kind of bias we address through diversity efforts; most have not been treated as minorities in their formative years.

We are concerned that diversity, even when it is identified as an institutional priority and appears prominently and repeatedly in mission statements and strategic plans, is often an add-on rather than a fundamental value that drives the academic enterprise. We believe that there is an integral relationship between interdisciplinarity and diversity, such that collaborations across cultures and identities that embrace the histories and perspectives of historically marginalized people are as integral to academic inquiry and the culture of the academy as are intellectual collaborations across fields of study. Researchers cannot do their best interdisciplinary work without weaving in the knowledge systems and thought traditions of diverse nonmajority cultures.

Finally, we want to conclude by noting that, if the complex problems of our world require ingenious and unorthodox solutions, those solutions must be informed by a vast range of perspectives. This range must be not only disciplinary and intellectual but also cultural and holistic. These perspectives must centrally engage diversity not only on a global but also on a domestic scale and must be informed by the histories and voices brought in from the margins and reclaimed as part of the national narrative. In advancing interdisciplinary inquiry, we need an integrative and holistic understanding of equity and diversity, a model that crosses all other functional areas and that is woven into them in an integral and fundamental way.

SUMMARY OF RECOMMENDATIONS

1. Given the complexity, richness, distinct histories, scholarly trajectories, and missions of the area of international studies and the constellation of intellectual interests that comprise academic fields grounded in domestic diversity, institutions need to facilitate campuswide conversations that will promote a deeper and clearer understanding of the relationship of these fields to each other. The objectives of these discussions should include identifying points of divergence and convergence in content matter and methodology to promote synergy and respect for differences. These conversations will enrich the campus community by fostering enhanced understanding of the relationship between international and domestic diversity and the implications of this for students and scholars.
 - How do international and domestic diversity programs collaborate in ways that create synergy but also preserve the unique character and agenda of the different programs and recognize both the different and intersecting needs of their constituencies?
 2. Institutions should provide equitable investments in cultivating and supporting interdisciplinary studies across the fields and acknowledge the experience and leadership of academic units and scholars on campus who have already developed a successful record of teaching and research in interdisciplinary studies. Working outside the constraints of conventional disciplinary methods can yield new insights into pressing social problems by combining the strengths of multiple methodologies while avoiding the blind spots of conventional approaches. With our rapidly changing demographics, cutting-edge research in important areas, such as community development, the environment, public health, agriculture, the sciences, and technology, can be further enhanced by the methods of community engagement and respect for diverse epistemologies that have been the hallmark of ethnic studies and women's studies programs. Investments in new interdisciplinary studies areas should not jeopardize the existence of, or justify the continued underdevelopment of, existing diversity studies programs but rather should be done in a way that cultivates synergy between them.
- In addition to accounting for local and global exigencies that influence the status of domestic and international diversity studies on campuses, other questions to consider as part of these discussions are:
- How do both diversity and international programs align with the institution's academic mission?
 - How do international issues intersect with other diversity issues such as gender, gender identity and expression, and disability?
 - How do international and domestic diversity programs collaborate to address the research and academic support services for new immigrant communities?

continued

SUMMARY OF RECOMMENDATIONS *continued*

3. Enhanced support for interdisciplinary studies at Consortium institutions should be aligned with strategies for diversifying the faculty and student body. A demographic imperative exists for developing research that is relevant to our changing world, and a diversity of views and experiences can enrich both disciplinary and interdisciplinary teaching and research. Institutions should develop recruitment and retention priorities and strategies to support their interdisciplinary goals. This means developing an interdisciplinary curriculum and a faculty that can sustain these objectives. Further, because few interdisciplinary programs are autonomous academic units, universities need to work with colleges and departments to deepen faculties' understanding and respect for interdisciplinary research and create a supportive environment for emerging interdisciplinary scholars so they are evaluated and promoted fairly and equitably.
4. Institutions should assess their capacity for and explore the feasibility of developing a university-wide interdisciplinary center focused on equity and diversity research. Such an approach can yield multiple benefits, as it harnesses the talents of diverse faculty across diverse disciplines, colleges, and departments and creates new intellectual synergies. Such efforts will also highlight the breadth and depth of talent on campus and can serve as a catalyst for meeting university goals of recruiting and retaining a diverse faculty.

CHAPTER 9

Collaborative Technologies

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INTRODUCTION

A key question posed by the committee on collaborative technologies focused on identifying the specific characteristics of successful interdisciplinary collaborations. Why do some collaborations succeed while others fail? The collective responses of Consortium institutions focused on the things that bring people together and the ways that people interact. These include shared values, goals, and beliefs among collaborators; honesty and trust; a common vocabulary; informal contacts; the willingness to contribute time and effort; and a shared reason to collaborate. Notably, these responses relate to the human element of collaboration rather than to physical space, specific technologies, or funding. Therefore, when considering collaborative technologies in relation to interdisciplinary work, it is essential to remember that a specific technology is successful only to the extent that it facilitates positive and useful interactions among and between people who want to work with one another.

The 22 self-study questions developed by the Collaborative Technologies Committee examined existing resources for and the use of collaborative technologies, predictors of success for interdisciplinary collaborations, the potential for technology to facilitate collaborations, and concerns and challenges regarding collaborative technologies. Campuses used a variety of techniques to administer the self-study, including online surveys and focus groups. The subjects of the questions can be grouped into four categories: the overall framework for collaborative technologies; intradisciplinary and interdisciplinary collaboration and technology; innovators and early adopters and their current practices; and future directions for collaborative technologies.

The survey was designed to be completed by chief information officers, vice presidents of research, head librarians, and leaders and decision makers in the areas of graduate and undergraduate education, faculty tenure and promotion, and campus public engagement. However, consultation and input from other stakeholders was included as needed. Eight Consortium universities responded to the self-study questions on collaborative technologies: Duke University; the University of

California, Berkeley; the University of Illinois at Urbana–Champaign; the University of Minnesota; the University of North Carolina at Chapel Hill; the University of Pennsylvania; the University of Washington; and the University of Wisconsin–Madison.

The most significant finding from this self-study is that there was great similarity across Consortium institutions regarding the methods of providing collaborative technology to users, the potential of technology to promote interdisciplinary collaboration, and the challenges posed by the supply and use of technology. This chapter draws on the self-study responses and our conference presentation and discussion in November 2008 to describe the state of collaborative technologies across responding institutions. We examine ways that technology can facilitate interdisciplinary collaboration, examine key issues and challenges related to collaborative technologies, and offer recommendations for overcoming these challenges.

THE STATE OF COLLABORATIVE TECHNOLOGIES

All of the institutions responding to the self-study use a mixed approach to supplying collaborative technology to users that involves combinations of local hosting by departments, colleges, and other units; central hosting by a campuswide information technology (IT) department; and external hosting by commercial or noncommercial entities (e.g., Google, Microsoft). One advantage of local hosting by departments, colleges, and other units is increased responsiveness to the local needs of the unit or of individuals within the unit. Local hosting also offers greater flexibility to customize and adapt tools based on the needs of the units, and end users have the necessary technical support close at hand.

Central hosting can be advantageous because it creates economies of scale and avoids duplication of effort. Rather than using 25 separate servers on a campus to host a blog or a Web site, this can be achieved more efficiently and cost-effectively with central hosting. Central

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hosting is also useful for addressing security challenges and federal requirements related to the management of data in accordance with the Health Insurance Portability and Accountability Act (HIPAA) and the Family Educational Rights and Privacy Act (FERPA) because it is more secure than local or external hosting. Central hosting also provides a standardized, consistent collaborative technology environment, which facilitates collaborative work across multiple units because the same technology can be accessed by all users. Finally, central hosting supplies technology services to underfunded units that cannot afford local hosting. The advantages of central hosting have made it the preferred approach on many campuses.

The fastest growing approach, but also the one that raises the most concerns, is external hosting. External hosting is rapidly increasing in popularity because it is relatively inexpensive, sometimes even free, and because new products are developed and released much more quickly than is often the case with central IT units. Most importantly, external hosts provide the sophisticated, intuitive, and changing interface that many users have come to expect. However, the chief concern with the use of external hosts is that the data passing through the host is no longer controlled by a central IT department, raising security and data management concerns.

A mixed approach to supplying collaborative technology is in place at all Consortium institutions, not because this is the planned or ideal approach, but rather because it corresponds to the reality of collaborative technology adoption. Early adopters of a new collaborative technology incubate its use through internal or, increasingly, external hosting. As the use of the technology matures and expands, institutions tend to migrate to centralized hosting and support services.

COLLABORATIVE TECHNOLOGIES AND INTERDISCIPLINARY COLLABORATION

Collaborative technologies can facilitate interdisciplinary initiatives by supporting the two basic building blocks of collaboration, namely, communication and resource sharing, which, perhaps surprisingly, are unrelated to any specific technology. Current technology exists and new technologies continue to emerge to facilitate collaboration. The main challenges faced by Consortium institutions as well as by other institutions throughout higher education are how to communicate effectively with potential users about the availability of collaborative tools and their potential applications, and how to teach users the skills necessary to successfully use the available technology. Once end users are aware of existing tools and are trained in their use, they will find an

array of collaborative technologies to help address common challenges in collaboration. For example, social networking applications and databases can reduce challenges related to locating potential collaborators. Tools that allow collaborative editing, online teaching, and data processing can increase the amount of time that faculty spend on teaching and researching as opposed to processing and editing work. Finally, low-cost or free video and audio conference tools can make it easier to engage in productive collaborations at a distance and reduce budgetary demands for travel.

KEY ISSUES AND CHALLENGES

Consortium institutions reported several issues and challenges related to the promotion and use of collaborative technologies. These challenges related to the policy environment, the disciplinary silos that exist within academic institutions, and high user expectations for technology. In this section, we also address the additional themes critical to the subject of collaborative technology beyond those identified by Consortium institutions: technology infrastructure and accessibility.

Policy environment

The challenge cited most often and by every institution is the deep tension that exists between the needs of interdisciplinary collaborators and the legal, policy, and regulatory environment that forms an underlying context for computing at research universities. The policy environment poses distinct challenges for interdisciplinary collaborative activity through different and often conflicting federal and state laws that govern the use and distribution of data. There is also a high level of variation in intellectual property policies across units and institutions. Compounding these challenges to collaboration is the fact that senior administrators within institutions of higher education tend to be very risk averse in the legal and risk management areas. In contrast, faculty and students are primarily interested in pursuing their research agendas and are generally willing to tolerate greater risks than the administrators who establish the policy environment that governs their work.

Disciplinary silos

The current institutional structure, in which many policy and technology decisions are made in disciplinary “silos,” makes interdisciplinary collaboration challenging in many ways. Time spent by a faculty member developing collaborative tools with an academic unit outside of his or her tenure home is of uncertain value in promotion and tenure committees. Additional challenges include difficulty finding potential collaborators in a technology environment that does not easily allow for context-rich searches across units, as well as the administrative hurdles

Common Tasks and Collaborative Technologies

Common Tasks Performed During Interdisciplinary Collaborative Work

- Decision making
- Updating and tracking study flow and progress (e.g., eligibility, consent, sampling, questionnaire completion)
- Hiring and training staff
- Generating reports
- Distributing data
- Developing and writing grants
- Connecting relevant coinvestigators to facilitate team projects
- Processing data-sharing agreements
- Developing study materials and class materials for teaching; evaluating teaching methods and content
- Analyzing data
- Updating Institutional Review Board applications within and across institutions nationwide
- De-identifying respondent data
- Randomizing respondents
- Obtaining feedback
- Conducting research and searching databases and Web resources
- Engaging in professional development
- Monitoring budgets
- Joint authoring
- Communicating with distant collaborators
- Facilitating threaded discussions
- Building repositories
- Building consensus, handling conflict, and fostering relationships across groups
- Dividing up work and tasks in projects
- Sharing files, documents, and Web materials
- Collaborating on creating and editing documents, presentations, and Web sites
- Conceptualizing, designing, and implementing a project

Collaborative Technologies That Can Facilitate Interdisciplinary Collaborative Work

- Web site development technology
- Video, teleconferencing, and Webcasting tools, which enable meetings and discussions with distant collaborators
- Web-based course delivery and conferencing applications like Adobe Connect, which enable instruction beyond traditional geographic boundaries and expand the campus and the educational impact of the university
- Easy-to-use geomapping software with data-handling capabilities
- Technology that can enable data to be used (or reused) by other people and teams
- Interoperable systems for managing security
- Tools and technologies with usable interfaces
- Secure repositories for version control and content sharing within groups
- Document-sharing tools for interdisciplinary or multicenter collaborators
- Online note-keeping systems that can be organized like a chart, not read top-down like a page; all users could add information at any node
- Desktop sharing
- Session archiving
- Single sign-on tools
- Searchable archives for finding research collaborators
- Integrated versioning
- Compatible tool sets

associated with implementing collaborative technologies in local hosting environments.

High expectations

Users' high expectations in terms of the promise and potential of collaborative technology pose their own challenges to collaboration. Faculty members tend to focus on the results promised by specific technologies and on finding solutions that meet their needs rather than on the technology itself. They want technology that is user-friendly and requires little training but is feature-rich and powerful, computationally and graphically. Faculty want technology that is customizable, flexible,

and transparent but that also ensures a high degree of security and privacy. They want technology that is linked with 24-hours-a-day, 7-days-a-week on-demand support provided by local staff. Many of these expectations are contradictory and difficult to meet, and central IT departments have been slow to respond to these expectations, particularly with regard to training and on-demand service, which are staff intensive.

Contrary to our committee's expectations, issues with technology infrastructure and accessibility were not described as challenges at most institutions. In particular, most institutions provide sufficient bandwidth

and have enough data storage to accommodate large projects, although scholars with specialized needs and those who use high-resolution videoconferencing do report some challenges in this regard. Despite the fact that collaboration tools have limited accessibility and do not work well with screen readers or other technologies that make computing accessible to scholars with visual impairments, there were no reported concerns with this issue across institutions in the self-study.

RECOMMENDATIONS

The committee made several recommendations to assist research universities in overcoming the challenges related to the policy structure, disciplinary silos, and overly high expectations on the part of current and potential end users.

We recommend that institutions be inclusive in the process of adopting new technologies. If they are to be adopted and used successfully, new technologies must meet faculty needs and be easy to use. For this to occur, faculty should be included as early as possible in the process of adapting and implementing new technologies.

We also recommend that institutions provide technology “matchmakers” to work closely with faculty. Matchmakers should meet and talk regularly with faculty and be conversant with their research focus, allowing ideas for technological collaboration to emerge from the faculty. This approach can also introduce faculty to unfamiliar collaborative technologies and assist them in identifying the specific technology best suited for the requirements of particular projects.

In addition, faculty and IT professionals need to lobby for improved policies and governance related to the use of technology and data management. Current policies and governance practices, along with the risk-averse nature of university administrations, inhibit the interdisciplinary, institutional use of collaborative technologies. It is essential to challenge the status quo. Interdisciplinary researchers and

IT professionals must work together to achieve an environment more conducive to interdisciplinary and cross-institutional collaboration.

To address issues related to the administration, ease of use, and security of collaborative technologies, we recommend that institutions improve identity and access management in general. In particular, it is important to develop a protocol that permits the federation of identity management systems to allow for a single identity on all of an institution’s campuses with the ability to sign into collaborative technologies systems from any campus location. One system with strong potential to do this is Kuali Student, a modular, open-source, standards-based, next-generation student system delivered through service-oriented architecture and Web services that incorporates personal identity and curriculum management, enrollment, program audit and evaluation, student financial records, admissions, scheduling, and financial aid systems. This system is a community-source system being developed by several higher education institutions and commercial affiliates, including two Consortium members (the University of California, Berkeley, and the University of Washington). The first modules will be released in 2010, with the full system available in 2012.

We further recommend that institutions establish a single, searchable expert database to assist faculty in locating other experts and potential collaborators on campus and throughout the academy. While some institutions have such databases in place, they also often have multiple and confusing databases that are not continuously maintained for currency, are not searchable, and are not integrated on a national or international level.

Finally, we recommend that institutions create new opportunities to foster the adoption of collaborative technologies through a sustained focus on faculty needs in relation to collaborative and interdisciplinary research, education, and training projects within existing IT units.

SUMMARY OF RECOMMENDATIONS

1. Be more inclusive in the process of adopting new technologies. If new technologies are to be adopted and used successfully, they must meet faculty needs and be easy to use.
2. Provide technology “matchmakers” to introduce faculty to unfamiliar collaborative technologies and to assist them in identifying the specific technology best suited for the requirements of particular projects.
3. Lobby for improved policies and governance related to the use of technology and data management. This should be done both by faculty and by IT professionals.

SUMMARY OF RECOMMENDATIONS *continued*

4. Develop a protocol that permits the federation of identity management systems to allow for a single identity on all of an institution's campuses with the ability to sign into collaborative technologies systems from any campus location.
5. Establish a single, searchable expert database in order to assist faculty in locating other experts and potential collaborators on campus and throughout the academy.

CHAPTER 10

Toward the Future of Interdisciplinarity in Research Universities: From Incremental to Transformational Strategies

Gail Dubrow, Vice Provost and Dean of the Graduate School, University of Minnesota

Findings from the self-studies conducted by members of the Consortium on Fostering Interdisciplinary Inquiry point to reforms that can be adopted, incrementally, by research universities that are intent on improving the climate for conducting research, operating educational programs, and providing training opportunities that routinely cross the conventional knowledge domains and organizational boundaries associated with established colleges and academic departments. The recommendations were developed by leaders in eight discrete areas of administrative responsibility to ensure that the project of making universities more hospitable to students and faculty who routinely pursue interdisciplinary approaches to inquiry is integrated into every aspect of the organizational policies and practices of research universities and is not merely focused on the few obvious areas, such as research administration or the tenure and promotion system, that have been the object of critical attention in past work on what is needed to foster interdisciplinary activity. Hopefully, the approach taken here, with its emphasis on presenting findings in a way that is closely aligned with the typical administrative structure and core responsibilities of central leaders at research universities, will make it easier for vice presidents and vice provosts to undertake systemic reviews within their own areas of responsibility that identify the remaining barriers to interdisciplinary inquiry and to look to some of the promising practices that have been identified at Consortium member institutions for inspiration about new initiatives that might advance progress toward what has become a ubiquitous goal of research universities in the 21st century.

ADDITIONAL AREAS OF INVESTIGATION

Even at the conclusion of an ambitious multi-institutional study in multiple areas of investigation, it is clear that the Consortium overlooked key elements of the administrative systems of research universities that have a bearing on the overall climate for interdisciplinarity. In the interest of defining the limits of this study, and of opening the door for others who strive to carry out even more comprehensive studies in the future, it is worth identifying some of the areas that were considered for inclusion but that ultimately were defined as being out of the scope of

this project. It also may be helpful to reflect on several areas of interest that emerged over the course of the study but that surfaced too late for the Consortium to go back and incorporate.

When the eight areas of investigation were announced at the outset of the Consortium's formation, the leadership of research university libraries lobbied quite heavily to have their area of administrative responsibility included in the self-studies. They made a very strong case for including libraries in any discussion about fostering interdisciplinarity based on the radical transformations currently under way in how knowledge is being managed, from older disciplinary models to a much more complex, networked approach that reflects the relevance of all sorts of information to many fields of inquiry. Their case for including libraries at the heart of any discussion of the academic/research mission of universities was compelling, but regrettably, tight deadlines prohibited reorganizing the project to add the development of another section of the self-study. However, given the importance of the topic, I would recommend that any institution seeking to adapt the Consortium's efforts to their own purposes engage their library leadership in designing a ninth self-study section focused on the knowledge and information systems that undergird research universities. I would also suggest that a national study on the topic is ripe for those seeking to follow up on the work of the Consortium.

In hindsight, another area that might benefit from the same level of attention that was devoted to the eight other self-study sections is the whole realm of undergraduate student services. These services are critical to the academic guidance offered undergraduates, starting with admission and the declaring of majors, followed by the counseling that enables undergraduates to navigate through degree programs, and continuing all the way to graduation and postgraduate career services. Though fostering interdisciplinarity has not yet become an explicit priority within undergraduate education at research universities, even a cursory view suggests that presumptions about disciplinary and interdisciplinary pathways are deeply embedded within the

Contributors are identified by their institutional affiliations and administrative titles as of the November 2008 Consortium on Fostering Interdisciplinary Inquiry invitational conference. Updated information is provided in the contributors' biographical profiles.

administrative systems that support undergraduate education, from the categories employed within registrars' data systems through academic advising services and the entire construct of undergraduate majors, minors, and distribution requirements. The overall discourse about undergraduates and interdisciplinarity is relatively underdeveloped compared to the robust discussions going on within graduate education, and the prevailing sentiments—based on anecdotal evidence only—favor delaying the introduction of interdisciplinary study until undergraduates have a firm grounding in a discipline, or, conversely, they mistake the broad exploration built into most undergraduate degree programs for a more systemic approach to developing the tools and methods of interdisciplinary inquiry.

Except for a willingness to design new intercollegiate majors, such as environmental or justice studies, based on their predicted popularity, the leaders of undergraduate education at research universities have yet to pursue deeper conversations about the role of interdisciplinarity in undergraduate education. However, undergraduates attending research universities generally stand to benefit from a thoughtful and sustained discussion about the role of disciplinary and interdisciplinary study in higher education. University leadership would benefit as well from engaging in a period of sustained study, exploration, and debate about disciplinary and interdisciplinary approaches to teaching and learning that informs broader conversations about the future of undergraduate education at research universities, both in the classroom and in less traditional venues for learning such as the vertically integrated laboratory or community-engaged settings. While undergraduate education was included in the Education and Training self-study section, the way it was framed caused missed opportunities to consider the critical role played by student services in shaping the educational experience of undergraduates. While the Consortium's findings about graduate education are quite robust, more work could be done to ensure undergraduate education gets the full treatment it deserves.

THE IMPACT OF THE ECONOMY ON INTERDISCIPLINARY INITIATIVES

The other limits of the existing study pertain less to issues of scope than to the reliability of the findings. It is a cliché of report writing to say, "This study raises more questions than it answers," but the cliché has the virtue of being absolutely true in the case of this project. It is true in the sense that some important questions asked in the self-study sections could not be answered for lack of basic accounting systems appropriate to institutions that want to foster interdisciplinary activity. For example, systems are only now being put into place to track the performance of

research centers and institutes on a routine, rather than a periodic, basis, and the metrics for determining the impact of institutes and centers on seeding faculty research collaborations and stimulating productivity are only now emerging as a shared concern at the research universities and funding agencies that have invested in their success. Until these systems are in place, it will be difficult to assess equity, measure progress, or even account for the extent of faculty and student engagement with research, education, and training initiatives that fall under the general rubric of interdisciplinarity. So too, while much is now known about what needs to be done to foster interdisciplinarity at U.S. research universities, knowledge alone does not ensure that effective action will be undertaken on the many fronts needed to implement improvements. Furthermore, modest, incremental improvements are not the same thing as systemic transformation that would put interdisciplinary scholars on level ground with their counterparts whose research, teaching, and training occur firmly within disciplinary boundaries.

The global recession that began to take hold on the eve of the November 2008 Consortium meeting in the Twin Cities highlights one of the least frequently examined subjects in the whole business of trying to foster interdisciplinary inquiry, namely, the impact of cycles of economic growth and decline on the capacity and will of research universities to make progress toward stabilizing and sustaining what are perceived to be elements of their core mission while simultaneously taking steps toward achieving their most important strategic priorities, such as fostering diversity, facilitating interdisciplinarity, and advancing academic excellence. Progress reports and updates provided by several Consortium member institutions on the eve of publishing these proceedings suggest that the economic downturn, which has hit public funding sources and private endowments with tremendous force, has driven many universities into survival mode. Most practitioners of interdisciplinary activity depend on the kind of intellectual rigor that is first cultivated through advanced training in one or more fields of disciplinary expertise, and so there is not quite so much essential opposition between disciplinary and interdisciplinary practitioners as might appear to be the case on initial inspection. However, tight fiscal times tend to polarize potential allies and to reframe potential synergies as intractable dilemmas with outcomes that appear to be mutually exclusive in a climate of scarce resources. Scenarios of continually shrinking institutional resources, with repeated cuts to base budgets, mean that the few discretionary funds potentially available to prime new investments are instead allocated to filling gaps and bridging shortfalls between crises. Institutional leaders despair about the prospect of assembling the resources necessary to support existing colleges, schools, and departments, even while knowing that

the future depends on investing wisely to reposition the university for future trajectories that require new forms of talent, skill, and knowledge that barely resemble the disciplinary organization of universities in the nineteenth and twentieth centuries.

The deteriorating economic climate for higher education institutions will put a new premium on low-cost reforms that have high-yield returns on new revenue—for example, in the area of research administration—as well as on reforms that make institutions inherently more attractive as destinations for the world's best students and faculty. Developing an institutional reputation for being a welcoming place for interdisciplinary researchers and scholars to do their best work may have untold competitive advantages in the new economy of higher education at a time when there are actually fewer discretionary dollars available to invest in interdisciplinary initiatives and when the competition for those scarce resources reaches new levels. Fortunately, the self-studies are replete with examples of reforms that cost little to implement other than institutional will.

MOVING FROM INCREMENTAL REFORM TO SYSTEMIC TRANSFORMATION

Most of the promising practices cited in the proceedings are incremental in character. Adjustments to the formula for calculating indirect cost returns, so that the research institutes and centers that galvanized collaborative interdisciplinary work among faculty from different units get a significant return that fuels further research, is one prominent example of the incremental reforms that contribute to making interdisciplinary research programs operate effectively. Similarly, adjustments to the faculty tenure and promotion code that more fully involve the leaders of interdisciplinary centers and institutes in the review of departmentalized faculty represent incremental improvements in the working conditions for faculty pursuing interdisciplinary research, since the reform realigns mechanisms of review with the actual work pattern of the faculty rather than subjecting all faculty to departmental review regimes regardless of how much work they do in other locations and in disciplinary constellations elsewhere in the university and the wider world.

A position at the center of ten public and private research universities' deliberations about fostering interdisciplinary activity offered me a privileged view of patterns in the organization, policies, and practices of research universities, and from that perch it is possible to discern institutional patterns that may be invisible from the standpoint of a person working within any single organization. Socially constructed arrangements, after all, tend to become naturalized simply out of habit. It becomes difficult to envision institutional forms and arrangements other than the ones that are familiar if only because it is simply human to respond to proposals for change with a one-size-fits-all rationale that claims, "That's a good idea, but we have always done it this way," effectively dispensing with change because the level of bureaucratic inertia is high, the human costs of making waves are incalculable, there are real forces within the university that benefit from a model that optimizes resource flows to established colleges and departments, and we have few comprehensive visions of what universities would be like without a collegiate and departmentalized root-and-branch structure as the organizational basis for operations.

For that reason, it is appropriate and necessary for this last chapter of the proceedings to rise above the recommendations offered in any single section of the self-study to offer even a partial and incomplete vision of what universities might look like if a completely hybridized institution put interdisciplinary research, education, and training on a level playing field with the older forms of organization that proved so effective for managing disciplinary undertakings. A systemic transformation of research universities might address the reality that faculty interests morph and change throughout the arc of faculty members' careers. Rather than viewing an evolving departmental "misfit" as a problem of personality or character, such a transformation would enable the institution to identify the situation as a structural problem and to recognize the necessity of evolving faculty appointments in ways that correspond, over time, to evolving faculty intellectual interests.

CHANGES IN FACULTY INTERESTS AND DEPARTMENTAL CONFLICT

The highly influential Boyer report, *Scholarship Reconsidered* (1990),¹ identified several distinct phases in faculty careers and recommended

¹Ernest L. Boyer, *Scholarship Reconsidered: Priorities of the Professoriate* (Palo Alto, CA: Carnegie Foundation for the Advancement of Teaching, 1990).

reforms that account for the real varieties of experience and emphasis within most faculty members' developmental trajectory. "It flies in the face of all experience," Ernest Boyer wrote, "to expect a professor to engage in the same type of performance across an entire career, without a change of pace."² Boyer principally conceptualized that "change of pace" as alternatives to the relentless emphasis on research and publications. Migration across disciplines, over the course of a faculty career, was not something Boyer envisioned *per se*, though in writing about the "scholarship of integration,"³ he at least partially anticipated the problematic treatment of interdisciplinary work within conventional systems of faculty evaluation. However, he defined the scholarship of integration, which he understood often to involve "making connections across disciplines,"⁴ principally as interpretations of original research rather than as a mode of research in and of itself, which in Boyer's vocabulary was the "scholarship of discovery." Thus, while the Boyer report was the first to describe faculty careers as dynamic and ever changing, free from blanket judgments about the variety of activities other than research that take priority, such as teaching or program building, it did not fully recognize the potential for faculty at research universities to extend their expertise far beyond their original field of training or their departmental home. Indeed, nowhere in the formal system of faculty appointments at research universities have provisions been made to accommodate significant shifts in the intellectual direction of highly productive faculty over the course of their careers. Nevertheless, Boyer's work lays a foundation for thinking even more broadly about shifts in focus and emphasis over the long arc of a faculty career, and it opened the door to imagining changes in the tenure and promotion code, as well as in the faculty appointment system, that would foster intellectual mobility and allow a greater diversity of work products and commitments to be rewarded by universities.

The existing mechanisms for extending faculty appointments beyond the original home department are additive, not transformative, such as joint or adjunct appointments in additional fields of expertise; temporary assignments to research centers or institutes; and special negotiations between faculty "misfits" and their departmental colleagues. Problems of "fit" tend to be resolved by separation or relocation of individual faculty to more receptive academic homes within the university or elsewhere, but the approach renders conflict as an individual problem instead of

one rooted in structural or organizational terms. A more robust toolkit is needed to ensure that research universities have the capacity to redefine the appointment homes of the boldest interdisciplinary explorers among the faculty, given that the process of acquiring expertise does not end with the award of a doctoral degree and often extends into new domains over the course of an active career. Indeed, the day may come when normative expectations are for faculty and students to gain mastery of relevant tools and methods outside their disciplinary expertise in preparation for breakthroughs that lie at the edges and intersections of existing knowledge.

The centrifugal tendencies of faculty with interdisciplinary interests, lodged in departmentally based appointments, already are disturbing to department chairs struggling to mount an established curriculum. Those faculty who are oriented centripetally, focusing on both the discipline and the department's priorities, often find themselves shouldering a larger proportion of the required teaching than their outwardly oriented colleagues; by these means structural problems in the organization of interdisciplinary and disciplinary commitments take on the appearance of interpersonal conflicts, and faculty with interdisciplinary interests run the risk of being judged selfish or less than collegial as they pursue an intellectual agenda that takes them away from their departmental home. The resolution of this problem depends not only on establishing fairer workloads among departmental colleagues but also on accepting as a normative and universal condition the idea that organizational forms should liberate, not constrain, the intellectual mobility and vitality of students and faculty. Organizational forms should follow the interests of faculty and students at research universities rather than fitting them into a rigid structure that takes tremendous force to change.

When their need for intellectual mobility is unfulfilled, faculty with interdisciplinary pursuits begin to feel irresolvable tension between their original academic home and the thrust of their emerging work, and the negotiations that once produced acceptable accommodations to all parties become more strained, particularly due to economic conditions that prevent department chairs from being as generous as they would like to be in accommodating the extradepartmental interests of their faculty. This in turn results in some of the most intellectually vital faculty becoming ripe for competitive offers from institutions better

²Ibid., 43.

³Ibid., 18–21, and *passim*.

⁴Ibid., 18.

positioned to fit their recruits' current intellectual identity. While most competitive offers are viewed as opportunities to enhance salary or other forms of currency, such as prestige, anecdotal evidence suggests that questions of disciplinary and interdisciplinary fit may play a role as well in motivating faculty to move to other universities. As such, a critical but unexamined element in warding off competitive offers is an ongoing and proactive consideration of continuing departmental and disciplinary fit as a normal developmental issue over the course of faculty careers, which ideally would lead to developing more-robust administrative mechanisms for restructuring appointments in ways that free faculty to do their best work, without damaging the ability of departments to mount their curriculum.

The tendency of universities to negotiate most conflicts at the local level may interfere with discerning widespread and long-term patterns of mismatch between organizational or administrative forms within institutions and the more dynamic interests of the people who work within these systems. Rather than fitting each person into the established disciplinary slots, a more productive approach might be to redesign organizational systems so that they operate in the ways that stakeholders want and need. Getting individuals with distinctive contributions to fit into the established organizational structure seems like a fundamentally flawed approach to unleashing the creative energy of students and faculty. In these sorts of systems, whose very purpose is to liberate talent to follow its creative impulses, the onus must be on the organization itself to adapt to the needs of intellectually mobile faculty and students rather than to arrange temporary respites from meeting routine departmental needs without systems in place to arrange for longer extradepartmental commitments over extended time periods.

RETHINKING THE TENURE AND PROMOTION SYSTEM

The area of tenure and promotion has obvious links to the issues of faculty mobility over the course of their careers. This is one fundamental aspect of research universities that has a sacred quality, in terms of the potential firestorm that might result from opening it up for examination, but it is also one of the pivotal elements in any discussion of the reward systems that favor disciplinary work over interdisciplinary activity. The primacy of departmental and disciplinary evaluation of faculty accomplishments produces the most complaints from faculty pursuing interdisciplinary lines of inquiry. Even though departmental evaluations of performance are not the only or even the most significant element of decisions about tenuring junior faculty or promoting tenured faculty to the rank of full professor, it is in the nature of departmental appointments for

accomplishments to be judged through the lens of whether a colleague's publications are placed in the flagship journals of a particular discipline; whether the teaching load has relieved the burden that would otherwise be assumed by others at the table; to what extent external research funding employs hungry graduate students from within the department; and to what degree individual accomplishments reflect well upon the department as a whole.

The interdisciplinary scholar whose appointment home is lodged in such a department may gain a reputation for excellence in multiple fields while violating each and every one of these departmental expectations along the way. Publication in an interdisciplinary venue might be the most effective way to reach multiple audiences but may be judged inferior to disciplinary or professional flagship journals at face value. A stint teaching outside of the department or team teaching a cross-listed course with colleagues from another department may have left departmental colleagues scrambling to pick up the curricular pieces, breeding resentment more than any other emotion. Interdisciplinary research with multiple principal investigators that successfully obtains external grant funding may require student assistants with skills not cultivated in the home department, thus violating unwritten expectations that funding will contribute to the support of graduate students in the disciplines. And finally, when faculty with interdisciplinary leanings receive recognition such as prizes, awards, and fellowships from venues outside of their home discipline, they may unintentionally exacerbate rather than ease perceptions that they are "playing for another team" rather than accruing capital that counts in the competition to advance departmental standing in national and international rankings.

The whole question of establishing meaningful productivity measures for departmental faculty members with interdisciplinary leanings is highly fraught with tension, since in the final analysis those who vote do not need to articulate the real reasons for their actions. Universities that have tried to tackle the question of who ought to participate in the assessment of faculty with interdisciplinary portfolios have been quite timid about confronting the dominance of departmentalized faculty in the voting process, leading to reforms that solicit input from other knowledgeable entities without granting them formal decision-making power. The directors of interdisciplinary research centers where faculty spend a significant portion of their time, for instance, may be asked to contribute a letter to the tenure and promotion file, but they are granted no direct power in the voting process unless the institution has made provisions for establishing special committees that include nondepartmental representatives. To date, memoranda of understanding

that have been written for newly appointed faculty, which provide for expedited review through special committees, have yet to be fully adapted for use with faculty already in the appointment system, though new faculty are not the only ones who engage in interdisciplinary pursuits.

REEXAMINING ACADEMIC DEPARTMENTS

Perhaps, more radically, a systemic approach might reexamine the whole notion of academic departments as the primary or only administrative base for faculty appointment homes. A powerful, but largely invisible, line prevents interdisciplinary research centers and institutes from being considered a legitimate home for those whose work does not entirely conform to departmental or disciplinary norms. Only the most highly funded interdisciplinary fields, such as cancer research, have been granted permission within some universities to become the tenure home for faculty whose intellectual identity and research programs are defined more by the problem they work on than the discipline through which they seek to address the problem. But there is no reason why centers and institutes, and the interdisciplinary cadre of faculty who are affiliated with them, might not become the tenure homes of the future for faculty whose intellectual interests correspond most closely to them. Furthermore, there is no reason why interdisciplinary centers and institutes cannot play a leading role in evaluating faculty for tenure and promotion. The teaching contributions of faculty can be evaluated by departmental or interdisciplinary faculty, depending on the actual location of their classes and the expertise relevant to them.

In recent years we have at last seen signs of movement to allow interdisciplinary centers to mount interdisciplinary degree programs, thus serving as functional alternatives to the departmental base of most appointments and educational offerings. While these changes require many administrative reforms to implement, they suggest one possible pathway to grafting a new networked, interdisciplinary structure of intellectual offerings onto the well-established departmental and collegiate frame. It is here, however, that the real potential for a backlash against interdisciplinary activity might gain momentum since departmental faculty are loath to let go of their privileged standing in the assessment process.

I would suggest, however, that the state of hyperspecialization, even within established disciplines, has become so acute that it might be productive to consider whether there are now many cases in which departmentalized faculty believe their disciplinary colleagues are not well positioned to evaluate their own work. After all, even within

disciplines with an extended history and heritage a proliferation of subfields has left faculty in writing programs, for example, loath to be evaluated by literary scholars; meanwhile, fields of professional practice, such as urban planning, are sharply divided by economists writing in a social science tradition and humanists writing monographs in an interpretive tradition. As the coherence of even established disciplines dissolves under the influence of multiple epistemologies and methods, the collective judgment of a department faculty becomes less relevant overall. It is in this wider context of disciplinary evolution that the notion of customized tenure and promotion committees begins to seem relevant to the goal of ensuring rigorous expert assessment of all faculty.

This model, combined with the previous reconsideration of the tenure and teaching home of faculty, promises more thoroughgoing transformation of the university to account for the changes that have taken place both in disciplinary and interdisciplinary contexts. It also highlights the rather modest and incremental character of reforms undertaken up to this point, since they have done little to alter the structural or organizational arrangements that give rise to problems of assessing interdisciplinary research, teaching, and training. Yet even the most effective interdisciplinary centers, institutes, and academic programs repeatedly have pointed to disciplinary appointments, rewards, and degree systems as the root problem underlying their own efforts to fully realize the promise of interdisciplinary inquiry. The task ahead is to reimagine the institutional arrangements that govern the faculty appointment and assessment systems to match individual faculty with those best positioned to evaluate the quality of their research, scholarship, or creative work.

While disciplinary contributions and local teaching certainly continue to be appropriate objects of disciplinary assessment by departmental colleagues, the whole realm of research, creative activity, and aspects of professional practice has migrated too far beyond the capacity of single departments and established disciplines to leave them as the sole or even primary venue for peer evaluation. Questions about the rigor of reviews can cut in more than one direction, since disciplinary colleagues may be ill-positioned to evaluate extradisciplinary accomplishments, and assembling the right team of senior reviewers is no small problem in emerging fields of knowledge. Nevertheless, all of the signs are present that a mismatch has evolved between the prevailing base of appointments and system of assessment and the actual intellectual trajectories of many university faculty. For that reason, research universities would be well advised to consider more profound changes in how they position highly

productive interdisciplinary faculty with respect to appointments and performance review or risk losing them to institutions that build new capacity to innovate in the organizational arrangements that can be made for interdisciplinary faculty.

INSTITUTIONAL COMPETITION AND COLLABORATION IN HIGHER EDUCATION

Institutional collaboration in the design of these innovative systems, ironically, may be the best strategy to ward off a kind of arms race that has developed between peer institutions to steal away the most outstanding faculty. As research universities vie to recruit the most productive or prestigious faculty away from one another, the question remains whether a cooperative model of talent sharing might offer a more promising model than the competitive one currently in place. Perhaps the best scholars in a given field, based at different universities, could be encouraged to mount the world's best research, education, and training program drawing on exchanges, distance and other technologies, and student mobility as the ingredients in fostering collaboration. Perhaps networks of institutes focused on informatics or sustainability could combine their power to solve real-world problems rather than compete with peer institutions for the largest share of research grants. And perhaps the training of graduate students could be refocused on providing them with access to the many institutions that have something essential to contribute to their professional development rather than on confining their learning to the institution that makes the best offer. The research university of the future might be a portal into a knowledge network rather than a destination in and of itself. A far more limited approach to partnership and collaboration is the current state of affairs, being shaped by a search for competitive advantages. A more radical vision for higher education is premised on unbounded collaboration and cooperation to generate discovery, enhance learning, and offer unparalleled training to the next generation. Institutional collaboration to share talented faculty through multiple appointments, affiliated networks of research institutes and centers, and agreements that allow graduate students substantial mobility between institutions to acquire the best training in the world might reduce some of the negative consequences of a system that is organized almost exclusively around competition over scarce resources such as the best students and the most outstanding faculty.

If the model for managing talent turns away from current practices and instead turns toward an operative model emphasizing faculty and student mobility nationally and internationally, freeing them to engage with other like-minded peers from any number of disciplines and institutions who are interested in mounting collaborative research

projects, degree programs, and exchanges of all sorts, then the economy of higher education will turn from scarcity to abundance as defined by administrative systems that foster collaboration among and between departments, colleges, research centers, and educational institutions wherever they are located. Voluntary commitments of time and energy to emerging academic programs, to interdisciplinary or interuniversity centers or institutes, and to teaching in the department or through distance arrangements that cross institutional and national boundaries all promise to create new forms of intellectual capital for cash-strapped universities. This can be achieved only by shifting the emphasis from controlling faculty appointments to enabling greater flexibility than was previously imagined in assigning faculty time to highly promising ventures that provide public goods at higher levels than can be realized when departmental and disciplinary self-interest is of paramount importance in the allocation of faculty appointments over the arc of faculty careers.

Taken to its logical extreme, this approach suggests that many of the most intractable problems associated with financing the future of higher education could be addressed by liberating the potential of faculty and students to organize themselves into formations that match the evolution of their intellectual interests rather than requiring them to conform to the somewhat ossified and substantially less mobile bureaucratic collegiate and departmental infrastructure, which requires enormous effort to change. The issue, then, is not how universities can more effectively control the distribution of faculty time but rather how they can exploit free inquiry to redesign institutions so that they map more closely to the interests, desires, and questions that are driving talent within the organization. The old model establishes the map and slots talent into it. The new model allows the structure of the organization to morph and change consistent with the evolving research, teaching, and training interests of its participants. The time has come to explore the potential for developing alternative models for the organization and operation of research universities, models built on the imperatives of interdisciplinary inquiry and collaboration.

The most precious resource of research universities is the unbounded intellectual curiosity of their faculty and students, and the prospective public good that may arise from it need not be channeled so rigidly into disciplinary evaluations of the benefits. The time has come to reenvision faculty appointments, at least in part, as residing in universities at large rather than as residing exclusively in departments, a process that requires careful attention to how the teaching mission will be accomplished under a more liberal system of appointments and how rigorous review

of performance can be secured. Universities have already figured out how to assess the work of those whose principal contributions are to established disciplines. For all the rest, including those who set out to tackle intellectual and social problems that transcend the usual disciplinary boundaries—and most of the really difficult problems tend to require interdisciplinary and collaborative approaches—the alternative systems of appointment and assessment will meet them on their own ground.

Far from merely being strategies for managing faculty whose complex intellectual attachments make them hard or difficult cases personally, these alternative systems would serve a higher public good, namely, to induce the faculty of research universities to choose some of the most intractable problems as the objects of intense scrutiny, to encourage them to innovate in the approaches and methods used to tackle those problems, and to reward their performance based on the quality of the intellectual work rather than its conformity to disciplinary norms. Indeed, it suggests a deeper critique of disciplinarity as a barrier to solving real-world problems that neither conform neatly to the archaic bureaucracy of universities nor are bounded by the tools and methods associated with individual disciplines. To liberate the intellectual energy of faculty and students is to commit research universities to solving our greatest problems. That alone is powerful motivation and incentive to undertake more systemic and comprehensive reforms of university administrative systems, despite the resistance likely to arise from faculty and department chairs, whose own disciplinary and departmental allegiances are defined in more conventional terms.

The long-term unfolding of this issue, however, suggests that lost momentum in the present represents only a temporary setback in an overall movement to complement the historic disciplinary structure of universities with a wider array of alternative forms that would place interdisciplinary exploration on the same terms as work in the established disciplines and professions that consume the larger parts of university budgets, even as institutions strive to reposition themselves as respected players in the emerging fields of knowledge critical to the future. Indeed, periods of decline sometimes prove to be fertile as planning periods, with the understanding that full-bore implementation of the plan will have to wait for more flush times. The optimal use of university resources depends on harnessing the intellectual curiosity, methodological rigor, and talents of faculty and students in all sectors while reducing the transaction costs involved in their pursuit of new agendas for research, pedagogies for teaching, and efforts to provide service to departments, colleges, and communities, from local commitments to those that take

place on a global scale. Because the movement to foster interdisciplinary inquiry is a vital component of strategic plans aimed at fulfilling the public mission of research universities, the time is right for members of the Consortium, along with others committed to making gains on this front, to look closely at the recommendations contained in these proceedings while working to shape a more coherent vision of how the research universities of the future will realize their enormous promise, not to simply increase the personal human capital of their students and faculty, but rather to do good for the planet and those who inhabit it. Nothing less is at stake in how we organize and reward knowledge creation within research universities, which makes the larger project of fostering interdisciplinary inquiry such a high-stakes—and worthy—undertaking.

My two years at the center of conversations among ten research universities about what they have done and still wish to do to foster interdisciplinary inquiry provides a very privileged perspective on the state of the field. Had these institutions not agreed to collaborate in designing and analyzing the self-studies, it would not even be remotely possible to detect emerging patterns in the reform of policies and practices at research universities, much less to speculate on the kinds of moves that might rise above the level of incremental reform to transform the landscape of higher education with respect to the organization and management of knowledge in the ways that I have suggested. This is to say that collaborative strategies for tackling some of the most persistent problems faced by research universities allow each institution to rise above the historical and political conflicts that have bogged down proposed reforms and to get to the point where visions rather than political or practical considerations alone drive the future direction of higher education. Despite their global orientation, research universities tend to be remarkably provincial and insular when it comes to designing and reforming administrative systems, as though what occurs at one institution does not have much in common with what occurs at similar institutions elsewhere.

Local discouragement about reform, much less transformation, can be reversed when contacts at other peer institutions have an opportunity not just to showcase what they have been able to accomplish under similar circumstances but also to provide technical assistance through the difficult implementation stage that allows for collective learning to trump reinventing the wheel repeatedly out of pure ignorance of what others have learned in the process of similar undertakings. The movement to transform universities so that an awareness and understanding of diversity was more fully integrated into the curriculum

benefited from a similar sort of collaboration and knowledge exchange among and between institutions, similarly supported by foundations and granting agencies dedicated to the cause. There, too, what looked like local problems exclusively soon were revealed to be systemic ones that pervaded higher education institutions nationally. Moreover, the strategies for curriculum integration practiced in one department turned out to be relevant far beyond local circumstances, and the collective commitment of many institutions set new standards for all by making those mired in inaction the exceptions to a new norm that established diversity as a core goal for higher education institutions, not just in the diversity of faculty and students present within universities but in the content of knowledge across the disciplines that previously had not benefited from the expertise and insights of women and minorities previously excluded. In this example, peer cooperation was an important prerequisite for universities to begin to build identities based on the warm climate they had established with respect to diversity.

The University of Michigan certainly broke out of the pack when it took on the most significant legal challenge to affirmative action in a generation. Likewise, the University of Michigan; the University of California, Berkeley; the University of Washington; and the University of Minnesota have established their superior credentials with respect to diversity not just by carrying out proactive recruiting programs but by establishing research centers and institutes that clearly convey to the rest of the world that they value the intellectual contributions of diverse faculty and students and that they regard research, scholarship, and creative activity focused on equity and diversity as essential knowledge for a better future. Institutional reforms that foster interdisciplinarity have much of the same potential as those that have been designed to foster diversity, and the strategies that have worked in one arena are ripe for adoption in relation to other agendas for institutional transformation that recognize that past policies and practices that worked for more homogenous populations of faculty and students, or for academics whose intellectual loyalties were cemented for life by disciplinary ties, no longer will work within institutions characterized by diversity and interdisciplinary modes of inquiry.

THE FUTURE OF THE CONSORTIUM

With the study and analysis phase nearing completion, what is the future of the Consortium on Fostering Interdisciplinary Inquiry? Unlike past studies, which have primarily focused on the development of written recommendations, this project was conceived in the tradition of action research, meaning that the project's design was intended to integrate research with action toward the desired goal of fostering

interdisciplinary activity at research universities. In the first stage, that meant building peer relationships both within and across institutions to increase awareness, knowledge, support, and ultimately the capacity for undertaking institutional change in key functional areas typically neglected by advocates of interdisciplinary activity. These relationships not only improved the quality of the questions and answers contained in the research phase of the project but hopefully enhanced the capacity of member institutions to make informed decisions and pursue an effective action agenda.

At the next stage of this project, existing Consortium members will be invited to select one or more of the recommendations arising from this study as the focus of their own implementation efforts, and they will be offered information about the other institutions that are working on related issues to allow for the possibility of mutual support and counsel throughout the implementation process. As the implementation of selected reforms at member institutions has already demonstrated, universities stand to learn much from one another's experience in understanding the sources of resistance to change, developing plans for consultation with key stakeholders, and considering viable alternatives in such matters as the revision of tenure codes, the adjustment of indirect cost returns, and strategies for ensuring responsible stewardship in managing institutional investments in research institutes and centers.

The combined cooperative and competitive pressures that animate Consortium membership can, in and of themselves, serve as an impetus for taking action, as peer institutions remain aware that their key competitors are moving forward with changes in ways that will help them to attract and retain faculty with the capacity to work at the leading edge of knowledge production and will thereby sharpen their position with respect to recruiting outstanding students and securing essential research funding.

The work of the Consortium, however, would be insufficient if its impact focused exclusively on the ten research universities that were founding members when the problems they have attempted to tackle are pervasive in higher education. For that reason, future plans include inviting other research universities, many of which have already expressed an interest in becoming Consortium members, to join contingent on their willingness to adopt one or more of the recommendations for change in policy and practice that are derived from the self-studies. Like the founding members of the Consortium, they will enjoy similar support from one another throughout the implementation process. By these means, we hope to translate recommendations into widespread action

across the landscape of higher education, connecting institutional research to administrative action in a way that has not previously been attempted. Should the leaders of the research university with which you are affiliated be interested in becoming an institutional member

of the Consortium as a vehicle for accelerating the pace of institutional reform, please contact us at the Office of Interdisciplinary Initiatives (gradoii@umn.edu), which is located in the Graduate School at the University of Minnesota.

Appendices: Background and Supporting Materials

Part A: Information About the Consortium, Self-Studies, and Conference

Appendix A1: Consortium on Fostering Interdisciplinary Inquiry Description

Appendix A2: Consortium on Fostering Interdisciplinary Inquiry Self-Study Questions

Appendix A3: Consortium on Fostering Interdisciplinary Inquiry Conference Agenda

Part B: Online Resources

Appendix B1: University of Minnesota Online Resources

Appendix B2: News Articles and Coverage

Part C: Electronic Documents

Appendix C1: Electronic Documents Available to Consortium Member Institutions

PART A

Information About the Consortium, Self-Studies, and Conference

APPENDIX A1:

CONSORTIUM ON FOSTERING INTERDISCIPLINARY INQUIRY DESCRIPTION

Fostering Interdisciplinary Inquiry: A Fall 2008 Invitational Conference and Creation of a New Multi-Institutional Consortium

Advances in interdisciplinary research and teaching are critical to producing workable solutions to many of society's most pressing problems. "Fostering Interdisciplinary Inquiry: An Invitational Conference" will focus on policies and practices of academic institutions and is intended to foster institutional cooperation among the nation's top research universities, public and private, and to expand understanding of both opportunities and challenges in advancing interdisciplinary research, academic programs, teaching, and training. A key goal of the conference is to create a consortium for interdisciplinary transformation that will continue to advance progress on these important issues.

The high level of institutional investment in seeding interdisciplinary initiatives during the past decade, and the multitude of interdisciplinary programs, centers, and projects that have emerged over an even longer period, are critical sources of institutional innovation and vitality. While the academy has been a fertile seedbed for these energetic initiatives, there is a growing sense that aspects of the existing institutional structure, policies, and practices, historically organized by discipline, create unnecessary impediments to success for faculty and students engaged in interdisciplinary teaching and research initiatives.

Universities that have made significant investments in interdisciplinary initiatives have much to learn from one another. A primary goal of the conference is to launch the development of a peer-oriented, multi-institutional consortium to assess the institutional support required to seed, support, and sustain interdisciplinary initiatives and to identify opportunities and challenges in advancing interdisciplinary activities and in building interdisciplinary capacity. Universities invited to participate are research universities that have invested heavily in supporting interdisciplinary initiatives. A network of university leaders, across a broad spectrum of functional positions, will be invited to collaborate in the development of an assessment tool, conduct a comprehensive self-study, engage in focused conversations, and share with peers their findings about fostering interdisciplinary teaching, research, training, and academic programs. These leaders will include representatives from provosts' offices, research offices, graduate schools, and development offices, along with representative leaders of successful university-wide interdisciplinary centers, institutes, and initiatives from each participating institution.

To build a knowledge base for advancing interdisciplinary policies and practices, participating universities will conduct a self-assessment in advance of the event. The University of Minnesota will take the lead in developing the assessment tool in consultation with the invited universities, in analyzing and reporting the findings from each university's self-study, and in convening the participants in fall 2008. The fall 2008 conference will focus on (1) the findings from the multi-institution study and (2) working sessions devoted to developing strategies for improving the climate for interdisciplinary activity at institutions of higher education. A final report will synthesize findings from the multi-institution study and conference for distribution to participants and the wider academic community. Repeated administration of the assessment tool would allow consortium members to monitor their progress in future years. It is hoped that the consortium established through this initiative will remain active and continue to share best practices for interdisciplinary advancement.

APPENDIX A2: CONSORTIUM ON FOSTERING INTERDISCIPLINARY INQUIRY SELF-STUDY QUESTIONS

In this appendix, you will find the instructions and open-ended questions that were developed by and used in the Consortium self-studies in eight critical administrative or functional areas whose policies and practices directly affect interdisciplinary activity at research universities. These questions were developed by administrators with institutional responsibility for and authority over each of the eight areas—largely vice provosts and vice presidents at member institutions who worked in multi-institutional committees with peers at peer institutions (through conference calls and e-mail exchanges) to frame the self-study questions.

Once the questions were fully developed and circulated to Consortium members, self-studies were managed and completed by survey teams at each Consortium institution, with an institutional lead coordinating the work in each of the eight study sections simultaneously. The self-studies underwent preliminary analysis at the University of Minnesota before being returned to committee cochairs for further analysis. Findings from the institutional self-studies were first presented by committee cochairs at a November 2008 invitational conference hosted by the University of Minnesota. The conference proceedings, published in this volume, represent a revised and expanded version of the reports first delivered at the November 2008 conference.

We include all of the self-study questions in the appendix to the conference proceedings to enhance the readers' ability to estimate the reliability of findings from the self-studies, which ultimately hinges on the quality of the questions and their mirror opposite: the enthusiasm and capacity of the respondents. We hope readers will draw on the Consortium's foundational work to develop new and more-advanced questions in future studies of interdisciplinary activity at research universities, with the caveat that the Consortium self-study questions, in some cases, were not well designed in the strictest social scientific sense of the term, and so their slightly "messy" quality ultimately needs to be considered when interpreting the present findings, as well as in any future use of the underlying questions for new work on this topic.

Not all forms of messiness, however, reflect poorly on the rigor of thought that went into the survey design and construction. Rather, they were part of the calculus of costs and benefits of centralized control over survey design and development versus local control through greater degrees of autonomy among the ultimate respondents, who are themselves highly capable administrators who understand what is generally known or unknown, what they need to know to be more effective, and who are positioned to implement changes in policy and practice immediately and long after the results have been disseminated.

Indeed, the work of the Consortium was highly intentional with respect to collaborative and interactive peer processes that assigned unusually high degrees of control over question formulation and development to groups of peers with expertise in particular functional areas. If the benefits of venturing into new areas with some original questions included a high level of local ownership and confidence and an excellent rate of response to the survey, we assure you that the price was known and chosen from the outset, even as we acknowledge that some resulting flaws could have been corrected through greater centralized quality control over the precise language adopted in the self-study questions. In this sense, collective consensus trumped some kinds of accuracy at the stage of formulating critical questions, but the findings are sufficiently powerful and persuasive as evidence of the value of the questions that there is no reason to conclude the proverbial baby ought to be tossed out with the bathwater.

Two questions that exemplify the sorts of messiness alluded to here are copied below for the purposes of illustrating what otherwise might remain an abstract concept. Both of these examples include loaded terms and multiple and double-barreled questions, and thus are not elegantly designed in the usual social scientific sense.

Example Questions:

What policies are in place to ensure fair evaluation of interdisciplinary faculty members' work? Who decides on "excellence" when there are not others in a similar interdisciplinary area to judge? If there is wide variance in evaluations of the faculty member's work quality and contribution, how is this variance resolved?

Is there a general attitude toward interdisciplinary research at your institution? What value is it perceived to add to the institution? What complications does it create for the institution (or administration)? At your institution, how does interdisciplinary research compare to disciplinary research in terms of status, prestige, and esteem? Describe differing opinions, if they exist, and who holds the differing opinions (in terms of roles or constituencies).

Despite the obvious flaws, the high quality of the findings indicate that ultimately yielded confirm their relevance to the Consortium's effort to probe unresolved issues considered a priority by experts. Action research, more than any other approach, requires a careful balancing act between expert mastery and engagement among indigenous experts, whose experience qualifies them to frame issues and set priorities but who may have more or less command of the tools and methods of research per se. Many elements of the Consortium's overall implementation plan directly framed choices in ways that accounted for the costs and benefits of tilting in either direction, and devised new strategies for accomplishing both goals well. Eliminating all sorts of messiness stemming from those tensions, however, has not been the goal of this project, so much as acknowledging and accounting for them analytically. That is why this note has prefaced the complete list of functional area self-study questions.

With these caveats in mind, we invite you use any or all of the self-study questions as you see fit in nonprofit venues. As the old saying goes, "Take what you need. Leave the rest." Any published work that results from the use of these questions, however, must be accompanied by a clear acknowledgment of the Consortium on Fostering Interdisciplinary Inquiry. As an additional courtesy, please send a copy of the newly generated material, which builds on the original work of the Consortium, as would be consistent with the underlying collaborative principles of the project. We can be reached at cfii@umn.edu or (612) 624-9647.

ACADEMIC ADMINISTRATION AND FACULTY GOVERNANCE SELF-STUDY SURVEY

Purpose of the Survey

The purpose of the Academic Administration and Faculty Governance Self-Study Survey is to understand policies and practices with regard to academic administration and faculty, and how these policies and practices may sustain or challenge interdisciplinarity.

Instructions to the Survey Lead

This survey should be completed by a point person, or “survey lead,” at each participating institution. Each section of the survey contains questions for which a relatively specific and discrete means of collecting the information is available. Where data-based answers are not readily available, an e-mail discussion among select staff members should help answer the question adequately. The survey also contains constituency-based questions that probably require the survey lead to enlist input from an array of stakeholders and experts in order to arrive at a complete answer.

In your responses, we ask that you not include URL links to Web sites or HTML documents, as these cannot be meaningfully interpreted as data. We also ask that you convey this request to others from whom you may seek responses.

Expertise to Complete the Self-Study

In the process of reviewing the questions that follow, subcommittee members should clarify the range of institutional officials and functional experts who should be sought out to answer them. While the survey lead is expected to provide the final answers, these other individuals will likely be consulted in the process.

Self-Survey Questions

1. Does your institution specifically recruit interdisciplinary faculty? If so,
 - a. What strategies does your institution use to recruit interdisciplinary faculty?
 - b. Who pays for searches, start-up costs, and salary for an interdisciplinary faculty member?
2. How are new faculty with interdisciplinary interests assigned to an academic “home”? (E.g., are they hired into a single department, two departments, an interdisciplinary center?)
3. What policies and practices govern fair division of the interdisciplinary faculty member’s teaching, service, and grant funds between or among their affiliate departments and/or interdisciplinary units?
4. Are interdisciplinary faculty appointments specifically mentioned in the institution’s policies for evaluating faculty?
5. What provisions have been made to help the interdisciplinary faculty member enhance his or her development and productivity, as well as navigate tenure and promotion?
6. What policies are in place to ensure fair evaluation of interdisciplinary faculty members’ work? Who decides on “excellence” when there are not others in a similar interdisciplinary area to judge? If there is wide variance in evaluations of the faculty member’s work quality and contribution, how is this variance resolved?
7. Who provides formal feedback to the interdisciplinary faculty member as he or she progresses toward tenure?
8. Who establishes the committees to review, and to provide feedback for, the interdisciplinary faculty member?
9. Who is responsible for preparing the merit reviews and tenure cases for the interdisciplinary faculty member?

10. Who identifies external reviewers to conduct the review of interdisciplinary faculty members?
11. Who serves on merit and tenure and promotion committees for interdisciplinary faculty members?
12. Do the university's tenure and promotion policies and practices specifically address the role of interdisciplinary research and teaching? If so, what has been the impact of such policies on interdisciplinary research and teaching?
13. What are the mechanisms for making changes in promotion and tenure, distribution of indirect costs, creation of centers, etc.?
14. What issues has your institution identified as problematic for interdisciplinary faculty? (Consider all levels—from central administration to individual faculty member.) How have you addressed these issues?
15. Has your institution developed policies that refer specifically to interdisciplinary research and education? Please attach copies of those policies.
16. What data do you collect and track for interdisciplinary programs and centers? How frequently do you collect and track the data?
17. What policies are in place to guide the creation and governance of interdisciplinary programs, centers, and institutes?
18. What mechanisms has the institution developed to seed, nurture, and sustain interdisciplinary programs, centers, and institutes?
19. Who initiates creation of an interdisciplinary program, center, or institute?
20. What mechanisms are there for evaluating the viability of proposed interdisciplinary initiatives?
21. What provisions have been made for assuring that departments are not penalized by faculty engagement in an interdisciplinary initiative?
22. Who provides the funding for an interdisciplinary program?
23. How are interdisciplinary programs, centers, and institutes monitored, evaluated, and renewed at the institutional level? At the college level?
24. How often is an interdisciplinary program or center reviewed? What are the criteria for renewal? Who conducts the review?
25. Who ensures that suggested changes are implemented?
26. What actions are taken if the program does not improve after implementing changes?
27. If a program is discontinued, what happens to its students?
28. What steps has your institution taken to sustain the coherence and quality of interdisciplinary programs when key faculty depart, retire, or take on other responsibilities?
29. What is the extent of central administration and oversight of interdisciplinary research and education at your institution? Where does the primary responsibility for administration and oversight of interdisciplinary research and education lie at your institution?
30. What serious pushback on decisions that were made in support of interdisciplinary research and education have you experienced?
31. How has your institution made an effort to address both structural and cultural issues that are barriers to interdisciplinary research and education?
32. Does the institution have a set of interdisciplinary priorities that are tied to the strategic goals of the institution, and, if so, how are they supported?
33. Identify one or more specific changes in policy and practice in the area of academic administration and faculty governance that would increase your institution's capacity to foster interdisciplinary inquiry. For each proposed change, please address the following logistical questions:

- Which institutional officials and entities would need to lead, and actively participate in, the process of transformation?
- What obstacles would have to be overcome to accomplish the change?
- Which approaches and methods are likely to be effective in overcoming the obstacles you've identified?
- If an analysis of the self-studies supports institutional change in this direction, how likely would your institution be to implement this change?

EDUCATION AND TRAINING SELF-STUDY SURVEY

Purpose of the Survey

The purpose of the Education and Training Self-Study Survey is to understand institutional policies and practices that affect the university's ability to seed, support, and sustain educational programs that cross disciplinary boundaries. Beyond specific academic programs, it also seeks to identify and understand grant-funded and university-sponsored efforts to provide faculty, students, staff, or postdoctoral appointees with training in the skills and competencies needed to engage in interdisciplinary and collaborative research and educational initiatives.

Instructions to the Survey Lead

This survey should be completed by a point person, or "survey lead," at each participating institution. Each section starts with questions that have a relatively specific and discrete means of collecting information. Where data-based answers are not readily available, an e-mail discussion among select staff members should help answer the question adequately. The survey also contains constituency-based questions that probably require the survey lead to enlist input from an array of stakeholders and experts in order to arrive at a complete answer. (Some possible stakeholders/experts are suggested.) The survey lead may seek out multiple and varied perspectives on any question, as seems appropriate in order to answer the question fully.

In your responses, we ask that you not include URL links to Web sites or HTML documents, as these cannot be meaningfully interpreted as data. We also ask that you convey this request to others from whom you may seek responses.

Expertise to Complete the Self-Study

In the process of reviewing the questions that follow, subcommittee members should clarify the range of institutional officials and functional experts who should be sought out to answer them. While the survey lead is expected to provide the final answers, these other individuals will likely be consulted in the process. Experts in this area may include, for example, graduate school deans and associate deans, and vice provosts for graduate or undergraduate education.

Education and Training Self-Study

1. Which units, if any, have administrative and leadership responsibility for interdisciplinary educational activities? Describe the scope of these units' responsibilities and characterize the resources at their disposal to foster interdisciplinary education. (Please distinguish, as appropriate, between central units that have responsibility for academic programs that cross college boundaries, and the management of interdisciplinary activities that are contained within a single school or college.) How does this unit (or do these units) make the case for the value of investing in interdisciplinary education? Please identify and describe the specific initiatives this unit has sponsored to advance interdisciplinary education and training and highlight which ones have proven to be especially promising or fruitful. Along with your answers, please submit a single document file into which you have pasted "calls for proposals," memos, or similar documents that convey how funding designed to support interdisciplinary educational and training initiatives is disseminated. Please name this file
CFII_Education_and_Training_<university_name>_attachmentQ1.doc
substituting your institution's name for <university name>.
2. Identify any significant changes made at the undergraduate level at your institution that were intended to foster interdisciplinary education. Please address changes such as investment, institutional policy and practice, and the establishment of new programs. How effective have these changes been in achieving the desired goals, and what future changes do you anticipate?

3. Identify any significant changes made at the graduate level at your institution that were intended to foster interdisciplinary education. Please address changes such as investment, institutional policy and practice, and the establishment of new programs. How effective have these changes been in achieving the desired goals, and what future changes do you anticipate?
4. Identify any significant changes in professional education at your institution that were intended to foster interdisciplinary (or interprofessional) education. Which professional schools or programs have been leaders at your institution in advancing interdisciplinary (or interprofessional) education? Please address changes such as investment, institutional policy and practice, and the establishment of new programs. How effective have these changes been in achieving the desired goals, and what future changes do you anticipate?
5. Changes in institutional policy or practice sometimes have unintended consequences for interdisciplinary education. (For example, caps on total undergraduate credits, intended to hasten time to degree, may inadvertently discourage students from pursuing double majors.) Have any recent changes in policy or practice, intended to solve other problems, inadvertently raised new barriers for student and faculty mobility across the disciplines or the goal of fostering interdisciplinary education? How, if at all, has your institution managed these negative impacts while achieving its intended goals?
6. Beginning with the earliest established programs and continuing to the present, briefly trace the development of the most significant interdisciplinary graduate programs at your institution. What has driven their growth? How were resources mobilized for their support? Which ones do you project will emerge in the future? Why?
7. Within undergraduate education, which majors have emerged as the best-enrolled interdisciplinary fields of study? Which minors? What challenges have they posed logistically?
8. Identify any areas in which your university has aligned strategic institutional priorities, targeted research investments, and investment in interdisciplinary academic programs. At what stage in the development of interdisciplinary research investments are related educational programs typically discussed? Who initiates such discussions?
9. Have interdisciplinary academic programs developed evenly across the arts and humanities, the social sciences, science and engineering, and the professions, or are there disparities among and between these sectors? Please address the number of programs and resource investments by sector.
10. Do any of your interdisciplinary academic programs create intellectual synergies across fields that are rarely connected in higher education (e.g., the fine arts and the sciences)?
11. Please provide a brief case study of a highly successful interdisciplinary graduate program (as measured by ranking, reputation, vitality, ability to attract investment, or other common institutional standards). Please highlight the factors that have supported its development and contributed to its success.
12. Please identify chronic concerns for interdisciplinary graduate programs that fall short of achieving their potential.
13. Based on both the successful and unsuccessful examples, what lessons might be learned that contribute to “best practices in interdisciplinary graduate education”?
14. Identify top challenges and opportunities for students engaged in interdisciplinary education. What has your institution done to address these challenges and to take advantage of opportunities?
15. Is there a dedicated pool of funding to support new and emerging interdisciplinary educational programs? How is this pool funded and how are funds distributed?
16. What has your institution done to provide mechanisms for building social and intellectual connections, and mobilization for advocacy, among those interested in interdisciplinary activity (above the level of individual programs)?
17. What mechanisms has your institution developed for soliciting feedback and critical comments about the status of interdisciplinary activity from faculty, students, postdoctoral appointees, and staff? How effective are these mechanisms? What new mechanisms might be useful for ensuring that future action is informed by input from the larger community engaged in interdisciplinary inquiry at your institution?

18. Identify any committees or reports on the status of interdisciplinary education at your institution. Along with your answers, please submit a single document file into which you have pasted relevant report(s). Please name this file

CFII_Education_and_Training_<university_name>_attachmentQ18.doc

substituting your institution's name for <university name>.

19. Identify and describe changes in institutional structure, policy, or practice that have been implemented to foster interdisciplinary education. Discuss their impact.
20. What innovations have been advanced by your graduate school to foster interdisciplinarity?
21. What changes in graduate education still need to be made in the future to advance interdisciplinarity? What will it take to implement those changes?
22. Identify all externally funded interdisciplinary training grants (e.g., IGERT) awarded to your institution.
23. What kinds of institutional resources have been mobilized to support these externally funded interdisciplinary training initiatives?
24. How will the kinds of interdisciplinary activity these grants were designed to foster be sustained beyond the funding period?

25. What institutional reforms are needed to take interdisciplinary innovations originally promoted by external training grants and make them routine university practice?
26. Identify any initiatives or programs that promote the development of distinctive competencies associated with interdisciplinary/collaborative work that are offered to faculty, staff, students, and/or postdoctoral appointees outside of any specific degree program.
27. Identify additional specific changes in policy and practice in the area of education and training that your institution has identified, but not implemented, that would increase your institution's capacity to foster interdisciplinary inquiry. For each proposed change, please address the following logistical questions:
- Which institutional officials and entities would need to lead, and actively participate in, the process of transformation?
 - What obstacles would have to be overcome to accomplish the change?
 - Which approaches and methods are likely to be effective in overcoming the obstacles you've identified?
 - If an analysis of the self-studies supports institutional change in this direction, how likely would your institution be to implement this change?

RESEARCH SELF-STUDY SURVEY

Purpose of the Survey

The purpose of the Research Self-Study Survey is to understand how universities encourage and support high-quality interdisciplinary research environments for faculty and students, while maintaining excellence in the traditional disciplines and without placing graduate student progress and preparation at risk.

Instructions to the Survey Lead

This survey should be completed by a point person, or “survey lead,” at each participating institution. Each section of the survey contains questions for which a relatively specific and discrete means of collecting information is available. Where data-based answers are not readily available, an e-mail discussion among select staff members should help answer the question adequately. The survey also contains constituency-based questions that probably require the survey lead to enlist input from an array of stakeholders and experts in order to arrive at a complete answer.

In your responses, we ask that you not include URL links to Web sites or HTML documents, as these cannot be meaningfully interpreted as data. We also ask that you convey this request to others from whom you may seek responses.

Self-Study Survey Questions

1. Does your institution define interdisciplinary research? If so, how? If you could change or revise this definition, how would you, and why?
2. Does your institution currently have research faculty positions dedicated to interdisciplinary research? Are these research positions assigned an academic home? How are those decisions made?
3. How does your institution currently provide the infrastructure to enable the preparation of large interdisciplinary grant applications? (“Infrastructure” includes such considerations as grant writers, finance/budget staff, other production staff, time buyouts for grant PIs, and mechanisms for tracking of grants.) What changes to the current infrastructure support would facilitate more effective grant applications, and/or foster more interdisciplinary research?
4. How does your institution allocate both overhead return and scholarly credit for interdisciplinary grant awards to create incentives for the participation of departments in submitting such proposals? What changes to the allocation process could be made to better support interdisciplinary research at your institution?
5. What kinds of policies for cost-sharing among academic departments foster interdisciplinary research activity? Please describe both what exists currently at your institution, and what kinds of policies, if they did exist, would better foster interdisciplinary research activity.
6. How does your institution provide interdisciplinary environments for research that promote the involvement and success of students at all levels, from undergrads to postdocs? What gets in the way of greater levels of student involvement? What could change that would promote more student involvement and success?
7. Please describe efforts at your institution to foster interdisciplinary research. Please describe both what efforts exist currently at your institution, and what efforts could be made to better foster interdisciplinary research. Have there been successful collaborations with social sciences or humanities and “hard” sciences? What would be promising areas for such collaborations?

8. Identify three of your university's most significant interdisciplinary research centers or three successful interdisciplinary research collaborations. What facilitates research success? What gets in the way of success?
9. With regard to interdisciplinary research, what has your institution done well?
10. If you are aware of successful interdisciplinary research efforts at other institutions, please list them here.
11. Is there a general attitude toward interdisciplinary research at your institution? What value is it perceived to add to the institution? What complications does it create for the institution (or administration)? At your institution, how does interdisciplinary research compare to disciplinary research in terms of status, prestige, and esteem? Describe differing opinions, if they exist, and who holds the differing opinions (in terms of roles or constituencies).

DEVELOPMENT (FUNDRAISING) SELF-STUDY SURVEY

Purpose of the Survey

The purpose of the Development Self-Study Survey is to identify and understand the opportunities and challenges for development when fundraising for interdisciplinary initiatives.

Instructions to the Survey Lead

This survey should be completed by a point person, or “survey lead,” at each participating institution. Each section of the survey contains questions for which a relatively specific and discrete means of collecting information is available. Where data-based answers are not readily available, an e-mail discussion among select staff members should help answer the question adequately. The survey also contains constituency-based questions that probably require the survey lead to solicit input from an array of stakeholders and experts in order to arrive at a complete answer.

In your responses, we ask that you not include URL links to Web sites or HTML documents, as these cannot be meaningfully interpreted as data. We also ask that you convey this request to others from whom you may seek responses.

Expertise to Complete the Self-Study Survey

This survey is intended for development professionals and may also include consultation with and input from those who set university-wide priorities (e.g., provost’s office). Development expertise may be called upon from the following areas: corporate and foundation relations, planned giving, annual giving, development research, gift administration, stewardship, development communications, and select collegiate chief development officers. The survey lead is expected to provide the final answers.

Framing Questions

When respondents complete the self-study questionnaire, it may be helpful for them to keep in mind the questions posed in this section, as they will help to frame your university recommendations of “best practices” for interdisciplinary fundraising. These questions are to help you formulate a summary at the end of the self-study that will examine what works, what doesn’t work, and what could be changed to foster success in fundraising for interdisciplinary initiatives.

- What changes in policy and practice in the area of development/fundraising would increase your institution’s capacity to foster interdisciplinary inquiry?
- Which institutional officials and entities would need to direct, and actively participate in, the process of transformation?
- What obstacles would have to be overcome to accomplish change?
- Which approaches and methods are likely to be effective in overcoming obstacles you’ve identified?
- If an analysis of the self-studies supports institutional change in this direction, how likely would your institution be to implement this change?

Self-Study Survey Questions

Section I: Development Model

1. Please provide a brief overview of how your development operation is organized (e.g., centralized, decentralized, hybrid, etc.).

Include a brief explanation about how your university operates across academic boundaries, and how that may affect your institution's development operations. (Operations may include some or all development areas, such as college units, stewardship, planned giving, major gifts, corporate and foundation relations, event planning, etc.)

Section II: University Administration Role and Organization

2. Does your institution clearly allocate resources, systems, and investments in support of interdisciplinary initiatives?
3. How do your institution's development efforts align with and support university priorities? How are interdisciplinary initiatives weighted for fundraising priority among other university initiatives? Give examples.
4. Has the institution's leadership clearly defined a priority in encouraging interdisciplinary partnerships? Is there "buy-in" from deans? If so, what is the implication for the development agenda?
5. Does the institution have in place or will it create an incentive plan for deans, directors, and faculty to form interdisciplinary partnerships? Are there institutional incentives for working collaboratively on interdisciplinary fundraising efforts? Please explain.
6. How do the needs and timeline of an interdisciplinary project affect and inform the development strategy for securing building endowment funds versus current-use (demand) funds? Is it easier to raise endowment funds than current-use (demand) funds? Please give examples and offer rationales for your recommendations.
7. What kinds of processes at your institution are in place to help decide *where* donor dollars in support of an interdisciplinary project reside? How are funds managed and spent—*who* is the authority in how funds are dispersed? Please give examples and identify best practices.
8. How does your institution manage the disbursement/management of funds secured by development staff per donor intent?
9. Does your institution's development leadership and/or staff have a role in the discussion that shapes the "big ideas" for the institution's interdisciplinary agenda—focusing on and prioritizing those ideas that have the greatest potential for fundraising success? Explain and give examples.
10. Does academic leadership involve and consult with development staff in determining what elements within a project are fundable and what type of funding to ask for? Should "escape clauses" be discussed and developed with university leadership if an initiative changes drastically or ceases to exist? Please give examples and offer rationales for recommendations.

Section III: Development Office Structure and Policy

11. Does your institution have the technology and flexibility to track and group prospects by "interest"? If so, please explain. If not, what elements would your organization desire or require in the design of a new system?
12. Do your institution's development efforts currently include fundraising for interdisciplinary programs and projects?
13. To what degree is private fundraising expected or required for interdisciplinary initiatives? How does this compare to private fundraising expected or required for more traditional programs? How are the private fundraising goals derived (e.g., with the results of a feasibility study, with the assessment of real prospect interest, or to fill budget gaps not covered by other sources of support)? Please give specific examples.

14. Does/should development have a visible and primary role in helping the institution assess the fundability of interdisciplinary initiatives? Are there examples where the projected private funding component for an initiative either fell flat or exceeded expectations? Please give an example of either a success or failure.
15. Is there a development program area or officer assigned exclusively to “interdisciplinary initiatives” in your organization?
 - If so, how does your institution structure that area and position, and how does the area or position work with the existing development area? To whom do they report?
 - If not, is there a future for growth in this area in your institution? How many initiatives would require support and how many officers would you envision hiring to accommodate the workload?
16. Document an example of fundraising for an interdisciplinary program or project at your institution. Include and highlight the following: strengths and/or weaknesses, opportunities and/or challenges, the role of institutional boundaries in the success or effectiveness of the effort, corporate/foundation and/or individual support, current support and/or endowed support, and resources (staff, operating budget, etc.).
17. To date, has your institution had success in identifying and involving prospective “angel funders” for interdisciplinary programs and projects? Are they already included in the institution’s overall fundraising strategy?
18. Does your institution leverage corporate and foundation support to secure other sources of support, such as government dollars? How? Give examples.
19. Is it possible to fund interdisciplinary projects through contributions from nonaffiliated (nonalumni) prospects? If there are examples, how have they been identified and involved?
20. Because interdisciplinary initiatives cross academic boundaries, how should gift counting and credit be handled? Does your institution have a means to assign gift credit to development staff if they help to secure government funding? Are there examples from your institution? Please give a rationale for your recommendations.

Section IV: Development Communications

21. Has your institution created a communication strategy targeted at donors for a specific interdisciplinary program or project? Were faculty engaged, and, if so, how?
22. Has your institution highlighted interdisciplinary funding opportunities in a major campaign?
 - a. If so, were they incorporated into the campaign case? What was your experience and outcome? Document a success and/or failure.
 - b. If not, was there a rationale behind your institution’s decision not to highlight interdisciplinary funding opportunities during the campaign? Please explain.
23. Are interdisciplinary initiatives incorporated into the annual communications and marketing plans for your development operation? Is interdisciplinary fundraising handled centrally or at a collegiate/unit level, or both?
24. Has your institution had success with “packaging” a case for support of an interdisciplinary initiative?
25. Has your institution had a success story in marketing and securing unrestricted support of an interdisciplinary initiative? If so, please explain.
26. What are the most important elements in developing a communications plan and ultimately marketing a case for financial support for interdisciplinary initiatives?

Section V: Multiple-University Interdisciplinary Development Collaborations

27. Has your campus been involved in a multiple-university interdisciplinary project for which there was a private fundraising component? If yes, please give a brief summary and describe the collaboration among the development officers.

Section VI: Summary and Suggested Best Practices

28. Revisit the framing guideline questions at the beginning of this self-study and provide a summary that addresses what works, what doesn’t work, and what could be changed to facilitate success in fundraising for interdisciplinary initiatives. Identify your recommended best practices.

FINANCE AND BUDGET SELF-STUDY SURVEY

Purpose of the Survey

The purpose of the Finance and Budget Self-Study Survey is to identify and understand policies and practices regarding the financial support of interdisciplinary education and research, and how these policies and practices may sustain or challenge the institutional capacity to engage in interdisciplinary inquiry.

Instructions to the Survey Lead

This survey should be completed by a point person, or “survey lead,” at each participating institution. Each section of the survey contains questions for which a relatively specific and discrete means of collecting information is available. Where data-based answers are not readily available, an e-mail discussion among select staff members should help answer the question adequately. The survey also contains constituency-based questions that probably require the survey lead to enlist input from an array of stakeholders and experts in order to arrive at a complete answer.

In your responses, we ask that you not include URL links to Web sites or HTML documents, as these cannot be meaningfully interpreted as data. We also ask that you convey this request to others from whom you may seek responses.

Expertise to Complete the Self-Study

While the survey lead is expected to provide the final set of answers for the self-study, subcommittee members may choose to consult with other institutional officials and functional experts to answer specific questions as needed.

Self-Survey Questions

Instruction and Graduate Education

Questions from a central administration perspective

1. What central financial policies have been created at your institution to encourage interdisciplinary cooperation in the area of instruction?
2. How does your institution’s overall budget model help or hinder interdisciplinary activities?
3. Who provides the central financial leadership for organizing interdisciplinary instructional programs?
4. Where organizationally do the large pools of resources to encourage interdisciplinary instruction reside?
 - a. Has a dedicated pool of resources been set aside at your institution to foster interdisciplinary inquiry?
 - b. If so, would you characterize that pool as substantial? Modest?
 - c. Are the funds one-time or recurring (base) funds?
 - d. Who decides on the uses of these funds?
- e. What are these resources spent on? Is it “coffee and doughnut” money, or something else?
- f. How is the use evaluated?
- g. How does your institution decide which programs qualify for “interdisciplinary” funds? Is there a formal definition or policy, or is it left to decision makers?
- h. What happens to interdisciplinary funds in difficult budgetary times?
5. Do you eventually force interdisciplinary programs into collegiate structures, or are interdisciplinary instructional programs housed outside of collegiate frameworks?
6. How do you approach fundraising for interdisciplinary programs?
7. If you distribute tuition revenue to individual colleges and professional schools, how do you distribute revenue related to interdisciplinary teaching?

Questions from a cross-college perspective

8. How do you handle tuition/SCH attribution “credit” for cross-college interdisciplinary programs? In what ways do your policies encourage or discourage creation of cross-college programs?
9. Is there a proactive policy for funding TAs in cross-college interdisciplinary instructional programs?
10. Does your institution organize interdisciplinary instruction primarily through “memoranda of understanding” between and among deans, or is there a more regular process?
11. How do you organize the financial reporting and oversight in cross-college interdisciplinary programs?
12. Are there issues around effort and workload when faculty participate in a cross-college program?
13. If tuition revenue is distributed to individual colleges and professional schools, does this tend to erect barriers to participation outside of the college or professional school?

Questions from a collegiate perspective

14. Are there financial incentives within colleges for engaging in interdisciplinary instructional programs? The following are examples of such incentives:
 - a. Salary
 - b. Endowed chairs
 - c. Promotion and tenure
 - d. Start-up resources
 - e. Ongoing resources
15. How do you organize financial reporting and oversight in new interdisciplinary programs totally contained within a single college?
16. Do you require colleges to budget interdisciplinary programs within a single college separately from traditional, disciplinary-based departments?
17. For interdisciplinary programs contained within a single college, what review process do you use?
18. Do you ever close interdisciplinary areas to make way for new, emerging areas?

19. Can faculty have their appointment home in a purely interdisciplinary center, or must the appointment be departmentally based?
20. Are all faculty salary lines budgeted within a department, or can a faculty member’s base salary be budgeted in a purely interdisciplinary center?

Research and Training Grants*Questions from a central administration perspective*

21. What central financial policies have been created at your institution to encourage interdisciplinary cooperation in the area of research?
22. How do you evaluate the success of different financial strategies?
23. How does your institution’s overall budget model help or hinder interdisciplinary activities?
24. What is the nature of any centrally controlled pools of resources to encourage interdisciplinary research?
 - a. Who controls the decisions?
 - b. What are the parameters around start-up funding (e.g., length of time, total amount, etc.)?
 - c. How do you address the issue of matching funds for interdisciplinary grant proposals? Who commits to the “risk” of offering matching funds?
 - d. What are the expectations for ongoing funding of interdisciplinary research centers?
 - e. How do you “sunset” funding?
 - f. How does your institution decide which programs qualify for “interdisciplinary” funds? Is there a formal definition or policy, or is it left to decision makers?
25. How do you provide financial infrastructure around obtaining and managing large national-center grants?
26. How do you track and credit interdisciplinary research conducted by faculty with primary appointments outside interdisciplinary centers?
27. May research grants be credited to more than one academic unit (a center *and* a department)?

Questions from a cross-college perspective

28. Who provides oversight of cross-college interdisciplinary research and training centers?
29. What institutional policies have been established concerning the distribution and use of F&A cost recovery (i.e., ICR) for cross-collegiate research?
 - a. Are these policies followed all the time, or is there also a “memorandum of understanding” approach used among deans?
 - b. Does the splitting of ICR hinder the development of cross-college research activities? How?
 - c. Are there specific policies concerning the application of ICR in support of space costs prior to any subsequent distribution?
 - d. Does ICR accrue to the home college or professional school of the PI, or to the interdisciplinary center to which he or she belongs?
30. How has your institution addressed the financial sustainability of cross-college research and training centers, beyond an initial start-up period?
 - a. Where do these types of centers report?
 - b. Who oversees their finances?
 - c. Do these centers become part of your university’s “regular” budget process?
 - d. How are the core administrative costs covered?
31. Are deans and colleges financially rewarded for engaging in cross-college interdisciplinary research activity?
32. Are there issues around using research grants of a PI in one college or professional school to support graduate students from another college or professional school?

Questions from a collegiate perspective

33. Is there financial tracking or “credit” given for intracollegiate interdisciplinary activity?
34. How do college-based interdisciplinary research centers get started? Is there an approval process or threshold by which they become a financial entity?
35. How do your colleges work through funding the “core” versus funding new interdisciplinary activity?
36. Do you have the same ICR sharing issues for research and training grants that span departments within a single college, as you might with grants that span multiple colleges?

Final Question

37. Identify additional specific changes in policy and practice in the area of finance and budget that your institution has identified, but not implemented, that would increase your institution’s capacity to foster interdisciplinary inquiry. For each proposed change, please address the following logistical questions:
 - a. Which institutional officials and entities would need to lead, and actively participate in, the process of transformation?
 - b. What obstacles would have to be overcome to accomplish the change?
 - c. Which approaches and methods are likely to be effective in overcoming the obstacles you have identified? If an analysis of the self-studies supports institutional change in this direction, how likely would your institution be to implement this change?

FACILITIES TO SUPPORT INTERDISCIPLINARY TEACHING AND RESEARCH SELF-STUDY SURVEY

Purpose of the Survey

The purpose of the Facilities to Support Interdisciplinary Teaching and Research Self-Study Survey is to understand the current state of the art in facilities planning and implementation in support of interdisciplinary education and research.

Instructions to the Survey Lead

This survey should be completed by a point person, or “survey lead,” at each participating institution. Each section of the survey contains questions for which a relatively specific and discrete means of collecting information is available. Where data-based answers are not readily available, an e-mail discussion among select staff members should help answer the question adequately. The survey also contains constituency-based questions that probably require the survey lead to solicit input from an array of stakeholders and experts in order to arrive at a complete answer.

In your responses, we ask that you not include URL links to Web sites or HTML documents, as these cannot be meaningfully interpreted as data. We also ask that you convey this request to others from whom you may seek responses.

Please note: For several questions, you are asked to provide information about (1) all buildings in use that are totally dedicated to interdisciplinary programs and (2) a sample of ten centers you select that represent various areas, such as humanities, social sciences, life sciences, health sciences, physical sciences, and engineering. (We encourage you to exclude area centers and older centers.) Our committee asks these particular questions because many participating institutions have several hundred centers, some of which are virtual, and because some space management systems do not adequately track centers that share space with discipline-based programs.

Expertise to Complete the Self-Study

The survey lead may seek out multiple and varied perspectives on any question, as seems appropriate in order to answer the question fully. These may include individuals in facilities management and programming, and university architects, as well as directors or managers of interdisciplinary facilities, and capital planning decision makers.

Self-Study Survey Questions

1. To your knowledge, how many requests are there currently for entire buildings on campus or in research parks to be dedicated to interdisciplinary research or teaching? To what interdisciplinary areas will these buildings be dedicated? How many requests are pending for space that would require less than 50 percent of a new or renovated building? What intellectual areas do these requests represent?
2. Does your institution have some guiding principles on the assignment and reassignment of interdisciplinary facilities? If so, would you please share those with the committee?
3. What are the barriers to developing, financing, and/or maintaining research, teaching, and/or clinical spaces that intentionally foster interdisciplinary exchange, collaboration among those from multiple disciplines, and/or the ongoing work of interprofessional teams? Identify up to three significant barriers in order of significance.

Is demand for such space increasing? If so, to what degree? If demand is not *increasing*, has there been no change in demand, is demand decreasing, or have there been no such requests for buildings or building space?

4. Has your institution *retrofitted* existing buildings or elements of the landscape to foster greater degrees of interdisciplinary contact, socializing that promotes serendipitous intellectual exchange, or group collaboration? If so, please give specific examples. Are these buildings and landscapes different from those dedicated to specific disciplines? If so, in what ways?
 5. If your institution has designed *new space* to foster greater degrees of interdisciplinary contact, socializing that promotes serendipitous intellectual exchange, or group collaboration, please give specific examples. Are these buildings and landscapes different from those dedicated to specific disciplines, and, if so, in what ways?
 6. How much assignable square footage is there in the buildings you have built that are completely dedicated to interdisciplinary programs? What is the ASF allocated to your sample of ten interdisciplinary programs? (Please break out by center.)
 7. For your buildings dedicated to interdisciplinary space and for your sample of ten centers, what were the primary and secondary sources of construction funds?
 8. Does your institution increasingly organize and manage laboratories and facilities, not by discipline, but by broader subjects of research or to solve specific problems? If so, how would you describe the scope of its change in this direction? Major? Minor? Alternatively, has your institution been backing away from organizing and managing by broader subjects or to solve specific problems? Or has your institution made no changes to its practices of organizing and managing only by discipline?
 9. What process does your institution use to gather input from stakeholders on the design or form of space for interdisciplinary programs?
 10. What impact do issues of diversity (e.g., gender, ethnicity) have on the design of interdisciplinary facilities? A lot, a little, or no impact? Less impact than in previous years, or no change in this regard? Can you give an example that illustrates the impact?
 11. How does your institution determine demand and plan for the development of interdisciplinary space? Does assessing demand for interdisciplinary space differ from planning for space required by core disciplines—are there different players and processes?
 12. At your institution, if you have designed and built space specifically for interdisciplinary programs, have they been successful? Why or why not? Who owns these facilities—colleges, programs, or central administration? As other institutions look to you as a potential model, what issues should they consider?
 13. Where are interdisciplinary facilities physically situated in relation to the campus core? Who has access to these facilities? Are there opportunities for the public to observe collaborations in process or do they occur outside public view? Are there significant differences between arts and science facilities?
 14. Is it generally believed at your institution that a building for interdisciplinary research or teaching is an inherently different design from a building for standard research or teaching? If so, please list some of the attributes that differ. Do you know of a model for planning and constructing buildings for interdisciplinary research/teaching? Would you recommend that model?
- Interdisciplinary teamwork often requires routine access to space for team meetings, incubator space for working on projects, and access to other forms of infrastructure support such as administrative assistance (e.g., clerical and grants-related help). When these teams are under a single administrative entity, such as a department or college, the chair or dean presumably is responsible for providing the appropriate infrastructure. One key concern of this self-assessment is how space and other infrastructure support are managed when research or creative teams come from multiple disciplines. One model is that the constituent departments or colleges are “tithed” or “taxed” for contributions. Sometimes central administrators reserve these resources for interdisciplinary and collaborative ventures that lie outside the purview of any single dean or chair.*
15. Please describe both the customary and innovative arrangements that support facilities for high-priority interdisciplinary research, education, and training initiatives at your institution.
 16. Has your institution set aside “incubator spaces” for growing new research or educational initiatives that do not fit readily within academic departments, collegiate facilities, or other usual administrative units? If so, please explain where these spaces are located, administratively and physically, and the conditions that govern their assignment and use.

17. In designing facilities, how does your institution deal with shared equipment or instrumentation? How has your institution managed these resources to facilitate shared access and maximize the care and protection of shared equipment, while reducing potential conflicts over the use of scarce resources? How have these approaches translated into the development and design of space for housing shared equipment or instrumentation? Please give specific examples and explain the underlying economic model for shared use.
18. How does your institution design interdisciplinary research buildings that may need to perform for decades? For example, what is your method of creating flexibility in space (i.e., space that is open, adaptable, or reprogrammable) for interdisciplinary programs? How do you organize space for interdisciplinarity in various sectors, such as science or the creative arts?
19. What has helped to prepare the managers of space and capital construction at your institution to understand issues related to development and design of facilities that foster interdisciplinary and collaborative activity?
20. Who is usually the institutional point person and/or advocate for interdisciplinary space or facility allocation? What institutional roles did the leads for these projects have? Did having someone in a particular role make planning and implementation of the project run more smoothly or effectively? Has any particular role been problematic? Why?
21. Who usually decides how space or facilities are allocated for interdisciplinary programs when they cross college borders? What is this person's role?
22. How is the design of information technologies, particularly those that foster collaboration or interdisciplinary creativity, embedded in the design of interdisciplinary facilities?
23. With what models and examples of interdisciplinary facilities at other institutions of higher education are you familiar, and which would you like to emulate?
24. What have you learned about planning for and building interdisciplinary space? What advice would you give to your colleagues?
25. Identify one or more specific changes in policy and practice in the area of facilities, space, and capital planning that would increase your institution's capacity to foster interdisciplinary inquiry. For each proposed change, please address the following logistical questions:
 - a. Which institutional officials and entities would need to lead, and actively participate in, the process of transformation?
 - b. What obstacles would have to be overcome to accomplish the change?
 - c. Which approaches and methods are likely to be effective in overcoming the obstacles you've identified?
 - d. If an analysis of the self-studies supports institutional change in this direction, how likely would your institution be to implement this change?

EQUITY AND DIVERSITY SELF-STUDY SURVEY

Purpose of the Survey

The purpose of the Equity and Diversity Self-Study Survey is to understand the intersection of equity and diversity efforts and initiatives with interdisciplinary education, research, and teaching within and across institutions of higher education.

Instructions to the Survey Lead

This survey should be completed by a point person, or “survey lead,” at each participating institution. Each section starts with questions that have a relatively specific and discrete means of collecting information. Where data-based answers are not readily available, an e-mail discussion among select staff members should help answer the question adequately. The survey also contains constituency-based questions that probably require the survey lead to enlist input from an array of stakeholders and experts in order to arrive at a complete answer. (Some possible stakeholders/experts are suggested.) The survey lead may seek out multiple and varied perspectives on any question, as seems appropriate in order to answer the question fully.

In your responses, we ask that you not include URL links to Web sites or HTML documents, as these cannot be meaningfully interpreted as data. We also ask that you convey this request to others from whom you may seek responses.

Expertise to Complete the Self-Study

This section is intended for the institution’s chief diversity officers or individuals who have been appointed to, or have engaged in, work on issues of diverse faculty and/or the diverse research enterprise of the institution.

Self-Study Survey Questions

1. Is diversity considered a top strategic priority of your institution? If so, has it been the focus of significant central investment?
2. Does your institution establish any goals for diversity and/or outreach for the interdisciplinary centers that it internally funds or seeds (similar to the requirements of centers externally funded by NSF)? If yes, could you provide some examples of what those goals are and how they are evaluated?
3. How does your institution track the involvement of U.S. minorities in interdisciplinary centers/institutes? How does that level of involvement compare to their involvement in other disciplines in your institution?
4. Does your institution have a definition of diversity research? If so, what is the definition? (E.g., is it defined within the context of domestic diversity, international diversity, or a combination of the two?)
5. Using the definition you outlined in question 4, does your institution provide an opportunity for research activity on diversity scholarship? If yes, is this organized as an interdisciplinary activity, center, or institute similar to other interdisciplinary activities, centers, or institutes?
6. Identify three of your university’s most significant diversity-focused research centers or institutes.
7. What strategies have you used in recruiting and supporting faculty members who foster progress in the areas of both diversity and interdisciplinarity (e.g., dual partner recruitment or other practices)?
8. With respect to the intersection of equity and diversity, on one hand, and interdisciplinarity, on the other, what has your institution done well? Please describe successful change efforts in this area at your institution.

9. How have your university's investments in interdisciplinarity intentionally advanced other institutional objectives for supporting diversity?
10. Within the context of the university's efforts to advance interdisciplinary research, training, or education, have any concerns arisen regarding equity, diversity, inequality, or related issues? If they have arisen, please describe the concerns and how they have been addressed.
11. Identify specific changes in policy and practice in the area of equity and diversity that have increased your institution's capacity to foster interdisciplinary inquiry. For each change, please address the following logistical questions:
 - Which institutional officials and entities led and actively participated in the process of transformation?
 - What obstacles were overcome to accomplish the change?
 - Which approaches and methods were effective in overcoming these obstacles?
12. Identify additional specific changes in policy and practice in the area of equity and diversity that your institution has identified, but not implemented, that would increase your institution's capacity to foster interdisciplinary inquiry. For each proposed change, please address the following logistical questions:
 - Which institutional officials and entities would need to lead, and actively participate in, the process of transformation?
 - What obstacles would have to be overcome to accomplish the change?
 - Which approaches and methods are likely to be effective in overcoming the obstacles you've identified?
 - If an analysis of the self-studies supports institutional change in this direction, how likely would your institution be to implement this change?

COLLABORATIVE TECHNOLOGIES SELF-STUDY SURVEY

Purpose of the Survey

The purpose of the Collaborative Technologies Self-Study Survey is to compile information that will allow stakeholders to

- understand current usage of collaborative technologies on campus for interdisciplinary work;
- understand the opportunities for and barriers to introducing collaborative technologies into academic activities;
- identify and describe the overall technical framework for collaborative technologies currently deployed on campus;
- identify current trends (e.g., social, legal, policy, governmental, technological) that have an impact on the selection and use of interdisciplinary collaborative technologies;
- identify collaborative technology tools that will be needed in the future;
- identify values, beliefs, and behaviors that facilitate successful collaborations and successful interdisciplinary work, and the way that technologies may advance or hinder such work;
- identify innovators and potential early adopters using collaborative technologies; and
- begin to identify interdisciplinary campus team members who will help with future collaborative technology campus decisions.

Instructions to the Survey Lead

This survey should be completed by a point person, or “survey lead,” at each participating institution. Each section of the survey contains questions for which a relatively specific and discrete means of collecting information is available. Where data-based answers are not readily available, an e-mail discussion among select staff members should help answer the question adequately. The survey also contains constituency-based questions that probably require the survey lead to enlist input from an array of stakeholders and experts in order to arrive at a complete answer. The survey lead should gather data relevant to answering each question in ways that are reasonable and appropriate for his or her institution, including seeking out multiple and varied perspectives on any question in order to answer the question fully.

In your responses, we ask that you not include URL links to Web sites or HTML documents, as these cannot be meaningfully interpreted as data. We also ask that you convey this request to others from whom you may seek responses.

Self-Study Survey Questions

I. Overall Framework for Collaboration

This section is intended for chief information officers, vice presidents of research, head librarians, and leaders and decision makers in the area of graduate schools, undergraduate education, faculty tenure and promotion, and campus public engagement.

1. Please list up to ten collaborative technologies used at your institution and, where possible, indicate the level of adoption (i.e., number of active users) for each.
2. Please identify the current technical framework for collaborative technologies at your institution. Describe current platforms and technical standards employed to enable interoperability, and use of open-source or proprietary vendor strategies.
3. What has been the strategy used to host collaborative technologies on your institution’s campus (e.g., central hosting; federated hosts among various colleges, schools, and departments; or each campus unit hosting its own system)? Please describe the benefits and drawbacks of the approach(es) taken.
4. Please identify trends driving the growth and change in the use of collaborative technologies at your institution. These may include social, legal, policy, governmental, or technology-based trends. Please list the trends and also describe how these trends have an impact on learners, staff, faculty, and alumni.

II. Intradisciplinary and Interdisciplinary Collaboration

For the next section, intradisciplinary means within-discipline, contained within a traditionally structured and defined academic discipline.

By contrast, interdisciplinary refers to connecting and integrating two or more traditionally defined academic disciplines, professions, or technologies, along with their methods and perspectives, in the pursuit of a common goal.

5. Please list ten noteworthy *intradisciplinary* teams at your institution. Please include academic and nonacademic units. These groups do not need to be using collaborative technologies.
6. Please list the top five to seven values, beliefs, or behaviors that help make a successful *intradisciplinary* collaboration (e.g., establishing conventions around editing authority).
7. Please list ten noteworthy *interdisciplinary* work teams at your institution. Please include academic and nonacademic units. These groups do not need to be using collaborative technologies.
8. Please list the top five to seven values, beliefs, or behaviors that help make a successful *interdisciplinary* collaboration.
9. What are ways that technology tools could enhance collaboration, either intra- or interdisciplinary?
10. What are ways that technology tools could hinder collaboration, either intra- or interdisciplinary?

III. Innovators, Early Adopters, and Their Current Practices

Questions 11–20 are intended to gather information about the practices, perceptions, and preferences of innovators in collaboration at your institution. You may collect this information through whatever methods are reasonable and appropriate on your campus; one possible approach is described below. For questions 11–20, please provide a summary of the information you gather rather than raw data.

Please identify three to five interdisciplinary teams successfully using collaborative technologies (i.e., the current innovators) at your institution. Please list at least one teaching/learning, research, and public engagement team, using the table below to record names of leaders. Please e-mail the team members you identified and ask them to answer questions 11–19.

	Teaching and Learning	Research	Public Engagement
Faculty			
Staff			
Students			
Vendors/ businesses			

11. What social and/or technical tasks do you perform in your interdisciplinary collaborative work (e.g., decision making, handling conflict, getting to know each other, editing a document, sharing files)?
12. With whom do you collaborate? At what institutions and in which academic disciplines do your collaborators work? What is the nature of your collaboration?
13. What collaborative tools do you use?
14. What tools are you considering adopting?
15. What technology or tools would make your collaboration more productive?
16. What collaboration literacies (e.g., team tasks, stages, products, etc.) are most important in online (virtual) interdisciplinary collaborative teams?
17. What types of physical spaces are needed for interdisciplinary teams that use collaborative technologies?
18. What type of support is needed as you use collaborative technologies?
19. How do you know if your interdisciplinary team work has been successful?
20. What are leading, measurable indicators for the successful adoption of collaborative technologies at your institution?

IV. Future Directions for Collaborative Technology

The next two questions ask you to evaluate the potential for promoting collaborative technologies at your institution and to identify campus leaders who could assist in this effort.

21. Please list five to ten respected leaders on your campus in research, teaching, learning, and public engagement who are *not* early innovators in terms of using collaborative technologies, but who could be persuaded, with evidence and increased knowledge about the effectiveness of collaborative technologies, to use these technologies. In addition, please comment on why you think they have the potential to champion further work for selecting and supporting collaborative technologies.
22. Identify one or more specific changes in policy and practice in the area of collaborative technologies that would increase your institution's capacity to foster interdisciplinary inquiry. For each proposed change, please address the following logistical questions:
 - a. Which institutional officials and entities would need to lead, and actively participate in, the process of transformation?
 - b. What obstacles would have to be overcome to accomplish the change?
 - c. Which approaches and methods are likely to be effective in overcoming the obstacles you've identified?
 - d. If an analysis of the self-studies supports institutional change in this direction, how likely would your institution be to implement this change?

APPENDIX A3: CONSORTIUM ON FOSTERING INTERDISCIPLINARY INQUIRY CONFERENCE AGENDA

November 14–16, 2008
University of Minnesota

DATE AND TIME	LOCATION
<u>Friday, November 14</u>	
1:00–4:00 p.m. Work Session for Cochairs	Space provided per cochair request. Rooms: 301, 302, 303A, 303B Coffman Memorial Union
5:00 p.m. Reception	Dolly Fiterman Riverview Gallery at the Weisman Art Museum
6:00–8:00 p.m. Buffet Dinner <i>Welcome and Introduction</i> <i>Fostering Interdisciplinary Inquiry</i>	Arlene Carney, <i>Vice Provost for Faculty and Academic Affairs, University of Minnesota</i> E. Thomas Sullivan, <i>Senior Vice President for Academic Affairs and Provost, University of Minnesota</i>
<u>Saturday, November 15</u>	
7:30–9:00 a.m. Breakfast	West Wing, Campus Club
9:00–9:30 a.m. Welcome and Opening Remarks <i>Introduction of President Robert H. Bruininks</i>	John Ziegenhagen, <i>Director of Strategic Projects, Office of the Senior Vice President for Academic Affairs and Provost, University of Minnesota</i> Robert H. Bruininks, <i>President, University of Minnesota</i> Gail Dubrow, <i>Vice Provost and Dean of the Graduate School, University of Minnesota</i>
<i>Welcome</i>	
<i>Overview of Conference Goals</i>	

DATE AND TIME	Presentations and Discussion	LOCATION
9:30 a.m.–12:00 p.m.		Coffman Memorial Union
First Concurrent Sessions		
9:30–10:15 a.m.	<p>Judy Kirk, <i>Assistant Vice President of Development, University of Minnesota</i> Patricia Justice, <i>Assistant Chancellor for Development, University of Illinois at Urbana–Champaign</i> Moderator: Ann Waltner, <i>Director, Institute for Advanced Study, University of Minnesota</i></p>	Dale Shepherd Room, Campus Club
Development and Fundraising		
Finance and Budget	<p>Philip Hanlon, <i>Vice Provost for Academic and Budgetary Affairs, University of Michigan</i> Moderator: John Ziegenhagen, <i>Director of Strategic Projects, Office of the Senior Vice President for Academic Affairs and Provost, University of Minnesota</i></p>	President’s Room, Coffman Memorial Union
Space and Capital Planning	<p>Robert Kvavik, <i>Associate Vice President for Planning, University of Minnesota</i> James Roberts, <i>Executive Vice Provost for Finance and Administration, Duke University</i> Moderator: Louis Mendoza, <i>Associate Vice Provost for Equity and Diversity, University of Minnesota</i></p>	Room 303, Coffman Memorial Union
Second Concurrent Sessions		
10:20–11:05 a.m.	<p>Steve Cawley, <i>Vice President and Chief Information Officer, University of Minnesota</i> Ron Kraemer, <i>CIO and Vice Provost for Information Technology, University of Wisconsin–Madison</i> Moderator: Robert McMaster, <i>Vice Provost and Dean of Undergraduate Education, University of Minnesota</i></p>	President’s Room, Coffman Memorial Union
Collaborative Technologies		

DATE AND TIME	LOCATION
Second Concurrent Sessions (continued)	
10:20–11:05 a.m. Equity and Diversity	Rusty Barceló, <i>Vice President and Vice Provost for Equity and Diversity, University of Minnesota</i> Sheila Edwards Lange, <i>Vice President for Minority Affairs and Vice Provost for Diversity, University of Washington</i> Moderator: Lawrence Knopp, Jr., <i>Associate Dean of the Graduate School, University of Minnesota–Duluth</i> Room 303, Coffman Memorial Union
11:10 a.m.–12:00 p.m. Synthesis of Morning Session	ALL, led by moderators Rooms A, B, and C, Campus Club
12:00–1:00 p.m. LUNCH	West Wing, Campus Club
1:00–3:30 p.m. Presentations	Rooms A, B, and C, Campus Club
1:00–1:45 p.m. Academic Administration and Faculty Governance	Jeanie Taylor, <i>Former Assistant Vice Provost for Interdisciplinarity, University of Minnesota</i> Sheldon Zedeck, <i>Vice Provost for Academic Affairs and Faculty Welfare, University of California, Berkeley</i> Moderator: Susan Roth, <i>Vice Provost for Interdisciplinary Studies, Duke University</i>
1:45–2:30 p.m. Research	Frances Lawrenz, <i>Associate Vice President for Research, University of Minnesota</i> Moderator: Catherine Koshland, <i>Vice Provost, Academic Planning and Facilities, University of California, Berkeley</i>
2:30–2:45 p.m. BREAK	

DATE AND TIME	LOCATION
2:45–3:30 p.m. Education and Training	Gail Dubrow, <i>Vice Provost and Dean of the Graduate School, University of Minnesota</i> Janet Weiss, <i>Dean of the Rackham Graduate School and Vice Provost for Academic Affairs, University of Michigan</i> Moderator: Ann Waltner, <i>Director, Institute for Advanced Study, University of Minnesota</i>
3:30–3:45 p.m. BREAK	
3:45–4:45 p.m. Discussion	ALL Moderator: Robert McMaster, <i>Vice Provost and Dean of Undergraduate Education, University of Minnesota</i>
4:45–5:15 p.m. Next Steps for Implementation	Gail Dubrow, <i>Vice Provost and Dean of the Graduate School, University of Minnesota</i> <i>Conferees are on their own for dinner.</i>
<u>Sunday, November 16</u>	
8:00–9:00 a.m. Breakfast and Institutional Caucuses	Heritage Gallery, McNamara Alumni Center
9:00–10:15 a.m. Institutional Action	Institutional Leads with Discussion Kickoff by: Feniosky Peña-Mora, <i>Associate Provost, University of Illinois at Urbana–Champaign</i> Peyton Smith, <i>Assistant Vice Chancellor for Extended Programs, University of Wisconsin–Madison</i>
10:15–11:00 a.m. Next Steps for Institutional Action	Gail Dubrow, <i>Vice Provost and Dean of the Graduate School, University of Minnesota</i>

Part B

Online Resources

APPENDIX B1: UNIVERSITY OF MINNESOTA ONLINE RESOURCES

Office of the Senior Vice President for Academic Affairs and Provost: Consortium on Fostering Interdisciplinary Inquiry—academic.umn.edu/provost/interdisc/inquiry/index.html

Consortium on Fostering Interdisciplinary Inquiry myU Portal Site—www.myu.umn.edu/metadot/index.pl?id=1562406

Office of Interdisciplinary Initiatives—www.grad.umn.edu/oii/

APPENDIX B2: NEWS ARTICLES AND COVERAGE

“Agents of Transformation.” *Discovery 3* (2008–9): 12–14. University of Minnesota Graduate School.
www.grad.umn.edu/discovery/Discovery0809.pdf.

“Leading Through Collaboration.” *Discovery 3* (2008–9): 8–11. University of Minnesota Graduate School.
www.grad.umn.edu/discovery/Discovery0809.pdf.

Marty, Gayla. “Cooperation as a Key to Achieving Excellence.” University of Minnesota Graduate School. November 20, 2008.
www.grad.umn.edu/news-events/cfii_recap.html.

Redden, Elizabeth. “Encouraging Interdisciplinarity.” *Inside Higher Ed*. November 6, 2008.
www.insidehighered.com/news/2008/11/06/interdiscipline.

———. “‘Institutionalizing’ Interdisciplinary Research.” *Inside Higher Ed*. July 25, 2007. www.insidehighered.com/news/2007/07/25/interdis/.

Part C

Electronic Documents

APPENDIX C1: ELECTRONIC DOCUMENTS AVAILABLE TO CONSORTIUM MEMBER INSTITUTIONS

	Functional Area Report	Conference Presentation Executive Summary	Conference PowerPoint Presentation	Conference Session Summary Notes	Conference Session Audio Files
Academic Administration and Faculty Governance	X	X	X	X	X
Education and Training	X	X	X	X	X
Research	X	X	X	X	
Development and Fundraising	X	X	X	X	X
Finance and Budget	X	X	X	X	X
Space and Capital Planning	X	X	X	X	X
Equity and Diversity	X	X	X	X	X
Collaborative Technologies	X	X	X	X	X