Coaching and Training Module

Barriers and Strategies:
Talking Points for Interdisciplinary and Team Science Initiatives

The Coaching and Training Modules are intended to help individuals and groups learn about key aspects of interdisciplinary research and team science. They may be used for self-tutorials, mentoring and coaching, and formal workshops and short courses.

Interdisciplinary and team science initiatives face common challenges. When respondents to preliminary surveys for the 2005 National Academy of Sciences report on *Facilitating Interdisciplinary Research* were asked to rank the top five impediments to interdisciplinary research on their campuses, tenure and promotion criteria received the highest percentage, followed by budget, strategic plans, and space (pp. 73, 76). Subsequently, experts on team science identified a parallel range of personal, intra- and interpersonal, organizational, technological, socio-political, and physical factors that impede and enable collaborative work (p. 490). There is no universal formula for success. However, an overview of barriers and strategies will help individuals, planning groups, and teams build common understanding, formulate shared plans, and engage in joint implementation.

- *Facilitating Interdisciplinary Research*. (2004). Washington, D.C.: The National Academies Press. PDF file downloadable at http://www.nap.edu/catalog.php?record_id=11153
- Stokols, D., et al. (2010). "Cross-disciplinary Team Science Initiatives: Research, Training, and Translation." In R. Frodeman, J.T. Klein, and C. Mitcham (Eds.). *The Oxford Handbook of Interdisciplinarity*. Oxford: Oxford University Press.

This module has two aims:
• to identify common barriers and disincentives
• to identify strategies and mechanisms for overcoming them.

It charts approaches in two steps:
Step 1: using annotated bibliographies and training modules on this OVPR site
Step 2: incorporating materials from key works focused on barriers and strategies.

> **STEP 1: Use pertinent annotated bibliographies and training modules elsewhere on this OVPR website at the IDR link.**

The bibliographies and modules have multiple uses for individuals, leaders, and teams:

• to expand individual knowledge
• to mentor and coach others
• to anchor discussion and group learning in authoritative materials
• to incorporate resources into workshops, colloquia, and short courses.

Annotated Bibliographies highlight key literature and online resources.

Beginning Bibliography on Interdisciplinarity: includes introductions and overviews, strategies for change, scholarly studies, and key works in science and technology, social sciences, and humanities

Resources for Interdisciplinary Education: includes places to start, overviews of practice, pedagogy and learning, textbooks for students, learning assessment, and tips for finding resources in particular domains

Training Modules annotate key resources and provide tips for using them.

Barriers and Strategies: identifies common barriers and disincentives along with strategies and mechanisms for overcoming them. Step 1 [this page] describes annotated bibliographies and training modules on this OVPR site. Step 2 highlights materials from key works focused on barriers and strategies.

Education and Training*:* includes introductions and overviews, best practices, learning outcomes and criteria for learning assessment, additional online and grounded training modules and courses including sample syllabi and course descriptions. Emphasizes team science

Evaluation: includes introductions and overviews, international models from major evaluation projects, resources with useful graphics, curriculum models and learning assessment.

Tenure and Promotion [T&P]: includes overviews, guidelines and lessons from experience, and further readings and other resources.

Resources for Team Science: includes introductions and overviews, strategies for successful collaborations, evaluation, training and continuing professional development, and ways to find more resources and stay up to date. A combined full annotated bibliography and training modules with usage tips.

STEP 2: Incorporate materials from key works focused on barriers and strategies.

The following resources will help individuals, teams, and program and project leaders deepen understanding of what interdisciplinarity and team science entail in several ways:

• using particular chapters and sections for initial reading and discussion
• using specific chapters and sections for focusing planning and implementation
• using specific chapters and sections to coach the research process at different stages
• using checklists and tables as focusing points for discussion, planning, and implementation
• using checklists and tables as focusing points for evaluating progress.

Three overriding principles will enrich a developmental approach to using resources:

Inform: "Best Practices" are not universal formulas. However, they are steeped in the wisdom of practice and insights from literature so should be consulted for strategies and models.

Localize: Every barrier is matched by a solution, but it may not work locally. Informed decision-making is enhanced by being aware of local activities and leveraging available human and material resources.

Lead by Example: State-of-the-art practices inspire others by modeling change. Leadership is crucial across top-down, mid-, and bottom-up levels.

Holley, K. A. (2009). *Understanding Interdisciplinary Challenges and Opportunities in Higher Education*. **San Francisco: Jossey Bass. Vol 35, 2 in the ASHE Higher Education Report series.**

A digest of strategies for interdisciplinary change with a focus on structure and rewards. Includes chapters on definition, academic contexts, research practice, and learning and education. Text downloadable as a PDF file with membership in Academia.edu research sharing network at http://www.academia.edu/5390376/Understanding_Interdisciplinary_Challenges_and_Opportunities_in_Higher_Education

Exhibits for engaging faculty:
• *Exhibit 4*: Strategies for Interdisciplinary Faculty Engagement as an Institutional Goal
• *Exhibit 5*: Strategies for Developing Interdisciplinary Faculty Work Across Institutional
        Boundaries
• *Exhibit 6:* Strategies for Institutional Support of Interdisciplinary Faculty Activity Systems

Exhibit for shaping conversations about state-of-the-art practices:
• *Exhibit 7*: Best Practices Related to Interdisciplinarity

> **Lyall, C., et al. (2011).** *Interdisciplinary Research Journeys: Practical Strategies for Capturing Creativity.* **London: Bloomsbury Academic.**

Guides researchers and research managers through active strategies for designing projects, managing teams, training, career pathways, knowledge transfer, and evaluation. Includes many Case Study and Key Advice boxes plus sets of questions for multiple stakeholders in the research process. Wayne State University ELECTRONIC BOOK-ebrary/OPEN ACCESS BOOKS. Individual sections viewable free at
http://www.bloomsburyacademic.com/view/Interdisciplinary-Research-Journeys/book-ba-9781849661782.xml

See especially the following for focusing discussion, planning, implementation, and evaluation.

Key Advice Boxes:

      3.1: characteristics of an interdisciplinary researcher

      3.2: integration activities at key stages and list of ways of integrating disciplines
      3.3: checklist for a good interdisciplinary proposal and project design
            See also Figure 3.1: different design approaches

      4.1: key steps toward successful interdisciplinary team-based projects
            See also Case Study 4.3: the collaborator's prenup
      4.2: steps for facilitating interdisciplinary workshops and initiatives
      4.3: qualities of a good interdisciplinary leader
            4.4: tips for interdisciplinary team managers
            4.6: roles of a leader

      5.1: questions to consider when choosing a supervisor
            5.2: checklist of do's and don'ts for interdisciplinary supervisors and mentors
            6.1: questions to ask one's self about interdisciplinary motivations
            6.2: career development scenarios
            6.3: questions to consider when contemplating an interdisciplinary career
            See also Figure 6.1: degrees of involvement in interdisciplinary careers
            See also Figure 6.2: risks and benefits of interdisciplinarity

      7.1: questions to ask when assessing interdisciplinary quality
            7.2: quality criteria for interdisciplinary research
            7.3: tips for effective interdisciplinary review panels
            7.5: points to consider for larger interdisciplinary proposals or programs
            7.6: considerations for institutional evaluation and strategy
            7.7: tips for evaluating interdisciplinary publications

Klein, J.T. (2010). *Creating Interdisciplinary Campus Cultures: A Model for Strength and Sustainability*. **San Francisco: Jossey Bass and Association of American Colleges and Universities.**

Presents a systematic approach to identifying current activities and interests, leveraging resources, benchmarking best practices, building capacity and critical mass, targeting strategic initiatives, and general loosening of barriers along with criteria for evaluation and the career life-cycle. Wayne State University ELECTRONIC BOOK-ebrary and the Purdy-Kresge and Technology Resource Center Libraries: LB 2361.5 .K54 2010. Table of contents viewable at http://www.wiley.com/WileyCDA/WileyTitle/productCd-0470550899.html

See especially:

Chapter One:
Overviews of interdisciplinary work in science and technology, social sciences, and humanities provide updated background information on related research and education.

Chapter Two
Table 2: Framework for an Interdisciplinary Inventory of local activities can help
　　administrators identify and map what is happening on campus. Accompanying
　　Variables of Change can aid in determining what is appropriate and possible locally.

Chapter Three
• *Table 3.1: Barriers and Disincentives* can frame discussion of impediments, saving
　　time trying to identify the typical obstacles that arise, with checklist and explanation.
 • *Table 3.2: Facilitating Strategies and Mechanisms* can frame discussion of how to overcome
　　barriers and disincentives, with a checklist and explanation.
• *Table 3.3: Strategies for Building an Interdisciplinary Endowment* can guide discussion of
　　a portfolio of strategies for funding support.

Chapter Four
• *Table 4.1: Critical Mass Indicators for Sustainability* provides a checklist of
　　criteria for strong programs along with five principles for program review.

Chapter Five
• *Exhibit 5.2: Checklist for Annotating an Interdisciplinary Curriculum Vitae*
　　is a model for mentoring and advising students in the job search.
• *Exhibit 5.1: Interdisciplinary MOU Checklist* is a model for negotiating terms of a position
　　in final stages of job search and hiring.
• *Table 5.1: Strategies for Interdisciplinary Faculty Development* offers ideas and
　　activities for developing interdisciplinary and collaborative potential across all stages of
　　the career life cycle.

Conclusion: provides answers to the most common myths about interdisciplinarity.