

Organizational Structures to Promote Multidisciplinary Research Some Preliminary Thoughts from EAB's University Research Forum (June 2016)

Research Question

What are the best ways for universities to support research activities that require collaboration across existing academic units?

The Rise of Multidisciplinary Collaborative Research

Research that involves collaboration across disciplines is a top priority at research universities, driven by multiple factors:

- The emergence of exciting new fields of study that involve approaches or techniques from multiple disciplines (e.g. biomedical engineering, environmental sustainability, brain science)
- The growth of team science, bringing together groups of investigators from different disciplines into larger scale collaborations
- Donor and funding agency interest in addressing “grand challenges” that require the combination of approaches from multiple disciplines to solve pressing social issues

While not new, the level of interest of interest in multidisciplinary collaboration has increased dramatically in recent years, as evidenced by:

- Co-authored publications
- Multiple PIs on grants
- Interdisciplinary journals
- Interdisciplinary grant programs at funding agencies
- Large scale internal seed funds
- Proliferation of centers and institutes
- Growth of interdisciplinary graduate programs
- Creation of interdisciplinary departments

The Challenge of Balancing Disciplinary and Multidisciplinary Research

This rapid growth has created tensions with the traditional disciplinary structure which still controls most of the levers of resource allocation:

Resource Allocation	Tensions for Multidisciplinary Research
Faculty hiring decisions	Departments hire to cover teaching needs and to fill gaps in disciplinary coverage. They tend to prioritize covering existing territory rather than exploring new areas at the margins of disciplinary interest
Criteria for promotion & tenure	Because standards differ by discipline, a faculty member doing work in multiple disciplines may not meet traditional standards in each one separately, e.g. in terms of publications in top disciplinary journals
Research space allocation	Research space is typically allocated to people. It can be hard to find space for new collaborative projects
A portion of indirect cost recovery on grants	At many institutions some F&A recovery goes back to the department. If PI's are also in centers there may be concerns about F&A being "diverted" away from the department

Interdisciplinary activities typically sit outside normal planning, budgeting, and resource allocation processes. The organizational challenge, therefore, is to simultaneously preserve the strengths of the traditional departmental structure while allowing for the growth of new structures.

As Gumport (2002) explains, as knowledge evolves so much organizational structures. Structure matters because it supports certain kinds of knowledge creation and inhibits others. University structure also communicates institutional identity to outside stakeholders—demonstrating to students, funders, and potential faculty where the institution excels and what the institution prioritizes.

Gumport identifies five different processes for changing academic structure:

- Differentiation—departments and programs split into multiple, more specialized entities
- Promotion—departments become divisions, schools, or colleges
- Evolution—departments change name or focus
- Consolidation—departments merge into larger departments
- Stability—departments do not change structure

Here analysis of the evolving structure at San Jose State University provides what might be called an "organic" history of the evolution of disciplines and departments. This is a slow process that happens over many decades.

Many today would argue that this organic process of disciplinary change is too slow to respond to rapid changes in scientific opportunities and market demand. The proliferation of centers and institutes and other extra-departmental structures represents an attempt to maintain the traditional structure while superimposing a new, more flexible structure.

Jacobs (2013) perceives this trend as a danger to scholarship and provides a comprehensive defense of the ability of academic disciplines to support innovation and collaboration. A stable departmental structure, he argues, is essential to protect the kinds of long-term investments required to support ground-breaking research and thriving PhD programs.

“This programmatic stability, accompanied by intellectual dynamism, is valuable. It allows for greater certainty, longer time horizons, and greater faculty investments in long-term research ventures. In short, disciplines create a zone of academic freedom that is essential for the vitality of critical inquiry, research, and scholarship.” Jacobs (2013), p. 212.

He also claims that such organizations are critical to defending faculty autonomy, fearing that a “portfolio approach” to academic programs privileges central administration decisions at the expense of faculty independence.

“The main concern is that disciplines and programs will become elements in a portfolio rather than academic disciplines that need careful and long-term nurturing. The risk is that deans will pursue short-term strategic opportunities over the long-term cultivation of particular departments...” Jacobs (2013), p. 213.

For Jacobs, disciplinary departments are the bulwark of academic freedom and the foundation for long-term, transformative research.

Few would argue for the abandonment of the academic disciplines or traditional academic departments, but there is a growing recognition that these structures can inhibit the growth of new types of collaboration that may represent institutional priorities even though they may not align perfectly with departmental priorities. The debate about multidisciplinary and academic structure highlights a series of priorities and values that are tension:

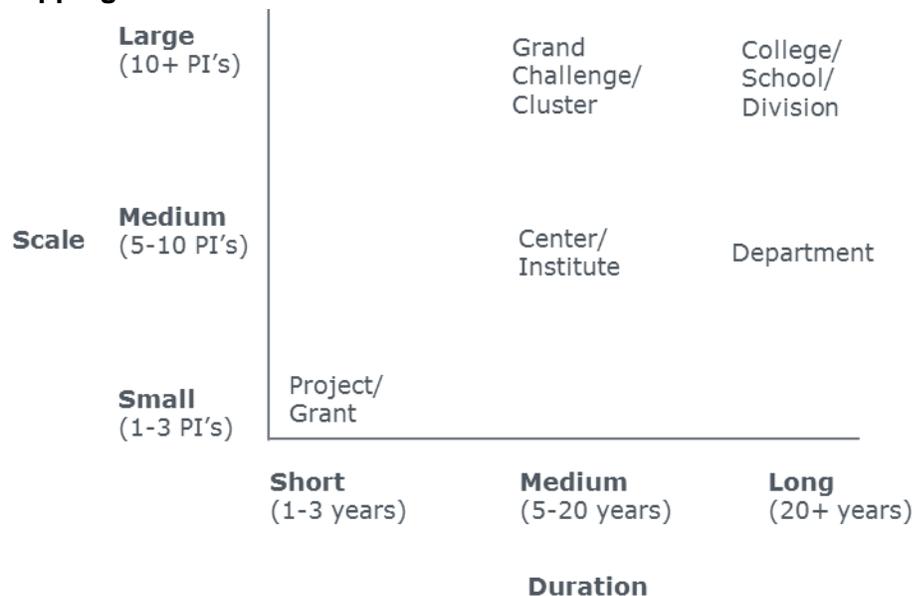
Breadth	Focus
Stability	Agility
Department priorities	University priorities
Faculty autonomy	Administrative coordination
Independence	Responsiveness

Both sides of these dualities have value to the universities mission and any single approach involves tradeoffs between competing goods.

It is useful to visual the range of academic structures on campus to determine if there is sufficient variety to accommodate the range of research opportunities and goals. When Harvard

University did such an analysis in 2006, the discovered strong departments and schools and very strong individual scholars but a deficit of medium sized collaborations of medium length.

Mapping the Scale vs. Duration for Academic Collaborations



Because scientific collaborations evolve very quickly, while formal organizational structures evolve very slowly, they will always be in tension. Tensions are generated because different individuals and groups have different goals and different incentives. No organizational model can perfectly resolve them, but a series of “fixes” have evolved over the past two decades.

These approaches are answers to the critical questions:

- How to manage tenure home
- How to manage hiring
- How to allocate space
- How to make faculty aware of potential collaborators
- How to identify, highlight and build institutional strengths

Models for Stimulating and Supporting Multidisciplinary Research

A number of approaches exist to stimulate and support research and teaching collaborations across departmental or college/ school boundaries:

- Joint Faculty Appointments
- Cluster Hires
- Centers and Institutes
- Cross Disciplinary Departments
- Clusters, Initiatives, Themes, Grand Challenges
- New Divisions/ Schools

These approaches range from relatively minor additions to traditional academic structures to wholesale organizational redesigns.

Joint Appointments

Description	Faculty have tenure in two (or more) departments
Advantages	Joint faculty can serve as a bridge between disciplines increasing awareness and building collaborations. Also can be a form of cost sharing
Challenges	Departments must agree on tenure and promotion criteria. Committee work for two departments can be overwhelming. Jacobs (2013) criticizes the joint appointment approach on pp. 216-18, arguing that it leads to divided loyalties (and time commitments) which will ultimately sabotage the integrity of the departmental structure
Examples	Common at most universities
References	Michigan State University has posted best practices for joint appointments

Cluster Hires

Description	Hiring initiative designed to bring in multiple faculty who will collaborate around a topic of strategic importance to the institution
Advantages	Enables an institution to build a strength in a niche area that cuts across multiple departments. Can be used to attract star researchers (due to the level of funding and visibility of the initiative)
Challenges	Departments may feel that the new hires do not align with departmental needs. Disciplines left out of the cluster hire may question how priorities were set.
Examples	University of Wisconsin, UC Riverside, Florida State University
References	See Severin (2013) and McMurtrie (2016)

Centers and Institutes

Description	An organization of faculty (who typically maintain their tenure home in a department) and staff around shared research interests. Centers can be within a department, across departments within a school, or across schools (“university centers”).
Advantages	Centers sit on top of the departmental structure and depend on it for resources. Creating centers not only facilitates collaboration around a specific topic, it also signals to external stakeholders that the institution has a strength in a certain niche.
Challenges	While in theory it is easier to sunset a center than a department, at most institutions centers (at least the large ones) have become as permanent (and some would argued siloed) as departments.
Examples	Many research universities have 100+ centers or institutes on campus. A few canonical examples are: University of Illinois Beckman Institute Harvard/ MIT Broad Institute Stanford Bio X Purdue Discovery Park (really a shared infrastructure and space that supports multiple centers)
References	See Boardman (2010), Bozeman (2003), EAB (2009)

EAB (2009) describes two different philosophies of center management. At the University of Alabama Birmingham (UAB) university-wide centers are largely “virtual”. The resources are almost entirely borrowed from departments: all faculty have tenure homes in departments, core facilities are run by departments, and funding comes from the deans. The deans vote every three year on the continuance of each center (and the launch of new university-wide centers). Dismantling a center is relatively easy because they have few fixed assets. Duke University has created a number of semi-permanent institutes around topics of enduring interest (Brain Sciences, Global Health, Cancer, etc). These institutes have budget lines and development staff and facilities. Within the institutes, however, centers can be created (and terminated) in response to changing needs.

Cross-Disciplinary Departments

Description	Departments composed of faculty from more than one school or college (often a collaboration across medicine, engineering, and basic sciences)
Advantages	Offers a more permanent investment in and support for a well-defined and popular new emerging discipline while leveraging existing resources in other parts of the university
Challenges	Because it depends on shared resources it may face some of the same challenges as centers and institutes
Examples	Harvard, Developmental and Regenerative Biology
References	

Clusters, Initiatives, Themes, Grand Challenges

Description	A large, loose collection of faculty from across the university who are working towards a single ambitious goal
Advantages	Grand Challenges can connect faculty from disparate parts of the university with problems that have strong resonance for outside stakeholders (including funding bodies, students, state governments). They require relatively little fixed infrastructure (but lots of coordinating work)
Challenges	Grand challenges and cluster initiatives are often defined by the announcement of a large institutional investment. Some faculty may be annoyed by the hype or feel left out of an initiative not broad enough to align with their interests. Prioritizing a few initiatives may make some faculty feel that they aren't priority. There is little evidence yet whether these large initiatives are successful at generating societal impact or increased external funding.
Examples	UCLA Grand Challenge Dartmouth University Academic Cluster Initiative Indiana University Grand Challenges University of Chicago Arete (a support function to help identify and catalyze large-scale collaborations)
References	Basken (2016), Ledford (2015)

New Divisions/ Schools

Description	Recombining departments into new divisions or schools that align with emerging research interests rather than traditional disciplines
Advantages	A large scale reorganization offers opportunities to differentiate the university, invest significant resources in fast growing areas, and better align teaching and research functions with market demand
Challenges	A significant percentage of current faculty are likely to resist major shifts in academic structure which change performance expectations and priorities
Examples	Arizona State University Berea College
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