

Engaging Faculty in Interdisciplinary Research: Challenges and Best Practices from a Career Development Perspective

Abstract

In recent years, the growth in interdisciplinary research has contributed to significant advancements in science. However, from a career development perspective, faculty perceive a number of impediments to conducting interdisciplinary research. This paper will describe the rise of interdisciplinary research in academia ([Section I](#)). It will describe faculty's perceived impediments to conducting interdisciplinary research ([Section II](#)). Next, it will review evidence that women have a stronger propensity to collaborate and to conduct interdisciplinary research than men, thereby suggesting that engaging in interdisciplinary research may have a disproportionately negative effect on women's career development ([Section III](#)). Finally, given the critical importance of interdisciplinary research to scientific advancement, it will review best practices for supporting interdisciplinary research at the institutional level ([Section IV](#)), provide conclusions ([Section V](#)), and provide supporting references ([Section VI](#)).

I. Introduction: The Rise of Interdisciplinary Research in Academia

Many important research questions demand solutions that integrate knowledge from multiple scientific disciplines. Interdisciplinary research has delivered new technologies and discoveries, as well as healthier and more prosperous lives (National Academies, 2005).

Since the mid-1990s, federal funding agencies have increasingly pushed researchers towards conducting interdisciplinary research (Rhoten & Pfirman, 2007). A growing proportion of federal Requests for Proposals require an interdisciplinary research approach (Pfirman et al., 2011). The National Science Foundation (NSF) has acknowledged the importance of interdisciplinary, cutting-edge science and technology for the growth and vitality of the economy and society (Van Hartesveldt & Giordan, 2008).

II. Impediments to Conducting Interdisciplinary Research from a Career Development Perspective

Despite the tremendous contributions of interdisciplinary research, studies reveal several impediments to engaging in it from a career development perspective. For example, in a survey of researchers participating in interdisciplinary programs funded under the NSF Environmental Research and Education portfolio, Rhoten and Parker (2004) found that approximately 16% of graduate students reported "negative" career effects of the program's interdisciplinary design. Several graduate students indicated a greater prevalence of interdisciplinary role models among non-tenured staff than among tenured staff.

Rafols and colleagues (2012) found evidence that "excellence-based" journal rankings have a systematic bias against interdisciplinary research. This may create or reinforce disincentives for researchers to engage in interdisciplinary research. When journal rankings are used to help determine the allocation of prestige and resources for faculty, it can hinder interdisciplinary research.

For many faculty, a major impediment to conducting interdisciplinary research is the perception that it will put them at a disadvantage in the review and promotion process. Traditional faculty review and promotion systems tend to favor disciplinary over interdisciplinary research (Pfirman et al., 2011). As Valian (2005) states, faculty working in traditional, disciplinary areas may be unable to evaluate interdisciplinary work, as it will likely be at odds with the approaches and findings with which they are most comfortable. In a study by the National Academies (2005), both individuals and provosts ranked concern about “promotion criteria” as the top impediment to interdisciplinary research at their institutions. In a survey of scientific employees at a large research university, van Rijnsoever and Hessels (2011) found that disciplinary research collaboration was positively related to academic rank, but that interdisciplinary research collaboration was unrelated to academic rank.

III. Evidence for Gender Differences in the Propensity to Collaborate and Engage in Interdisciplinary Research

Evidence suggests that women have a greater propensity to collaborate and engage in interdisciplinary research than men (Kuhl & Villeval, 2013; Rhoton & Pfirman, 2007; Van Rijnsoever and Hessels, 2011). Engaging in interdisciplinary research may have a disproportionately negative effect on the career development of women.

Evaluation Associates Ltd (1999) analyzed survey responses from 5,505 researchers in the United Kingdom and found that greater percentages of women than men reported participating in interdisciplinary research at almost every age and in almost every discipline. In a large-scale analysis of publications indexed in the Web of Science, Abramo and colleagues (2013) found that women researchers showed a greater propensity to collaborate within their institutions and outside of their institutions (domestically) than men researchers. Leahey (2006) found evidence that faculty who specialize tend to publish more, and that women tend to specialize less than men.

In a survey of STEM faculty from ten private, mid-sized research universities, Hyland, Krasas, Levine, and Abrantes (2011) found that, compared with men, women expressed more desire to pursue additional opportunities for collaborative and interdisciplinary research. However, women also perceived greater institutional constraints. Women agreed more than men with the statement, “I would like to pursue more interdisciplinary research, but only after I am more established in my career.” Compared with men, women agreed less with the statement, “Participation in collaborative research is viewed positively during the tenure/promotion review process.”

IV. Best Practices in Promoting Interdisciplinary Research at the Institutional Level

To facilitate interdisciplinary research, Pfirman and colleagues (2011) offer guidelines for individuals and academic administrators in several areas. The areas include structural considerations, position creation and institutional acceptance, search and hiring, early-career scholar development, reviews and tenure, and senior career development. For example, in the review and tenure processes, they recommend developing interdisciplinary criteria and providing special guidance to individuals who will write letters of reference. Further, to support career development, they recommend that merit pay and professional development funds for interdisciplinary activities be made available at the Dean’s level or higher.

In 2008, the NSF Integrative Graduate Education and Research Traineeship (IGERT) Program sponsored a two-day workshop to define the progress of interdisciplinary research and graduate education, as well as their impacts

on academic institutions. **The working groups provided key recommendations to universities for advancing interdisciplinarity (Van Hartesveldt & Giordan, 2008), including the following:**

- **Develop new models of organizational structures and funding to facilitate interdisciplinary research and build incentives for interdisciplinary collaboration among faculty.**
- **Establish policies regarding the distribution of overhead funds for interdisciplinary grants.**
- **Establish policies regarding credit for multi-authored publications, patents, and grants.**
- **Provide clarity and transparency in the valuation of work. This must include both traditional measures and nontraditional measures that capture the breadth of interdisciplinarity.**
- **Revise tenure and promotion guidelines, to include recognition and reward for contributions to interdisciplinary research and education.**

V. Conclusion

Despite the significant scientific advancements that interdisciplinary research has created, faculty experience a number of disincentives to conducting interdisciplinary research, from a career development perspective. These impediments may affect women more than men, given the research evidence that women have a stronger propensity to collaborate and to conduct interdisciplinary research than men. It is critical to follow best practices for engaging faculty in interdisciplinary research. This will support equity among faculty who engage in disciplinary and interdisciplinary research, and it will help to fuel the advancement of scientific knowledge.

VI. References

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