

The Challenges of Interdisciplinary Research for Tenure Track Professors

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Abstract

Interdisciplinary research is the collaboration of people fusing knowledge, theories and methodologies from two or more disciplines. Interdisciplinary collaboration can advance fundamental understanding to form a more inclusive means of examining complex issues beyond the scope of a single discipline. The increase of public monies being dedicated to interdisciplinary research is one way federal agencies like the National Science Foundation are trying to foster more collaboration among people of different disciplines. Data is collected from published articles in the Canadian Journal of Agricultural Economics from 1996 to 2010. Information on authors of each article—occupations, departmental affiliations, positions held, institutional affiliations, and sources of funding—is collected. Since agricultural economics is strongly tied to policy and the increase of funding for interdisciplinary research, I anticipate there will be a rise in the number of interdisciplinary research articles published in the Canadian Journal of Agricultural Economics. I also anticipate that if there are no barriers to joint collaboration between disciplines there will be an increase in the number of tenure track professors engaged in interdisciplinary research. This is a critical issue for professors who are required to publish research in order to receive tenure. This study also has implications for understanding whether difficulties from engaging in interdisciplinary research as opposed to intradisciplinary research for tenure track professors is still relevant.

Introduction

Over the last several years there has been a greater initiative to fund interdisciplinary research. The concept of interdisciplinary research, however, has been around since the 1930s and was brought into scientific discourse in the 1980s (Klein, 1996 & Geertz, 1980, as cited in Broto et al., 2009). The recent push for interdisciplinary research has come about for several reasons, but particularly because it has been regarded as the foundation and the driving force of current policy-making decisions.

Agricultural research is particularly shaped by the concept of providing solutions to the agricultural sector and is especially sensitive to the current demand for applied, or “problem-solving,” research (Lockeretz and Anderson, 1993, as cited in Duffy et al., 1997). Governments favor investing in research that has applicable results because collaboration between academic and commercial interests is seen as a major driver of national economies (Lowe & Phillipson, 2006). Furthermore, we can see this push for interdisciplinary research initiatives from public and private organizations that set forth requirements for research proposals has a direct relevance and potential application to policy-making decisions.

This study explores whether the initiative to fund more interdisciplinary research has actually created a visible increase in the number of interdisciplinary research published, looking specifically at the *Canadian Journal of Agricultural Economics*. Also, it will look at how frequently tenure track professors are cited in the *Canadian Journal of Agricultural Economics* over a time span of 14 years. This study is significant because it is a critical issue for professors who are required to publish research in order to receive tenure and this study has implications for understanding whether difficulties from engaging in interdisciplinary research as opposed to intradisciplinary research for tenure track professors is still relevant.

Literature Review

Human endeavor to understand the world is traditionally fractured into disciplines, so the rise of interdisciplinary research is spawning a vast amount of literature examining its role in the advancement of science.

There is an ample amount of research suggesting that collaboration between individuals in different disciplines can enhance the overall research. Levitt and Thelwall (2010) note that collaborative research tends to be more highly cited than non-collaborative research and that encouraging behavior associated with high citation can be conducive to higher quality research. Gardner et al. (2002) also suggest that collaboration “enhances the entire research process and generates benefits beyond the research project” (as cited in Liao, 2010). Oh et al. (2005) indicates that collaboration can lead to groundbreaking research (as cited in Liao, 2010). The conclusions of these studies imply that collaboration from diverse members simulates more productive brainstorming, creativity, and innovation than a research team with no diverse members (Liao, 2010).

A large body of research has also been devoted to developing tools to measure the quality, or contribution, of research. The most common tools used are traditional bibliometric indices such as citation analysis, impact factor, and research awards. Citation analysis measures the number of citations an article receives by calculating the frequency at which an article is cited by other papers. A journal’s impact factor is calculated as the average number of citations per article published in a specific journal. The research awards tool is calculated based on the number of awards a particular article receives. Traditional bibliometric indices, such as citation analysis, impact factor, and research awards, have also been criticized for being bias in their measures and assessing research outputs as if they were consumer goods rather than providing descriptive data (Wiles et. al., 2010).

Research done by Broto, Gislason, and Ehlers focuses on the practice of interdisciplinary research and its relationship with institutionalized disciplines. Through the analysis of nine qualitative interviews, they identify the motives of the researchers to engage in interdisciplinary research and discuss the characteristics of interdisciplinary research practice they found to be important. They conclude that “interdisciplinary research practice relies on disciplinary institutions as points of theoretical and methodological reference,” but because interdisciplinary research is the interplay of disciplines at the border area, tensions “occur between the practice of interdisciplinary research and the practice of more traditional disciplinary research” (Broto et al., 2009). They define disciplines as institutions because “disciplines can be understood as institutions that coordinate the production of knowledge” (Broto et al., 2009). More specifically, they use a definition from Vatn (2005) to define institutions as “conventions, norms or formally sanctioned rules coordinating human action,” and in this case, the practice of research. Thus, the norms and set of instructions on how to generate knowledge within disciplines can create difficulties and constrain research between disciplines. In their conclusion, they emphasize that disciplinary traditions are still important for interdisciplinary research because interdisciplinary research occurs with reference to disciplines; however, because of disciplinary institutions, like the university, research organizations, and funding bodies, research participants may experience challenges when undertaking interdisciplinary research.

In Heberlein’s study “Improving Interdisciplinary Research: Integrating the Social and Natural Sciences” (1988), he interviews several social and natural scientists to address specific barriers they encounter when engaging in joint collaboration between social and natural science disciplines. The five barriers addressed in this study are: weakness of the social sciences, a perceived illegitimacy of the social sciences, the punishments associated with interdisciplinary research, the lack of disciplinary support structures, and the conflicts over power and control. Heberlein asserts that there is a perceived weakness of the social sciences structurally because they are “less developed than the natural sciences in terms of theory, data, method, and tradition” (1988). Social sciences are also regarded as a much softer science compared to natural sciences because natural sciences are often more quantitative and believed to be more rigorous. Heberlein notes that “people denigrate the social sciences by referring to ‘science’ when they mean science that deals with physical and biological issues, and using the terms ‘social science’ or ‘social studies’ when referring to science that deals with human behavior” (1988). This perceived weakness and illegitimacy of social sciences in turn creates tension between social researchers and natural science researchers. Professional risks and punishment for participation in interdisciplinary projects is also a major barrier. Interdisciplinary research often requires more time and effort, yet this type of research produces fewer professional rewards because it is often times more difficult to publish in one’s own disciplinary journal. There is also less disciplinary support. In Heberlein’s conclusion, he points out several solutions his participants discussed. Several main points are more administrative and institutional support and a revision of the reward structures for interdisciplinary research.

Methodology

This analysis of interdisciplinary research uses data from the *Canadian Journal of Agricultural Economics*. Data is collected from all published journal articles from 1996 to 2010—a total of 558 articles. Access to journal articles was through WorldCat online. Information on the author of each article—occupations, departmental

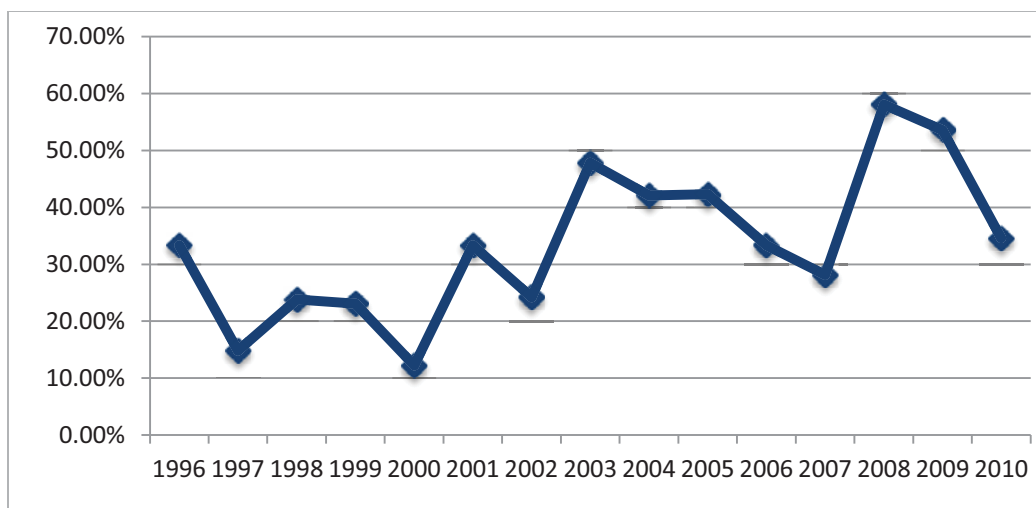
affiliations, positions held, institutional affiliations, and sources of funding—is collected into an Excel spreadsheet separated into different worksheets by year.

Since agricultural economics is strongly tied to policy and to the increase of funding for interdisciplinary research, I anticipate there will be a rise in the number of interdisciplinary research published in the *Canadian Journal of Agricultural Economics*. I also anticipate that if there are no barriers to joint collaboration between disciplines there will be an increase in the number of tenure track professors engaged in interdisciplinary research.

Results

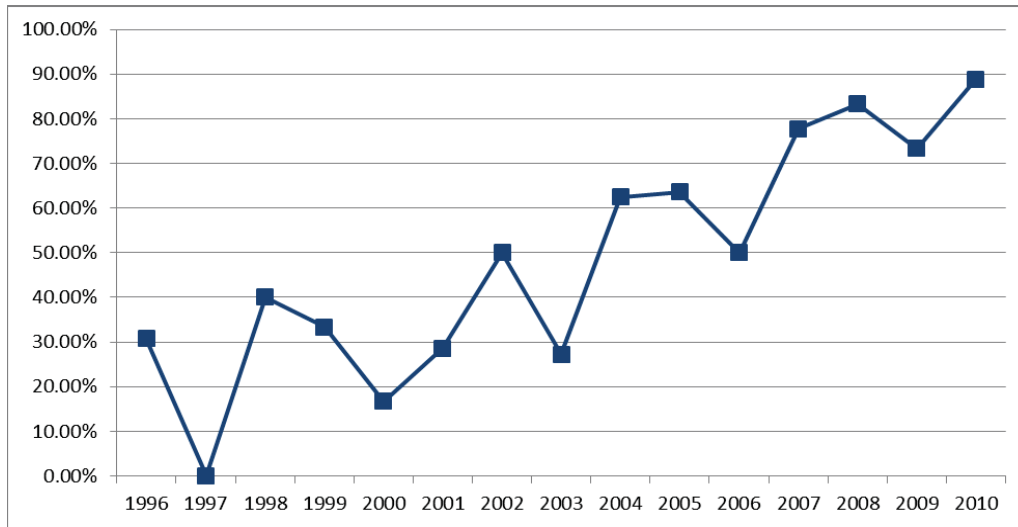
Each year the total number of articles published in a volume of the *Canadian Journal of Agricultural Economics* varies greatly, so I decided that a better measure would be to take averages and percentages. In order to look at the percentage of interdisciplinary journal articles published per year, as shown in Table 1 below, I defined interdisciplinary as any journal article with individuals from different affiliations. For example, an article with a researcher affiliated with a university and a researcher affiliated with an institution, like the USDA, I would consider to be interdisciplinary. To calculate the percentage of interdisciplinary journal articles per year, I added up the number of interdisciplinary articles and divided the total by the total number of articles published in that particular volume. As you can see from the results, there is no distinct trend. I would have expected there to be a positive linear trend given the push for interdisciplinary research from funding agencies.

Table 1. Percentage of Interdisciplinary Journal Articles Published Per Year



I also looked at the percentage of interdisciplinary research articles co-authored with a tenure track professor. To calculate the percentage, I added up the number of interdisciplinary articles with a tenure track professor listed as an author and divided that number by the total number of interdisciplinary articles published in that volume. Looking at the results in Table 2, there is a positive linear trend.

Table 2. Percentage of Interdisciplinary Research Articles Co-Authored with a Tenure Track Professor



Conclusion

In summary, I cannot conclude that the initiative to fund more interdisciplinary research has created an actual increase in the number of interdisciplinary articles published in the *Canadian Journal of Agricultural Economics*. An explanation for this maybe the strict requirements disciplinary journals set forth for publication. An interdisciplinary research article may not be as well received because it is being reviewed by peers in a discipline with rules and norms on how to conduct academic research. This supports the claims that there still is tension between disciplines. Even though there is a linear trend to the percentage of interdisciplinary research articles co-authored with tenure track professors, the actual number of articles identified as interdisciplinary was still significantly less than articles that were intradisciplinary.

I am not able to make any generalizable conclusions because I only looked at journal articles published in the *Canadian Journal of Agricultural Economics*. Further research should consider including a variety of agricultural economic journals to better determine if there is a correlation between the push for interdisciplinary research and actual publications of interdisciplinary research.

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