Understanding the Process and Success Factors to Increase Synergies between Research and Teaching

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ABSTRACT

While the synergies between research for knowledge discovery and teaching are widely accepted, the evidence is mostly implicit, verbal and poorly documented, and many times contradictive. In an effort to better understand the interaction between these important activities, the main objective of this study is to collect knowledge illustrating their synergies through specific cases. A complementary objective is to identify the important factors, which professionals should implement or avoid for increasing the likelihood that these synergies will be derived. To collect the necessary information personal interviews have been used to address the research question. The same set of questions was sent to several professionals known to have extensive experience in the areas of academic research and teaching. The respondents were asked to: 1. briefly describe the knowledge area in which the synergies occurred; 2. For the specified knowledge area, to please describe in summary form but specifically how they derived the synergy between research and teaching; and 3. Based on their personal experience, to please identify the important factors to increase the likelihood that academic research will produce benefits for teaching, and vice versa. The results strongly corroborate the importance of academic research for effective teaching. Based on the results, a set of recommendations are made to faculty members and school administrators to further promote academic research as an important factor for more effective teaching.

INTRODUCTION

At the AACSB accredited college and universities, research expectations for faculty and even undergraduate students have been rising [3]. At some institutions research productivity has become the dominant and sometimes the sole criterion for hiring, tenure, and promotion [1, 2]. This trend has been driven by several factors, including institutional growing dependence on external funding to support basic operations and higher national rankings. Justifying this increased emphasis on research is the long standing premise that research enhances teaching [4-6]. However, we are far from having a unanimous opinion, as a smaller but significant number of faculty and administrators have advanced opposing arguments [7-12].

Perhaps this controversy stems from the basic differences between high quality researching performance and high quality teaching performance. Rugarcia [11] and Felder [7] proposed that researching and teaching have different goals and require different skills and personal attributes. Researchers are valued mainly for new knowledge discovery and validation, for the problems they solve. Teachers are valued for what they enable their students to discover and problem solving, thus developing and enhancing students' knowledge and abilities. In terms of required skills, researchers must be curious and observant, objective, obstinate in testing hypotheses, skilled at drawing inferences, and tolerant of ambiguity. On the other hand, teachers must be skilled communicators, familiar with the conditions that promote learning and able to create them, and approachable and empathetic to the students. While doing both would be highly desirable, they require dramatically different and mutually exclusive capabilities. Consequently, we should not be terribly surprised that some studies [15, 13, 14, 8, 9, 7] reveal no significant correlation between faculty research quality and effective teaching.

At the institutional level the connection between research and teaching is even harder to demonstrate. Astin's large longitudinal study of American institutions [15] found significant negative correlation between universities' research orientation and several important educational outcomes such as satisfaction and most measures of cognitive and affective development. He supported his contentions by showing that students attending institutions more strongly oriented toward student development had the opposite pattern of effects. Nevertheless, Astin proposed that the negative correlations were at least partly due to hiring faculty with strong research orientations who expectedly gave low priority to undergraduate teaching; not really providing clear evidence supporting a basic conflict between teaching and research.

MOTIVATION AND OBJECTIVE

Overall, the results so far point to a significant conceptual disagreement about the synergies between faculty research and teaching for the reasons discussed above. Nevertheless, many faculty members have been able to perform both sets of activities reasonably well. Why have they been able to find synergy in academic practice? What is the background of such faculty members? In what areas of knowledge they operate? How do they derive the synergies between research and teaching? What are the factors they believe are important to increase these synergies? Given the ambiguity of the research results so far, the primary objective of this study is to look at the self-reported connection between research and teaching experience by specific faculty members with experience doing both.

CONCEPTUAL BASIS AND METHOD

Given the questions discussed above, to better understand the link between research and teaching, five university professors (each considered to be a case study) known for their considerable experience doing both during their careers were asked to describe their experience and opinion while answering four specific questions: **1. Personal information (personal experience, formal education, job experience, etc.) relevant to the synergies being addressed. 2. Briefly describe the knowledge area in which the synergies occurred. 3. For this knowledge area, please describe in summary form but specifically how you derived the synergy between research and teaching. 4. Based on your experience, please identify the important factors to increase the likelihood that academic research will produce benefits for teaching.**

THE CASE STUDIES

Case Study 1: In terms of formal education, I made a choice to focus on entrepreneurship as well as strategic management of new ventures during the last 3 years of my 4 years working in my doctoral program. During those 3 years, I studied how to best manage the assets and liabilities inherently tied to new ventures being 'new.' My dissertation, titled, "Attaining legitimacy: Individual and dyadic level effects in the entrepreneur-investor context," was a springboard into my past and current research in the areas of 'managing new ventures' and 'managing potential investor perceptions in the new venture context.' I spent a great portion of my four years in my doctoral program studying how to best strategically managing ventures pre- and post-startup. Then, having worked with many of such

firms in the past eight years, I have been able to perceive best practices at work, and objectively perceive and measure the factors leading to variance in the performance levels of those firms serving as the client firms for senior consulting projects. I took what I learned through reading and completing research in the area of new venture management and put what I had attained in terms of knowledge to use while lecturing entire classes, and especially while coaching senior consulting project groups in a more intimate fashion. I believe this must happen in two ways. One way is that high-quality textbooks should be used in the classroom, especially if the professor in a newly minted Ph.D., or is teaching the subject matter for the first time. Another way is for professors to keep up with research in the subject areas where they teach. Again, no other substitute exists for a well-read, knowledgeable, and wise professor when it comes to increasing the likelihood that academic research (i.e., "good" academic research from high quality journals) will produce benefits for teaching.

Case Study 2: Bachelor's Degree in Business with emphasis in Finance, MBA with Marketing emphasis, Ph.D. in IS. Since the Ph.D. thesis always kept one foot in academia and the other in industry through industry seminars, consulting, and data collection for research. Presently as an endowed chair professor this process of linking the new knowledge from research projects to teaching classes has continued unabated and is fueled by increasingly broader research areas. It started at first in the IS sub-areas such as systems development and maintenance, data base administration, expert systems development and management, and project selection and management. My mission as an endowed chair professor requires a broader focus for research so the knowledge areas over the years included the strategic management of technology, Business Process Reengineering, new product management, and business innovation. The variety of courses taught has also widened, correspondingly. In my case, the primary benefit from research is the continuous learning from industry about the important trends and issues relevant to them. That gets translated into what is important for my students to learn to become attractive as prospective employees. That in turn determines the required adjustment to course content. The most important factor to produce these benefits start with always keeping in mind that academic research must produce results relevant in practice. The new knowledge will then open the door to business managers who become more willing to participate in seminars, discuss business and technology trends and issues, and data collection for further research. As this practical research environment gets translated into curriculum changes, students will become more motivated by the likelihood that their chances for employment have increased, by having more up to date knowledge and skills, and by visitors from industry willing to participate in the classroom.

Case Study 3: Bachelor's Degree in Business with Finance major, MS in Operations Research, and PhD in Information Systems (emphasis in Human-Computer Interaction). Worked as an operations research analyst for a Fortune 500 firm for 4 years between the MS and PhD. During the 4 year span in which I worked as an operations research analyst I served as an in-house consultant to other departments within the company. I worked closely with end-users in the development and implementation of decision-making tools. The skills I acquired during this time have proven to be valuable in my two main teaching areas, programming and business analytics. During my PhD studies I focused on human-computer interaction, which, coupled with my real-word

experience, provided further support of my teaching of programming. During my PhD studies I focused on issues related to human-computer interaction, which is of direct benefit to the teaching of user-interface design in programming courses. In research efforts since obtaining my PhD I have focused on the support of human decision-making, which has been of direct benefit in the teaching of business analytics along with program development. Academic research should be grounded in the support of real-world decision making. In order to effectively inform teaching of how to support human decision making, academic research must be based on a knowledge of the strengths and weaknesses of humans as decision makers. Through such knowledge we can, as teachers, help direct students towards those areas of decision making that will most likely benefit from computer-based support.

Case Study 4: Earned an M.P.A. from the Lyndon B. Johnson School of Public Affairs, University of Texas at Austin, and a Ph.D. in Industrial Administration (Information Systems) from Carnegie Mellon University. I have recently been part of the leadership team directing the research agenda of the Center for Healthcare Informatics at Tennessee Tech University. In that capacity I have worked with large data sets from which insights into healthcare expenditures and outcomes have been produced. This past semester I taught an M.B.A. course in Healthcare Analytics offered by the College of Business at Tennessee Tech University to both Masters of Business Administration and Masters of Professional Studies in Healthcare Administration students. Currently engaged in a research effort spanning the public policy, information systems, and healthcare fields. It involves the aggregation of two large data sets that, when combined, can be used to investigate the impact of public transportation on healthcare outcomes. The first data set, which contains approximately 200,000 records, was extracted from a routing software application used by the Upper Cumberland Human Resources Agency to schedule public transportation for the residents of 14 rural counties in middle Tennessee. The second data set contains Medicare claims data for all Medicare beneficiaries and Medicare/Medicaid dual eligible patients served by the Cumberland Center for Healthcare Innovation, an Accountable Care Organization consisting of 36 primary care practices in the Upper Cumberland region. The research project described above required expertise in data extraction, transformation, and loading. The data were extracted from multiple data sources in differing formats and then loaded into a multi-table SQL Server database created by the researchers. The database was then used as the data source for analyses performed using Dell Statistica, an enterprise level analytics and data mining software package. This skill set was the focus of the Healthcare Analytics course. Students were given assignments that required the extraction of differently formatted data from multiple sources, transformation of the data into a coherent whole (requiring descriptive statistics and the creation of new, calculated fields), and the application of predictive analytic algorithms to identify patterns in the data that contained significant explanatory power. I was able to illustrate the material much more effectively using my own research experience than I would have been able to without it. If you are lucky enough to be able to create a course that has direct synergies with the research you are currently conducting, clearly your teaching will benefit from your research experience. Students enjoy and benefit from illustrations of the skills and principles that they are being taught. A professor who has employed those skills and principles while involved in research efforts will be much better able to provide real world

examples of the course material in use. The professor will also be better able to provide advice regarding the appropriate use of the course material. For example, using my research experience as a guide I was able to stress the importance of getting to know the data by means of fairly simple descriptive statistics before plunging into more complex analyses

Case Study 5: I received my Ph.D. in Management with a concentration in Information Systems in 1995. I also worked in the information systems field for eight years in the private and public sector. As a result of that experience, my research has had a practitioner focus by looking at the effective application of technology in addressing business problems. The most recent knowledge area is in technology innovation management. For organization to remain competitive, it is critical that they develop an environment that fosters innovation in all of its stages – discovery, incubation and acceleration. I have seen the impact of this especially in the healthcare industry. I have taught an Information Systems overview course to undergraduate students for several years. Because all Business majors take the course, it is often challenging to demonstrate the relevance of the course to such a wide audience. As a direct result of my work in the technology innovation management area, I have incorporated that topic into the course to better demonstrate the critical role information technology plays in the success of an organization. Passion for what you are teaching is a critical factor in effective teaching. The more you understand and become excited about a field of research, the more this passion will come through in your teaching. In addition, a teacher must have credibility as an expert in the field. This is accomplished through an effective research program.

RESULTS AND CONCLUSIONS

The results from this study provide clear evidence addressing the questions raised by the conflicting literature regarding synergies between teaching and research. The reported personal experiences and opinions from the professional researchers/teachers indicate that scientific research is an important knowledge supplement and complement to academic teaching.

Common sense forces us to realize that whatever knowledge is being imparted today in classrooms was likely priorly discovered by a researcher in the past. Therefore the most important conclusion from this study must be that to substantially increase the knowledge transferred in the classroom, teachers and administrators must strive for increased research effort by all faculty at every institution of learning. Administrators must be willing to change the faculty reward system (pay, awards, promotion, and tenure) to reflect the need for this extra effort. Also of critical importance is the recognition that research will take time so a reasonable teaching load must be worked out based on individual institution expectations for teaching, research, and professional services to various publics.

A major sub-question for teaching oriented institutions is 'Should dedicated academic teachers also be engaged in research activity?' Based on the above discussion, the answer must be yes. Otherwise the result will be an unproductive delay in the knowledge supply chain because all knowledge discovered by researchers on a specific topic must first be conveyed to the teachers before being passed on to the students. The results showed the researcher/teachers reported that

substantial new knowledge has been acquired through research and delivered in the classroom. Thus in an age when knowledge has become the most important factor of production, all faculty must become at least partly researchers seeking further scientific knowledge. At a minimum teaching-only faculty should at least be rewarded to undertake the early stages of the research process, mastering the knowledge published in the research literature instead of just teaching based on textbooks and trade magazines.

This basic conclusion corroborates the generally neglected but undeniable importance of scientific knowledge. Such knowledge has been the only power behind the incredible progress that mankind has experienced from its early days to now living quite comfortably even in a wide variety of very difficult environments, landing on the moon and building space stations, conquering numerous diseases, having instant worldwide multimedia communication freely available, and a long list of other major accomplishments. All these accomplishments by humans must be credited to the researchers, the scientists responsible for the historical development of scientific knowledge. Without science and the use of the scientific method on which it is based, none of the great human accomplishments would have been possible. Therefore, we need more research for further knowledge beneficial to society, and we need to teach the results from research as soon as practical.

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