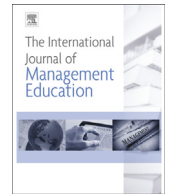


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## Research Notes

## Undergraduate research experiences: Identifying lessons learned and challenges for business schools

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## ABSTRACT

We explore the merits of undergraduate research experiences (URE) in business administration. Despite a good fit of the skills gained by student researchers to the skills in great demand in the workplace, we have identified a large gap between the implementation of URE in science versus business administration. Based on publicly available curricula data provided by 101 institutions across the country, we found that only 21 institutions offer research opportunities for undergraduate business students. We investigated good practice in UREs and have translated our insights into lessons learned about program features for business schools. Through reflecting on typical hurdles for implementing URE in management education, we identified factors that could facilitate business schools in catching up with their counterparts in science. As an exploratory study, our findings are drawn from our own decade-long personal experience in offering undergraduate research opportunities at business schools both in the U.S. and Germany, from our examination of published URE curricula across the nation and from carefully conducted in-depth discussions.

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## 1. Introduction

The term “undergraduate research” has a long and distinguished history in engineering, science and the arts, however this is not the case in business education. The meaning of the term “undergraduate research” varies in terms of the scope of research problems, the range of student involvement, and faculty expectations. The straight-forward definition provided by Wenzel (1997) was adopted here: “Undergraduate research is an inquiry or investigation conducted by an undergraduate in collaboration with a faculty mentor that makes an original intellectual or creative contribution to the discipline.”

In recent decades, many U.S. universities have integrated undergraduate research experience (URE) into their curricula - often encouraged by the recommendation that “research-based learning should be the standard” (The Boyer Commission, 1998). For example, the Undergraduate Research Opportunities Program at the Massachusetts Institute of Technology in 1969 was the first of its kind in science. Across all disciplines, undergraduate research is viewed as a quality differentiator (U.S. News & World Report, 2008). The academic trend of offering URE is promoted by several organizations such as the Council on Undergraduate Research (CUR) and the National Leadership Council for Liberal Education and America's Promise. Furthermore, significant financial support for URE is provided by the National Science Foundation (NSF) in STEM disciplines (Science,

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Technology, Engineering, and Mathematics) with \$33 million in 2007 and approximately 1000 active awards. The interest in URE has also grown in many other countries. For example, Macquarie University (Australia) organized a nation-wide UR conference, and Jilin University held one of the first UR conferences for business students in Mainland China.

Despite the growing trend toward instilling a research experience in undergraduate education in the sciences and engineering, the same trend does not appear in management education. Indeed, URE for business students was started considerably later. To the authors' knowledge, one of the first was at Ursinus College (Department of Business and Economics) in 1991. Indeed, student participation across all business disciplines in nation-wide undergraduate research conferences shows only a small degree of involvement. For example, the total number of all students participating in the Annual National Conference on Undergraduate Research increased dramatically (from 1919 in 2006 to 2800 in 2008), but over the same period the number of business student participants dropped by nearly half (from 72 to 48). Furthermore, from the \$33 million awarded in 2007 by NSF in support of URE, no support to business schools was provided.

The goal of this study is to assess undergraduate research activities at U.S. institutions so as to provide an understanding of if and where URE is being done effectively and what are possible key factors for success. In particular, the primary focus here is to explore: 1. To what extent do UREs respond to the need for students' skill development? 2. What is the current level of research activities for undergraduate students nationwide at U.S. business schools? 3. What good practice in URE from STEM disciplines can be transferred to business curricula? 4. Why do business schools lag behind in terms of URE? 5. How to foster URE at U.S. business schools?

Our study has its roots in a more than 10-year-long investigation of curricula adjustments towards undergraduate research opportunities at business schools. The authors' own commitment in management education, offering URE for all students in our courses in the U.S. and Germany, has been gradually refined over more than a decade with the goal of synthesizing academic and experiential knowledge and (re)shaping management education itself.

The rest of this report is organized as follows. In Section 2, we briefly outline theoretical underpinnings for linking teaching and research and review evidence-based findings. In Section 3, a content-based approach is used to analyze programs at 101 institutions based on the rich information found on university websites. Then, Section 4 highlights what would be considered good practice in URE and prescribes lessons learned for designing those programs at business schools. Possible impeding factors for implementing UREs at business schools are diagnosed in Section 5, so are facilitating factors for promoting URE. The limitations of our exploratory study are outlined in Section 6. The paper concludes in Section 7 with summarizing key results.

## 2. Literature review

### 2.1. Theoretical foundation

Undergraduate student researchers learn through facilitated problem solving. The rationale for this instructional method has a long history (Dewey, 1938; Kilpatrick, 1918) and goes back to the constructivist theory, which claims that students' learning outcomes are increased when their research task enhances their own "world of knowledge" in their particular field (e.g., Duffy & Jonassen, 1992) instead of purely memorizing information from lectures or solving prepared cases. Specifically, this pedagogy has the following features: First, learning is efficient when embedded in a situated context (e.g., Brown, 1994). A student's interests and background drive his or her decision to select and develop a topic. Second, learning is enhanced when students move from being passive recipients of information to being active investigators. Third, the role of the instructor is significantly different than in the traditional setting. He or she is not just a lecturer feeding information, but an enabler, promoting critical reasoning by questioning and pointing out alternatives (for more details about the modified teaching strategy see Stößlein & Kanet, 2008). In sum, the underlying pedagogy of URE is subsumed under problem-based learning (PBL). We applaud Ungaretti, Thompson, Miller, and Peterson (2015) for fostering the understanding that while PBL is an effective approach for raising much needed skills among U.S. business students, it also has its challenges when implemented in class. Indeed, PBL is considered in German-speaking countries to be the most important pedagogical innovation (Markowitsch, Messerer, & Prokopp, 2004) and has also found its way into a number of U.S. business schools (e.g., Kanet & Barut, 2003; Kanet & Stößlein, 2008).

The teaching role in URE is certainly not new; it dates back to at least the 19th century to the famous Prussian scholar of the German enlightenment, Wilhelm von Humboldt (1809) who saw himself not as a lecturer but more as a 'researcher-teacher' (McNeely, 2002). As such, it has been a distinct characteristic for a long time at German universities to allow students to gain research experiences to enhance their research-related skills. The call among scholars in U.S. higher education that every student independent of their career prospect can benefit from research integration (e.g., Levy & Petrusis, 2012) is grounded on von Humboldt's ideal.

The linking of research and teaching in the student learning experience has been theorized in various concepts. Several frameworks have been developed to comprehend undergraduate research with its various facets. For example, Levy and Petrusis (2007, 2012) distinguish four types of URE: "identifying, pursuing, producing, or authoring". Each focus depends on who frames the inquiry (client or student) and on the degree of knowledge acquisition (building new or exploring existing). To reflect the experiences through the lenses of students, the former two URE types are labelled as 'information' frames, the latter two types as 'discovery' frames (Levy, 2009). Another valuable framework (Healey, 2005; Healey & Jenkins, 2009) classifies URE into the scope of the research tasks (research content vs. research processes and problems) and situates

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