The International Journal of Management Education 16 (2018) 483–492

Contents lists available at ScienceDirect

The International Journal of Management Education

journal homepage: www.elsevier.com/locate/ijme

Surveying industry advisors to select data analytics topics for all business majors

Kevin Pan[a,*], Alan I. Blankley[b], Matthew J. Mazzei[c], Cynthia Frownfelter Lohrke[b], Jennings B. Marshall[a], Charles M. Carson[c]

[a] Department of Economics, Finance, and Quantitative Analysis, Samford University, Birmingham, AL, USA
[b] Department of Accounting, Samford University, Birmingham, AL, USA
[c] Department of Entrepreneurship, Management, and Marketing, Samford University, Birmingham, AL, USA

ARTICLE INFO

Keywords:
Data analytics
Business education
Undergraduate curriculum
Survey
Industry advisors
Employers' needs

ABSTRACT

In an effort to expand data analytics instruction, universities have launched data analytics majors and graduate programs in data analytics. While this effort meets the need for developing data analytics specialists, an equally important need is to improve the data competencies of undergraduate business students who do not major in analytics but still need to have competencies with analytics. However, business students not majoring in data analytics have limited credit hours available for data analytics. Therefore, it is necessary to select data analytics topics that meet employers' needs. We hypothesized that surveying industry advisors would help us revise the current curriculum to incorporate data analytics learning objectives that are both necessary and sufficient. The results showed that the most important data competencies are basic spreadsheet skills (86%), intermediate spreadsheet skills (82%), retrieving relevant data (86%), documenting data (92%), and presenting data (96%). The least important area is teaching software programming to non-analytics majors (14.5%). As a result of this study, we were able to develop a new curriculum to meet employer needs by revising previous courses without increasing required credit hours.

1. Introduction

It is, perhaps, safe to say that the topic of data analytics generates considerable interest, attention, and enthusiasm from both the popular press and academia. For example, in just the one week between June 21, 2017 and June 28, 2017, *The Wall Street Journal* published at least sixteen articles with either a focus on analytics or reference to an analytics concept such as big data or machine learning. All this attention to data analytics suggests that the ability to acquire, manage, and analyse large amounts of data for business purposes is both an existing need and a trend that is very likely to continue into the future. If true, then it becomes imperative for institutions of higher education to consider how to integrate the skills and capabilities necessary to manage and analyse data into business school curricula.

To respond to this need, universities have begun developing data analytics majors and graduate programs (Wilder & Ozgur, 2015; Wymbs, 2016; Zhao & Zhao, 2016). A student majoring in data analytics typically enrolls in a four-year curriculum dedicated to instruction in computer programming, quantitative methods, and statistical software packages. This type of curriculum prepares

* Corresponding author. Department of Economics, Finance, and Quantitative Analysis, Brock School of Business, Samford University, 800 Lakeshore Dr., Birmingham, AL, 35229, USA.
E-mail address: kpan@samford.edu (K. Pan).

https://doi.org/10.1016/j.ijme.2018.09.001
Received 23 September 2017; Received in revised form 13 April 2018; Accepted 5 September 2018

graduates to be data analytics specialists whose main function is to organise, manage, and analyse data. While it is important to develop data analytics major programs to provide training for future data analytics specialists, it is also important to develop data analytics curricula for business students who are not data analytics majors, such as accounting, entrepreneurship, finance, management, and marketing majors. With the explosion of data in the business world, Cárdenas-Navia and Fitzgerald (2015) suggest that there is a tremendous societal need for business professionals who are not primarily data analytics specialists to be able to apply data analytics in their professional functions. This idea is supported by the fact that business academic journals and conferences that do not primarily specialize in data analytics have devoted both journal space and conference time to analytics-related topics. For example, Perols, Bowen, Zimmermann, and Samba (2017) showed how data analytics can be used by accounting professionals for fraud detection; the American Accounting Association has held conferences for its members entitled "Accounting Is Big Data" annually since 2015; the Academy of Management held a conference on big data in 2018. In other words, business professionals who are not primarily data analytics specialists need to be data competent to advance their primary fields.

However, it is challenging to develop a data analytics curriculum for all business students who are not data analytics majors. First, business students need to be motivated to learn quantitative subjects (Singh, Misra, & Srivastava, 2017). Additionally, business students may not have sufficient backgrounds in mathematics and computer programming (Wang & Gu, 2016). Most importantly, business students not majoring in analytics have only a limited amount of credit hours available for data analytics. They already have many required courses to take in their respective fields. What is the best way to provide data analytics education to these students?

To respond to the need for business students to learn data analytics, one approach is to add courses or course content. For example, proposals of one-course introductions to data analytics have been presented (Dichev, Dicheva, Cassel, Goelman, & Posner, 2016; Frydenberg, 2015). As part of such a course, Dichev et al. (2016) and Ashraf (2017) suggested teaching Python programming to business students (Python Software Foundation, Wilmington, DE). In addition, teaching R, a statistical programming language, has been proposed for business students by Wu, Mai, and Yu (2015) (R Foundation for Statistical Computing, Vienna, Austria). While these course proposals are helpful, questions remain regarding adding courses to help business students apply data analytics consistently in their primary fields of study. On one hand, is it sufficient to add only one data analytics course? If not, how many courses need to be added? On the other hand, it would not be practical to simply require these students to learn all the possible topics, given that these students already have many other required courses in their primary field of study. Therefore, which topics are most necessary?

Instead of adding additional courses to an already crowded undergraduate curriculum, we concentrated on leveraging and integrating existing course content from separate courses covering quantitative methods, statistics, computer software competency, and management information systems into an equal number of courses focused on data analytics. Our overall objective was to provide undergraduate business majors requisite data analytics skills and knowledge they need to be successful in the marketplace without expanding the overall number of courses or credit-hours needed to graduate. As a result, a critical component in revising the undergraduate curriculum, was to identify what knowledge and skills employers expected or wanted from the undergraduate business majors they hire.

An industry-driven approach has been suggested to help with the design of undergraduate business education (Azevedo, Apfelthaler, & Hurst, 2012). Therefore, to address the need to revise current courses and design a data analytics curriculum, we designed and conducted a survey among our Business School's industry advisors. The rationale is that these experienced industry advisors are not primarily data analytics specialists, but are business professionals that have been successful in their respective fields. These advisors represent career achievements that business students can seek to emulate, such as accounting firm partners, entrepreneurs, finance managers, and marketing professionals. It would therefore be useful to survey these advisors on what data analytics skills are relevant and important for all business students. Specifically, we hypothesize that the survey can help us determine, among the many possible topics, which ones are necessary and sufficient for undergraduate business education.

The rest of the paper is organized as follows. In the next section, we briefly discuss the literature related to analytics pedagogy, then succinctly consider the backgrounds relevant to developing the survey. We then consider the survey as it relates to our research questions, discuss the results for each research question, and finally consider the larger implications of the survey findings. The findings should be of broad interest to business schools that wish to design required data analytics curriculum for undergraduate students that would prepare them for successful business careers in the digital age.

2. Literature review

Several papers have addressed the development of a curriculum for data analytics majors, but did not address the development of data analytics curriculum for non-analytics business majors. Zhao and Zhao (2016) performed a web mining study of 215 AACSB-accredited business schools in the U.S to survey the presence of business analytics programs among AACSB-accredited schools. They specifically searched for business analytics majors and found that less than 20% of the 215 schools had Bachelor's degree programs in business analytics. Aasheim, Williams, Rutner, and Gardiner (2015) reviewed undergraduate data analytics and data science programs and found that data analytics programs had more emphasis on the evaluation of tools while data science programs had more emphasis on data preparation. Phelps and Szabat (2017) surveyed faculty that teach business analytics courses and found that they are taught by faculty trained in a diverse set of disciplines, such as statistics and information systems. To help establish a business analytics program, Wymbs (2016) described the process of adding an undergraduate Data Analytics program to the Information Systems Department and suggested that an innovative process model was useful. Wang and Gu (2016) discussed the challenges of teaching data science in a business school due to students' insufficient backgrounds, and suggested teaching R (R Foundation for Statistical Computing, Vienna, Austria) to students due to its popularity. Wilder and Ozgur (2015) proposed a curriculum for business