

How Business Schools Can Integrate Data Analytics into the Accounting Curriculum

By Norbert Tschakert, Julia Kokina, Stephen Kozlowski, and Miklos Vasarhelyi

The demand for accountants with data analytics skills is growing rapidly, providing for exceptional career opportunities. A recent McKinsey Global Institute study asserted that, even with additional university programs in data analytics becoming available, companies will need to train employees internally for many years to overcome the current skills shortage (“The Age of Analytics: Competing in a Data-Driven World,” December 2016, <http://bit.ly/2fyfoVU>). McKinsey also noted that, while the estimated number of data science programs graduates could increase by 7% per year, the high-case scenario indicates a 12% annual growth in demand, leading to a shortfall of some 250,000 data scientists. In addition, McKinsey described the equally important role of the business translator, who acts as the link between the analytical talent and the practical application of the analytical results to address business requirements. The requirements for these business translators include not only an in-depth understanding of the data, but also

organizational knowledge and industry or functional expertise that enables them to ask the data scientists the correct questions and derive the appropriate insights from their findings. These requirements appear analogous to the traditional requirements that an accountant be able to understand and explain the accounting results, but in this case, that expertise includes numerous forms of data.

Because the insight extracted from data can provide for a meaningful competitive advantage, organizations are allocating increasing amounts of resources to analytics initiatives. A 2016 survey of 422 European and U.S. executives conducted by the Economist Intelligence Unit reports that analytics and big data will be the most important digital competency for their organizations in the next three years (“The Quest for Digital Skills—A Multi-Industry Executive Survey,” <http://bit.ly/2uOi6bv>). To prepare for this future, students and accounting professionals must acquire data analytics skills. This article describes how business schools can include data analytics in their accounting curriculum and how CPAs can build analytics skills.

The State of Data Analytics in Education

Data analytics has been defined as “processes by which insights are extracted from operational, financial, and other forms of electronic data internal or external to the organization” (KPMG, “Leveraging Data Analytics and Continuous Auditing within Internal Audit,” 2012). The Association to Advance





Collegiate Schools of Business (AACSB) includes data analytics in Business Standard 9 (Curriculum Content) and Accounting Standard A7 (Information Technology Skills and Knowledge for Accounting Graduates), describing it as an important area. AACSB also offers a Data Analytics Seminar for business schools, and universities are working on many additional programs. The pressure to implement data analytics into accounting programs is higher for double-accredited schools (i.e., business and accounting), as standard A7 states:

Consistent with mission, expected outcomes, and supporting strategies, accounting degree programs include learning experiences that develop skills and knowledge related to the integration of information technology in accounting and business. Included in these learning experiences is the development of skills and knowledge related to data creation, data sharing, data analytics, data mining, data reporting, and storage within and across organizations.

Strategies for Incorporating Data Analytics into the Accounting Curriculum

Because data analytics has the potential to turn into a core business discipline (Bill C. Hardgrave, “Volume, Variety, and Velocity: Big Data Is Here to Stay,” *eNewsline*, July 2013, <http://bit.ly/2vMQYOG>), business schools should teach it. The authors advocate that business schools begin with a pragmatic approach. It is important that accountants can use common data analytics tools to support decision making and can communicate with management as well as programmers. The initial focus should not be to turn accountants into programmers or database experts, which can be overwhelming. The authors further advise working closely with the business school advisory board. This will provide important feedback from the business community and help keep the content current.

Using teaching cases is a great way for educators to become familiar with a topic, and data analytics cases are in the process of being published for a variety of accounting classes (see the online supplement at <http://www.cpaj.com>). Classroom material and cases are also available through websites provided by accounting firms for academics, such as Ernst & Young’s (EY) Academic Resource Center. The latest editions of various accounting and auditing textbooks include increased coverage of data analytics, often using examples for ACL and IDEA. The U.S. government provides almost 200,000 freely accessible datasets through data.gov, and educators can assign cases based on these datasets.

Recommendations for Undergraduate and Graduate Accounting Programs

PricewaterhouseCoopers has developed recommendations for curriculum changes and include the following skills for undergraduate programs (“Data Driven— What Students Need to

Succeed in a Rapidly Changing Business World,” February 2015, <http://pwc.to/2uyf7EO>):

- Learning of legacy technologies (Microsoft Excel and Access)
- Understanding of structured and unstructured databases (SQL, MongoDB, Hadoop)
- Obtaining and cleaning data
- Introduction to data visualization (Tableau, SpotFire, Qlikview)
- Univariate and multivariate regression, machine learning, and predictive tools
- Early coverage of programming languages such as Python, Java, or R.

The following skills are recommended for graduate programs:

- Advanced statistics
- Text mining, HTML scraping
- Solving optimization problems
- Data analytics internships, allowing students to solve real business issues.

One concern with PricewaterhouseCoopers’s recommendations is that many existing classes do not have any room to make space for additional topics. Universities have therefore focused their oftentimes limited resources on developing new certificate courses or new one-year analytics master’s programs and will introduce data analytics in existing coursework in subsequent years. Many of these programs have been launched, and a list of universities that offer degrees in data analytics is available at North Carolina State University’s Institute for Advanced Analytics (<http://analytics.ncsu.edu>) and KDnuggets (<http://bit.ly/2vqLtUS>).

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Including more information systems knowledge in the business curriculum is not a new topic; in 2001, Brett J. Long and Brian L. McGuire recommended significant changes in order to reform the traditional accounting program (“Reforming an Accounting Program: Sailing the Ship through the Academic Doldrums,” *Management Accounting Quarterly*, Summer 2001). One of their proposals included a combination of managerial



accounting, finance, or information systems tracks, which allows accounting students to specialize in another area of interest. Data analytics could be incorporated into the information systems track or be a separate track of its own.

Long and McGuire also described several hurdles that accounting departments may have to overcome. The typical accounting department will not have the resources to hire additional faculty to teach these subjects, nor will other departments transfer their faculty. One possibility is to consolidate departments, such as accounting, finance, and information systems. A more likely scenario is that the accounting program will include courses such as data analytics that are offered in the other programs. Getting the faculty from these programs to support this revised accounting program when it is presented to the school curriculum committee (and through the voting process) is a crucial step to the program's success.

Examples of universities that offer degrees in data analytics include Bentley University's master of business analytics and Georgetown University's master of science in analytics with a concentration in data sciences. Babson College has integrated

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data analytics across its entire core curriculum and offers a concentration in data analytics for both undergraduates and graduates. Some universities offer online degrees and certificates, such as Northwestern University's master of science in predictive analytics online, UC Berkeley's online master of information and data science, and DePaul University's business analytics certificate program. A four-course certificate (mining massive data sets) is available at Stanford University, and Rutgers Business School offers a certificate in analytic auditing in conjunction with its master of accountancy in financial accounting program. This certificate program updates students' analytic skills by learning and applying audit analytic techniques and developing skills in visualizations, neural networks, and continuity equations.

As the capabilities of data analytics increase in complexity, enhanced skill sets will be required to support their development. Analytics have been categorized in terms of three capabilities: descriptive analytics report on what transpired in the past, predictive analytics incorporate models based on past data to predict the future, and prescriptive analytics rely on models to specify

Exhibit

Useful Resources for Students and Practitioners Learning Data Analytics

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| Simply Statistics | simplystatistics.org |
| R-bloggers | www.r-bloggers.com |
| Rutgers University's Accounting Web | raw.rutgers.edu |
| DataTau | www.datatau.com |
| Revolution Analytics | blog.revolutionanalytics.com/statistics |

optimal behavior. At present, the emphasis is on the development of prescriptive analytics. Developing the underlying models to support prescriptive analytics entails a greater degree of complexity, as it requires large-scale testing and optimization (Thomas H. Davenport, "Analytics 3.0," *Harvard Business Review*, December 2013, <http://bit.ly/2uyhm1e>).

Senior management is more likely to consume data analytics, whereas young professionals are more likely to produce this information. Accountants should have both sides in mind when they approach data analytics.

The Need for Preparation

Due to the evolving nature of data analytics tools, having the right training available when it is needed is important. Students and practitioners interested in learning more will find a wealth of resources available; a brief summary of generalist sites can be found in the *Exhibit*; a more comprehensive list will be included in the online version of this article at <http://www.cpaj.com>. As Roshan Ramlukun, Ernst & Young partner for global digital accounts and former global assurance analytics leader, stated: "Those who will succeed have the ability to adapt and excel in a dynamic environment, and they also communicate and network well with others to get additional ideas." □

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