A Dialectic on Graduate Analytics Education

Panel

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Abstract

While Data Analytics programs are proliferating in many disciplines, traditional academic approaches seem to favor depth of technical skills over soft skills in their approaches to creating Data Analytics programs. Yet business wants an equal focus on communication, relationship development, and other soft skills. This panel will explore the issues in graduate analytics education to develop an understanding of the spectra of needed topic areas and discuss what these mean for analytics program design.

Keywords: Data Analytics, big data, panel, education

Introduction

Competitive advantage increasingly results from employees who can navigate complex data using sophisticated tools to bring deep insights to strategic and operational challenges. The era of “Big Data” has led to the need for a new generation of business- and tech-savvy employees (Chiang et al. 2012; Jacobi et al. 2014). Skills in high-performance database platforms, advanced analytics, tools, and data visualization are highly in demand (Davenport et al. 2012). A new type of role is emerging from this confluence of technical, business, and analytics skills for employees with who also have business domain maturity. Traditional academic programs are seen as lacking in supporting the development of such employees through traditional M.S. in Computer Science, Master of IT, or MBA programs.

Academic programs are emerging from academic institutions in response to these needs. The number of U.S. schools offering Data Science / Business Analytics degrees has exploded from none in 2000 to over a hundred in 2015. Nearly half are offered through business schools, with the others range from Arts & Sciences to Engineering. Two-thirds of the program names focus on Business Analytics and most of the remainder emphasize Data Analytics. At one of the longer-tenured programs, two-thirds of the students didn’t have a business undergraduate degree, and about half began the analytics program within two years of completing their prior degree (Rappa 2015). These students may lack a proper business foundation.

Excessive focus on tools and techniques, however, could de-emphasize the soft skills needed to apply these technical capabilities effectively. This panel proposes a dialectic on the effectiveness of academic programs in preparing graduates for careers in analytics. A particular focus will be on the trade-off between development of deep technical and analytical skills versus critical thinking, industry knowledge,
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and foundational business skills such as strategy, marketing, operations, and finance. Industry practitioners will challenge academic thought-leaders in this free-flowing debate.

**Issues and Panelists’ Positions**

**Issue 1:** Why does Big Data Analytics education matter? There are three concerns with this question. First, is this yet another fad? Second, should there be special programs or should analytics proficiency become a core educational component? Third, should schools teach all needed areas or should schools focus on analytical skills and have companies custom teach everything else to meet their needs?

**Issue 2:** Can formal educational programs help, and what should be their focus? Formal academic programs may provide avenues for students to develop their technical skills. Analytics programs can provide research-based courses. But, which skills are critical? Students can engage with faculty, but exposure to practitioners and development of practical experience are also critical. The challenge is also to develop problem-solving skills applicable to employees that may operate in a variety of industries and functional areas. Further, analytics employees need to understand their employer’s (or clients) strategic direction when deploying their efforts. They need to understand when their results are significant, and where limitations exist on their approach and conclusions. Finally, soft skills such as interviewing, presenting, and analyzing processes also are needed. Some analytics programs are tools- and analytics-driven; others are methods-based. Some authors believe an interdisciplinary balance is best for businesses (Conway 2010) while other advocate strong technological and math skills (Holtz 2014). The problem is that all of these skill areas are too much for a single program to comprehend.

**Issue 3:** Where is the balance between skills & techniques and knowledge & critical analysis? Today’s “data scientist” needs a combination of business, technical, and critical thinking skills (Conway 2010; Jacobi et al. 2014). Formal academic programs can offer a variety of courses developing these knowledge areas, but must be pragmatically designed to be achievable by non-business savvy students and appealing to employers. Traditional IT, MBA, and statistics programs all partially address the needs, but more is needed (Chiang et al. 2012; Topi 2013; Tyler 1949).

The purpose of this panel is to discuss and debate the evolving needs for analytics-oriented academic programs, how to achieve a salable product that also serves industry, how these programs need to evolve further in order to meet these changing needs, to bring some perspective to analytics program design, and to engage the audience in a discussion about challenges and opportunities in analytics education.

**Participants**

*Damian Fernandez-Lamela, Fossil Group*

In order to be successful in marketing analytics, you need to influence decision makers effectively, which requires soft skills. In addition, analytics professionals need to focus on the most relevant business problems, apply a holistic view, use the right data, make sure that their results are significant and, crucially, be aware of the limitations of the methodologies they use.

Existing graduate analytics programs are too focused on shallow and outdated technical skills, such as simple regressions or proprietary analytics software. In addition, programs tend to be too narrowly focused. Graduates therefore lack up to date technical skills and sometimes even breadth of technical capabilities.

Moreover, graduate analytics programs should focus not only on developing hard technical skills, but also, and more importantly, on developing soft interpersonal and business skills such as developing successful business relationships, communicating actionable insights, managing up, and influencing executives to enable graduates to be successful in the real business environment. In addition, graduates lack practical experience, having little to no professional experience at the time of graduation. This could be solved by having more mandatory credits coming from field projects.
Graduate schools are failing to meet the analytics resource needs of industry. When hiring people with analytics degrees, much training is still required. While technically skilled, many graduates of analytics programs lack fundamental business knowledge or the ability to investigate, identify, and utilize available data, or the ability to engage conversationally with business customers. Or, often, have none of these skills.

Programs in IT and Computer Science produce students with strong mathematics, logic, and data analysis skills, but weak in business knowledge and practical expertise. Business schools tend to produce graduates strong in critical thinking and business analysis, but with insufficiently developed skills in navigating complex data environments using sophisticated analytical tools. Thus, programs tend to produce students that are strong in one extreme and lacking in the other. Anecdotally, a cursory review of the current enrollment at one of the oldest Business Analytics programs in the U.S. found that nearly half of their students have two or fewer years of work experience since their previous degree, and that about half of the students hold degrees in math, information technology, statistics, or engineering. Many of these students may lack the business knowledge and insights they need to apply their analytical skills effectively.

The skills required of effective analytics employees are broad. Not only do students need to have the technical tools, they also need to be able to understand business contexts, strategic direction, competitive pressures, and company capabilities. In short, students need capabilities that come from graduate business education, along with development of technical skills informed by practical experience. While it is a daunting challenge to bring the needed capabilities together into a single academic program, academic institutions must evolve. Whether they expand core and elective options within traditional MBA programs to enable a focus on analytics, or they develop new programs focused on developing deep analytical capabilities, the approach taken by most graduate business programs is insufficiently equipping their graduates with the capabilities that employers required. This must change, and quickly.

Data is driving both instinct- and experience-based decision making in various industry sectors and functions. Business Analytics plays an important role in supporting this trend. Corporate data can be structured or unstructured, big or small, sparse or dense. To be nimble, efficient, and profitable, companies seek to increase their ability to analyze this ever-increasing body of data. They are also looking to find patterns in data, to clean and organize data, and to apply analytical methods to develop processed data that can then be further analyzed using domain-specific models. Industry looks to academia to produce students prepared for these highly-skilled roles. Academic programs are also driven by the increased opportunities in applying data science, advanced modeling and quantitative methods using readily available (cloud-based) computing environments with increased network bandwidth, processing capacity and storage.

Formal academic programs not only provide avenues for students to develop their technical skills but also provide opportunities for students to engage with faculty and industry practitioners and develop experimental and innovative ideas. Research-based courses with a focus on problem solving and decision making in the context of various industry sectors and business functions continue to be a key focus of formal education programs at the MS level. Formal academic programs typically also offer courses that provide opportunities for developing technical skills, modeling techniques and critical thinking. It is up to the students to strike a balance between developing the software/analytical skills that are desired by many corporate employers, and enhancing the data research capabilities that are better suited for being effective data scientists. It is up to the students to understand their needs and goals, and take up appropriate courses.

While there are many data-related and technical problems that have to be overcome to develop Business Analytics solutions, a key challenge remains the adoption of these solutions and, thus, their ability to impact organizational performance positively. Ransbotham, Kiron & Prentice (2015) find that one of the
significant barriers to the use of Business Analytics in organizations is that managers and data scientists struggle to translate analytical insights into action. It is therefore crucial to gain an understanding of how managers use information and make decisions (Marchand & Peppard 2013). Cognitive and behavioral science provides us with insights that should help data scientists develop solutions that are more likely to inform managerial decisions and actions, and thus affect organizational performance.

Another way of ensuring that Business Analytics solutions make a difference in organizations is to embed them in business processes (Davenport, Harris & Morison 2010). This requires an understanding of business processes and skills to model and analyze these.

There are considerable risks associated with the use of big data, especially sensor, cell phone and click-stream data. While the analytic insights that such data may yield could have significant organizational benefits, consumer backlash due to concerns over privacy invasion could pose a serious threat to the organization. Data scientists, who have the ability to think through the broader implications of the solutions they build, are in a better position to protect the organization against the risk of such self-inflicted harm.

In developing a Business Analytics curriculum, I would therefore argue for the inclusion of an introduction to cognitive and behavioral science, a business process focus, and exercises in ethical decision making.

**Dr. Helmut Krcmar, Technische Universität München**

Big Data is here to stay, Data Scientists are needed to do “Big Data,” and therefore we need Data Analytics degrees to fulfill job market needs. While that sounds obvious, it gets more difficult when designing such a degree within the limits the typical amount of instructional time available for a bachelor’s or master’s degree. Should the degree focus only on methods and become basically an updated math-statistics Operations Research degree, or should the degree focus on the technical and design aspects of sensor networks, large scale distributed federated information systems with some added high performance computing, or should the degree focus on data-based business models in the digital age including legal and ethical issues? And what about specializing on any domain – anywhere between let say, business, mobility, energy, health, and civil participation?

All institutions starting such degree programs then embed them into their environment of students, employers, teaching and research resulting in many different interpretations: I will report on the discussion that led to the equivalent degree(s) at TU München and provide some insights into similar degree programs in Europe (esp. Germany), both on the IS and computer science arena.

For debate, I am personally convinced that Data Analytics degrees need to be concerned with a specific domain (not necessarily industry) to be guided towards a good mix of methods, technologies, value creating service systems and ethical sustainability to adequately serve the student´s needs.

**Dr. Sue Conger, Moderator**

As Moderator, Dr. Conger will not take a position but will introduce the panelists and questions and keep the conversation moving. It is desired that the individuals’ positions take about half of the time allotted, then the audience will be asked to also enter the discussion as Data Analytics programs are popping up all over the globe and all seem to have a different ‘take’ on what is needed for such a program.

**Panel Structure**

The panel moderator will be Sue Conger. She will present an introduction to the group, the panel format, and a short background of general graduate IS/IT programs and their ineffectiveness in producing analytics-ready graduates. She will also summarize current Data Analytics programs and their offerings. Then, the panelists will each present 5-7 minutes of their viewpoints, with academicians focusing on the current state of research and program design, and with the industry practitioners providing a counterpoint on the effectiveness of such programs. A panel and audience discussion of the program content needed to address the issues. The panel therefore would be roughly one third panel presentations and two thirds discussion and interaction. In some areas, the panel has a remarkable level of agreement;
in other areas, there is substantive disagreement. In addition to the panel discussion, we want to frame the issues and engage the audience to discuss how to best approach research and program design to develop a cumulative body of knowledge. Thus, we believe the debate on approaches will be stimulating and rewarding to all involved, and, optimistically, will lead to improved program design and research in the future.

**Participation Statement**

Each panelist has committed via email to being on the ICIS panel (if it is accepted). Copies are available.

**Biographies**

**Damian Fernandez-Lamela** is the Senior Director, Global Marketing Analytics for Fossil Group. Damian has more than 18 years of experience in strategy and marketing with a focus on applying analytics to gain a competitive advantage. He was Senior Director of Marketing Analytics for RealPage and before that Senior Director Analytics for Omnicom Group providing marketing analytics for AT&T (U-verse and mobile). He was also Global Marketing Analytics Manager at Dell where he was responsible for optimizing marketing decisions for over $1 Billion in annual advertising spend. He has an MBA from the MIT Sloan School of Management and a Master in Software Engineering from University of Salamanca, Spain. He is the President of the MIT Alumni Association of DFW.

**Dave Rogers** is a Director of Credit Analytics at Fannie Mae. He has extensive management and analytics leadership experience spanning the retail, financial, marketing, and technology industries. He sits on the Industry Advisory Board for the M.S. in Business Analytics Program at UT-Dallas. He is currently pursuing the Doctor of Business Administration degree through the University of Dallas Satish and Yasmin College of Business, and holds an M.S. in Management (MBA) from the Sloan School of Management at the Massachusetts Institute of Technology and a B.S. in Computer Science from The Florida State University.

**Helmut Krcmar** is Professor and Chair of Information Systems at the Department of Informatics at Technische Universität München (TUM) since 2002. He served as Dean, Faculty of Informatics from 10/2010 until 09/2013 and is a member of the Faculty of Business Administration. Since 2004, he is a member of the Program Faculty of the Elite Graduate Program “Finance and Information Management” in the Elitenetzwerk Bayern. Since 2013, he is Academic Program Director of the EMBA “Business and IT”. Helmut served as President of AIS 2014-2015. Since inception of the AIS, he has been actively involved in numerous activities, including AIS-Council Europe, ECIS, and ICIS. He is currently Industry Program Chair for ECIS 2015. Helmut is chairman of the German national E-Government Kompetenzzentrum (NEGZ). He is founder of the Informations- und Technologie Management Beratungsgesellschaft (ITM) and co-founder of several spin-offs out of the academic environment.

**Ulrike Schultze** is Associate Professor in Information Technology and Operations Management at Southern Methodist University and a visiting professor at Lund University, Sweden. Her research explores the impact of information technology on work practices such as implications of knowledge management technology and of Internet-based self-service technology. Most recently, she has focused on the implications of the virtual world Second Life, for personal identity. Dr. Schultze's research has been published in leading IS journals, including ISR, MISQ, EJIS, JIT and I&O. She has served on numerous journal editorial boards including MISQ, ISR, EJIS, JIT and I&O, and is currently an SE at JAIS. Dr. Schultze has also taken on leadership roles in AoM-OCIS, IFIP 8.2, ECIS 2014 and ICIS 2015. In SMU’s new MS-Business Analytics, Dr. Schultze teaches a course on Business Process Analytics. Dr. Schultze holds Bachelor’s and Master’s degrees in Information Systems from the University of the Witwatersrand, South Africa. She earned her PhD in Management, with a concentration in Information Systems from Case Western Reserve University.

**Ravishankar Narayan** is the Director of the Master of Science in Business Analytics program at the University of Texas at Dallas. His research interests are in the areas of Private-Public partnerships for Digital Equity, Game-based Experiential Learning in Business Contexts, and IT-enabled Governance, Risk and Compliance. His industry experience includes various consulting engagements in the areas of
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Business Analytics, Customer Relationship Management, IT Service Management and IT Governance. He holds a Ph.D. in Instructional Technology, M.S. in Computer Systems and B.S. in Industrial Engineering.

**Sue Conger** is a Professor at the University of Dallas Satish and Yasmin Gupta College of Business and serves as the Director of the Information & Technology Management program. She is also a Visiting Professor at Rhodes University in South Africa and a two-year Erskine Scholar at University of Canterbury in New Zealand. Her research interests are IT-related privacy, emerging technologies, IT service management, and innovative uses of IT. Her most recent research is on IT use in developing countries, and gamification of education and service jobs all of which she has presented at conferences and for which she has either book chapters or journal publications. Dr. Conger is on several editorial boards and the program and planning committees for several conferences.

Endnote:
1. The eight skills are SQL, statistics, machine learning, calculus and linear algebra, data munging (dealing with dirty, missing data), data visualization and communication, software engineering, and thinking like a data scientist (Holtz 2014).

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