Spring 3-15-2020

The Analytics Managers Ultimate Guide For Working With Universities

Robert J. McGrath
Health Management and Policy, robert.mcgrath@unh.edu

Comments

This is the preface to the forthcoming Text.

Preface

The seeds of this book began in 2016. We were both directors of academic graduate programs in analytics and data science. While we were in very different parts of the country – Durham, New Hampshire and Kennesaw, Georgia are 1,148 miles apart – and we were overseeing very different types of programs –a doctoral program and a masters program – we found that we were being asked the same questions from managers and executives of analytical organizations: *How can I recruit out of your program? I have a project – how do I reach out to your students? If we do research together who owns it? I have employees who need to "upskill" in analytics – can you help me with that? How much does all of this cost*?

As we engaged in discussions between the two of us, we learned that many of our academic colleagues at Oklahoma State University, University of Alabama, University of Cincinnati, Wake Forest University, were all engaged in similar conversations with organizations.

For many of us who oversee analytics programs, the opposite conversations were happening as well – *How can I bring a "real" analytical project in the classroom? How can I get "real" data to help my students develop the skills necessary to be a "data scientist? Is what I am teaching in the classroom aligned with the demands of the market for analytical talent?*

Historically, the academic domain and the corporate domain rarely intersected; as academics who worked in the private sector, we can tell you that the cultural chasms have been deep. But that gulf is narrowing. Today, there is an increasingly permeable membrane between academia

and the private sector, with more collaboration and meaningful integration occurring between the two sectors than at any other time in history. Consider the following:

- ✓ Before 2006 there were no formal university programs in the country with the title “Data Science”, or “Business Analytics”. Largely in response to the demands of the private sector, by 2020 there were over 300 programs at the masters level and almost 100 at the Ph.D. level.
- ✓ Almost half of all individuals earning PhDs in computational disciplines enter the private sector after graduation.
- ✓ Multi-organization innovation and research labs, which include university faculty, graduate students, private sector R&D teams and public sector policy contributors, are increasingly common; many of these labs publish more “academic” papers than individual academic institutions.
- ✓ In 2017, a quarter of all “academic” publications in data science journals included an author employed in the private sector with no academic affiliation, work in the private sector.
- ✓ According to the U.S. Bureau of Labor Statistics, in 2019 the gap between the supply and demand of individuals with computational skills continues to grow, with estimates for the number of data scientists – and all iterations – surpassing 1 million open positions.
- ✓ In 2017, Amazon launched “AWS Machine Learning Research Awards”, supporting research at universities (and non profit institutions).
- ✓ In 2019, Google announced that they would be conferring Ph.D. degrees.

At our own universities, we regularly see healthcare systems, financial service providers, manufacturing firms competing to hire the same student. At first glance, that makes no sense – after all, these are completely different industry domains. Just ten years ago, it was unheard of to see a big bank and a healthcare provider recruiting the same student. Today, its commonplace.

Organizations are facing previously unforeseen challenges related to the translation of massive amounts of data – structured and unstructured, static and in-motion, voice, text, image – into information to solve current challenges, and anticipate new ones. All while outpacing the competition and meeting increasingly complex demands of customers…frequently with employees whose skills have not kept pace with these tectonic data-centric shifts. So why would a bank and a healthcare provider want to hire the same student? Because while domain expertise is important, it is frequently subordinated; the bigger challenge is finding "data natives" who have the facility to work in a multi-faceted and complex data environment instead of finding a student with previous experience in banking.

Importantly, the advent of analytics and data science presents universities with unforeseen challenges. Unlike more traditional disciplines like mathematics or English, the organizational location of data science within a university is still not yet well defined – should it be housed in Computer Science? Statistics? Business? Or in an interdisciplinary center or institute? Data science curriculums are still nascent with little standardization and no accreditation. However, what is consistently recognized across the academic ecosystem is that data science – like Accounting, Medicine and Engineering – is really a discipline that is best learned through application. While most universities with data science programs have some requirement for experiential learning (e.g., applied projects, capstone courses, internships), aligning these

initiatives with companies can present challenges. Additionally, with the relatively new phenomena of individuals with PhDs pursuing careers in the private sector – while still engaging in meaningful and relevant research AND making more money than they would in academia – universities are experiencing their own "talent gap".

As those responsible for analytical teams consider strategies related to organizational data, strategic objectives and analytical talent, partnership with a university (or a portfolio of universities) can become a multi-faceted resource (or even a "secret weapon").

In our collective 50 years of academic experience (Bob is older), we have identified four broad objectives that companies – particularly those on the lower end of the analytics maturity continuum – have for partnering with universities in the context of analytics and data science:

- ✓ New Hires and entry talent pipelines
- ✓ Alternative Insights
- ✓ Innovation and Research
- ✓ Community Engagement

For a data science collaboration to be successful, both parties need to see benefits; organizational leaders need to also consider what the university will need to deem the collaboration successful. From our experiences as faculty and as academic administrators, universities have four broad objectives for partnering with companies in the context of analytics and data science:

- ✓ Student Experiential Learning
- ✓ Research
- ✓ External Funding

✓ Community Engagement

We wrote this book for managers of analytical organizations to help facilitate those conversations with universities and provide insights to some of those questions up front. We are also hoping that this book will broaden the aperture through which you think about universities – particularly in the context of analytics and data science.

In **Chapter 1,** we begin with an introduction to data science education. We address how data science has emerged (is emerging) as an academic discipline, how universities treat "data science" differently from "analytics", and why the academic location of a data science program within a university matters in the context of a corporate collaboration. In **Chapter 2**, we layout the roles and responsibilities of the people with whom you may come into contact at a university from faculty to deans, from career services to development (spoiler: they don't ALL want money). The chapter includes our "View from the Ground" where we have invited faculty, managers of analytical teams, and students to provide insights into how these partnerships "really" work. In this chapter we include reflections from a senior data scientist with The Home Depot on the insights gained by serving on a university analytics advisory board. In **Chapter 3,** we address the unique opportunities and challenges of working with an undergraduate population, with specific emphasis on how to get the most out of analytical internships. We provide two case studies of undergraduate engagements – from the University of New Hampshire and from North-West University in South Africa. In **Chapter 4**, we focus on what you can expect from working with masters level students. We include case studies of project courses with masters students from Kennesaw State University and from Oklahoma State University. We also highlight graduate collaboration from three perspectives: from a university analytics program director (Georgia

Tech), from a corporate sponsor of a masters-level analytics project (Shaw Industries), and from a masters student (University of New Hampshire). **Chapter 5** addresses the nuances of working with doctoral students and research faculty in data science, including the non-trivial issues of intellectual property assignment, scholarship, and publication. We include an interview with the leader of an innovation team from Equifax on the factors that contribute to a successful university research relationship. We also interview a doctoral student on their experiences working in a research lab supported with private sector funding. Finally, in **Chapter 6,** we address the role of continuing and professional education in analytics and data science, with specific examples from the University of Dallas and the collaboration between Uber and Arizona State University. We discuss the evolving role of the Certified Analytics Professional (CAP) credential as an emerging standardized credential and include a discussion with the Dean of a College of Continuing and Professional Education.