

Data Analytics at CNU

SBAA Annual Meeting
Charleston, SC
November 12, 2018

About CNU Luter School of Business

- CNU:
 - Predominantly undergraduate
 - About 5,000 total enrollment
 - Liberal Arts
- Luter School of Business
 - Undergraduate only
 - Accounting, finance, management, marketing concentrations
 - Total enrollment of about 400 majors and 200 minors
- Modest emphasis on quantitative skills:
 - Math statistics, business calculus and business statistics are required pre-business courses
 - 21 credit core; 18 credit majors
 - Financial and cost accounting classes are required for all majors
 - Operations management is a core class required for all majors
 - Business curriculum constricted due to liberal arts university curriculum requirements

How the Subject Came Up

- Everyone, everywhere seemed to be talking about “Big Data” and data analytics
- “Analytics” job market was/is accelerating
- Big business school data analytics graduate programs growing rapidly
- DASI (Data Analytics and Statistics Instructions) interest group became a permanent part of DSI conferences
- Lots of conference agendas and conversation about this “new” topic

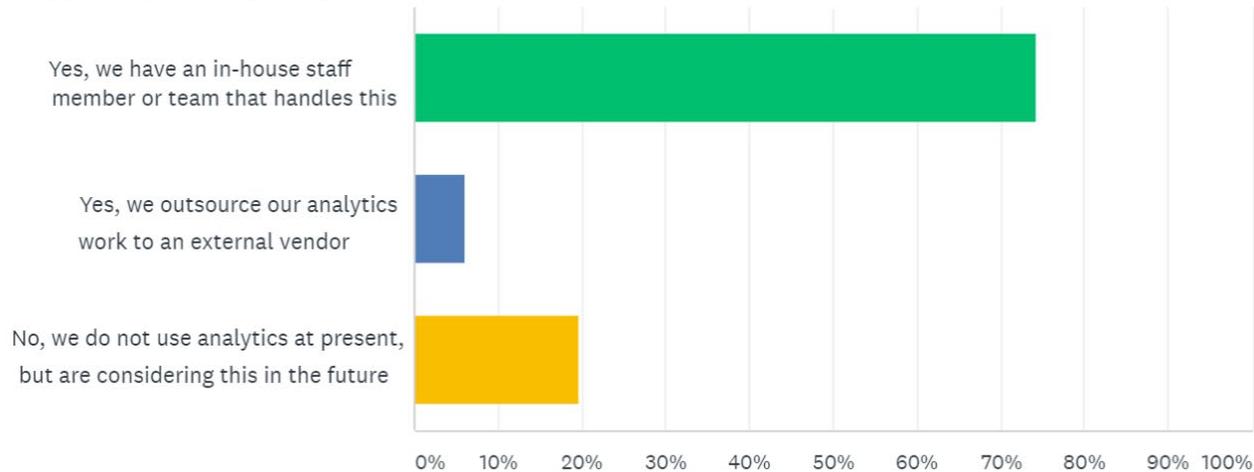
What is it? What should we do about it?

What We Decided to Do

- Brout professorship awarded to data-driven marketing professor
 - Used to develop introductory class in business analytics using R
 - Trialed course in Spring 2016 - as an elective for marketing students
 - Students loved it
- Presented idea of needed course to Board of Advisors (Spring 2016)
 - Gather outside reaction to relative merit of “data analytics”
 - Should this be for some or for all
 - Next steps?
- Surveyed our alumni
 - Alumni Technology Survey (3,537 email invitations, 290 responses)

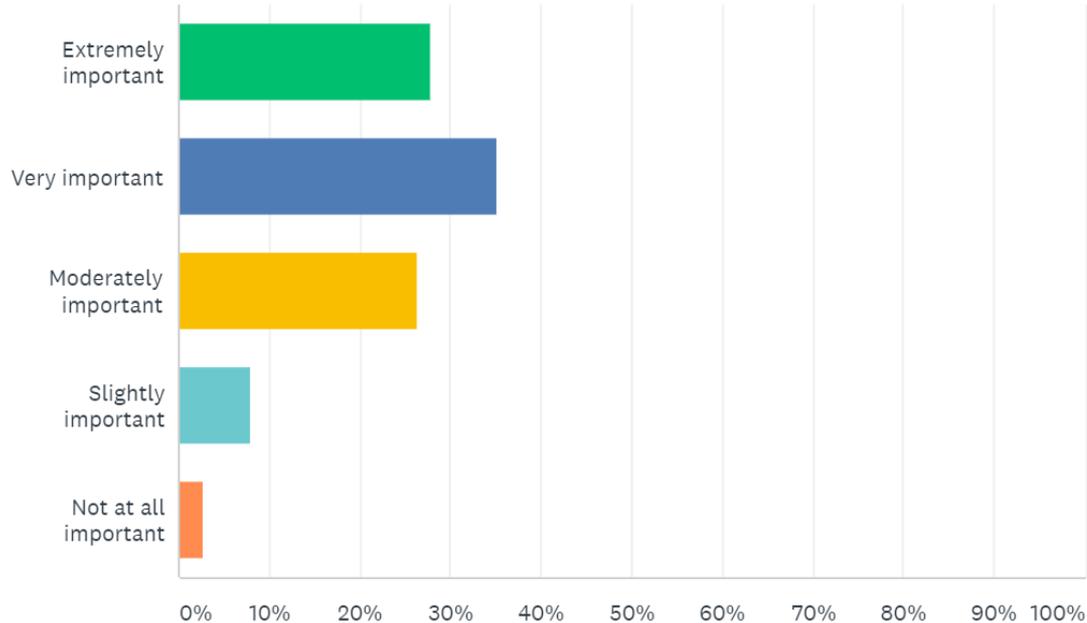
Alumni Survey

Do you or your company currently use data analytics in your daily business activities and decisions?



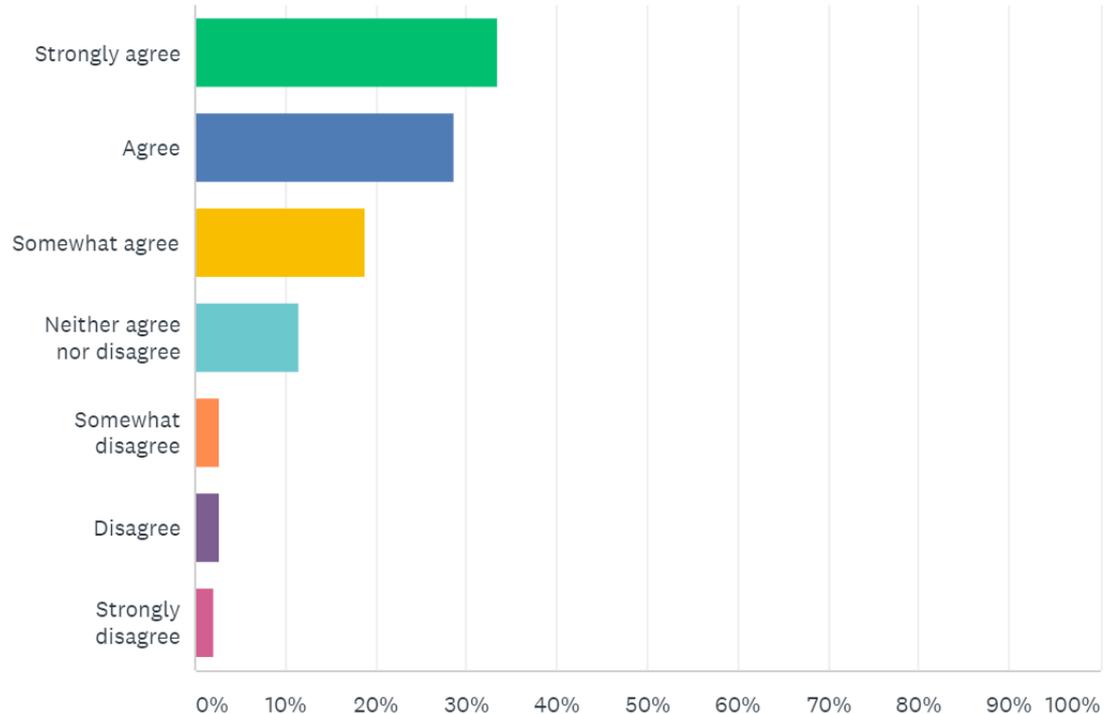
Alumni Survey

In your opinion, how important would a basic understanding of analytics be for entry-level hires?



Alumni Survey

Over the next five years, proficiency in some sort of analytics or "big data" software package is likely to be an important qualification for your career.



What We Decided to Do

- Faculty deliberated and chose to add to core
 - Extensive discussions with business faculty
 - Second Presentation to Luter Board of Advisors (Fall 2016)
 - Approved course shell and proposed spring 2017 “test” course
- Developed “test course” syllabus based on
 - Brout results and experience
 - Survey responses and analysis
 - W&M faculty input (as they launched their Masters in Data Analytics)
 - DSI Conferences (DASI - Data Analytics and Statistics Instructions special interest group)
 - Feedback from JMP Academic Coordinator
- Trial run as an elective for MGMT majors in spring 2017 -- using JMP

Highlights of Syllabus

- Introduction (descriptive, predictive, prescriptive analytics, what is Big Data?)
- Data visualization using Tableau
- Introduction to Predictive Analytics (using JMP):
 - Decision trees (classification and regression)
 - Linear regression
 - Logistic regression
 - Neural networks
- Clustering and its applications
- Two midterm exams, plus a final
- Two group projects (for a given data develop an analytical model and write a professional report). Report must be understood by a non-professional (“grandma test”)
- One group oral presentation.
 - Students pick a dataset, visualize it and deliver a 15-minutes in-class presentation

What We Learned

- Students generally see value. A lot of comments “I see how it applies to business world”
- Some students commented “I do not want to do that for the rest of my life”
- Students like Tableau (easy to learn, easy to use)
- Students can understand simple models better (decision trees, linear regression)
- Logistic regression is hard to understand and test results are lower
- Neural nets are hard to explain and hard to test
- Surprise: some students commented that even though learning R is clearly more difficult, they would prefer it, since JMP has limited adoption in the industry

Adjustments to Introductory Course

- Add material on principles of visualizations
 - Types of charts and when they are appropriate
 - Use of pre-attentive attributes
 - Use of color (color wheel, color blindness)
- Removed neural networks from material
- In fall 2018 one section is instructed using R, not JMP
- Results very favorable – fix syllabus for core implementation in fall 2019

What Happened Next?

- Spring 2018: offered second DA course -- Advanced Data Analytics (10 students)
 - Potential elective for MGMT major
 - Covered SQL/database design principles
 - Introduced data cleaning/wrangling
 - Basics of Python programming
 - Topics:
 - Naive Bayes model
 - k-Nearest Neighbors
 - Text analytics
 - Two group projects:
 - Use Python to analyze text file to compute frequencies of words
 - Analyze real retail data to recommend selecting 30 top selling basketball models out of 66
- Course received ALL favorable evaluations; introduced into catalog as MGMT elective for spring 2020

Looking Ahead

- Considering splitting MGMT major into ORG/HR concentration and Decision Analytics concentration
 - Advanced Data Analytics
 - Introduction to Programming (Python)
 - Supply Chain
 - Marketing data analytics?
 - ??
- Students will decide after taking required core data analytics class
- CS students (Information Systems concentration) can take intro and advanced data analytics classes as electives

Challenges

- Lack of enthusiasm among management quantitative faculty
- Selling to all faculty the need to educate ALL majors in data analytics
 - Do accountants need that? ACCT data analytics is rather specialized
 - “Excel is the King” in Finance
- Selling to students
 - Too hard (requires quantitative skills)
 - Is this something I need – I’m interested in HR
- Hard to find instructors (hot commodity on the job market)
 - Failed search in Fall 2016; success in 2017
 - Hired an adjunct (CNU grad, Masters of Data Analytics)
 - Found CNU alumni working in the field
 - New search in FY2020

Encouraging News

- Students are consciously seeking data analytics courses
- Industry feedback confirms everyone needs an introduction/familiarity
- Potential students (and parents) are asking about data analytics in curriculum and job placement opportunities
- Early feedback from graduates and employers is extremely positive
- Partnering with local companies
 - Booz Allen Hamilton
 - Sentara Health Systems
 - Ferguson Enterprises (\$16B company in Newport News)
- Involving business in curriculum development, received enthusiastic response
- New Masters (Financial Analysis) tilts towards data analytics

In Closing ...

- Understanding Data Analytics, like software skills, is a requirement in today's business world
- Introductory (Core) course needs to be heavily applications focused – What will it allow me to do?
- Involving business in the curriculum design and the teaching/learning experience is essential



Questions ??