SMLR MHRM Program
Selected Problems in Advanced Analytics
Fall 2017

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Thursdays 7:20-10:00pm
Levin 103
Course Number: 38:533:616:01

Office Hours: By appointment

Course Description: This course is designed to extend the basic research design and statistics curriculum offered in the HR Decision Making: Data-Based Decisions course. It will focus on topics such as designing organizational research; measurement strategies; data management (e.g. collecting, cleaning and merging data; managing data in multiple formats and from different databases); answering questions with data analysis; and an introduction to common data analysis packages.

Required Text: There is no textbook for this course. Readings and resources will be distributed via Sakai.

Required Software: This course will make use of several different software packages. It is up to you to access the software and install it on your personal computer.

1. R is free and open source. You will need to use a "mirror" to download the software. Visit: https://cran.r-project.org and click the link to get started downloading the R version appropriate for your operating system.
2. I highly recommend using R-Studio, which is an integrated development environment (IDE) for R. RStudio is free for personal use; visit: https://www.rstudio.com/products/RStudio/.
3. Tableau: As a student you are eligible for a free 1-year license of the software for educational use. Visit: https://www.tableau.com/academic/students to download the software.

SMLR Learning Goals: Advanced Analytics focuses on two SMLR Learning Goals:

II) Quantitative Skills – Apply appropriate quantitative and qualitative methods for research on workplace issues.
- Formulate, evaluate, and communicate conclusions and inferences from quantitative information
- Apply quantitative methods to analyze data for HR decision making including cost-benefit analyses, ROI, etc. (HRM)

VI) Application – Demonstrate an understanding of how to apply knowledge necessary for effective work performance
- Apply concepts and substantive institutional knowledge, to understanding contemporary developments related to work
- Understand the internal and external alignment and measurement of human resource practices (HRM)

Course-Specific Learning Goals: Upon completion of this course students should:

1. Understand how to use data analysis to answer organizationally relevant questions,
2. Be able to identify strengths and weaknesses in research design,
3. Be able to articulate the limits of analyses,
4. Be able to generate and implement strategies for data collection and analysis

Attendance: Attendance at every class is required. Absences for illness, religious holidays and other events recognized by Rutgers University will be excused. If you know you are going to miss a class because of a religious holiday I would appreciate an email prior to the holiday. I know that employer demands sometimes require even the most conscientious student to miss a class. I am much more sympathetic to a rationale for an

absence emailed to me before the absence than an excuse made after the fact. Even excused absences are not valid reasons for work not to be done.

Academic Integrity: The rights of students will be protected to insure that test scores are related to competence in the subject matter. Therefore, all examinations will be carefully proctored. If cheating is detected, it will be prosecuted to the limit allowed by University policies. An academic integrity contract is attached to this syllabus. This is the same academic integrity contract you agreed to when you enrolled in this program. By enrolling in this course you affirm you have read and agree to comply with these policies.

Grading: Grades will consist of the following components. Details will be posted on Sakai.

Slide Deck Reports	30%
Assignment	20%
Final Exam	30%
Participation	10%

Assignments: There are 5 individual assignments for the course that vary in their scope and deliverable. Each assignment will be better described in class. Assignments should be uploaded to the appropriate Sakai dropbox unless otherwise noted. Late assignments will not be accepted and will incur a score of "0".

Slide Deck Reports: In small groups you will complete 3 slide deck reports, which will require you to analyze data and report on your findings. Build your deck in Powerpoint and annotate each slide (approx. 10-12 slides) with what you might say were you presenting the slide. You may submit your deck by uploading it to Sakai. A random sample of groups will be asked to present during the respective classes the deck reports are due.

Final Exam: There will be one cumulative examination as noted on the course schedule. The examination will be worth 30% of the course grade. Make-up policy: An examination grade of "0" will be assigned to any student who is absent without a legitimate excuse on the date of a regularly scheduled test. Legitimate excuses include illness (verified by a note from a doctor), inclement weather (only when the Rutgers Information Service (848-932-INFO) indicates that Rutgers is closed), scheduled religious holidays, business trips or events where attendance is require by an employer, when the instructor emails the class announcing class is suspended, or other dire circumstances such as a death in the family.

Students with learning disabilities or other reasons for taking the examination outside the regular examination time should present a statement to that effect with appropriate documentation as early in the semester as possible, but certainly prior to the first examination.

Getting Help: There are many ways for you to get help in this course. First, I encourage you to utilize the vast resources across the Internet as your first stop for questions and problems. There is nothing we will do in this course that someone somewhere in the world has not already done. Google is your friend when you run into challenges in this class, as are StackExchange, Datacamp, and Youtube. Finding answers to your own questions is a valuable skill that will serve you as an analyst beyond this course; you will almost certainly be asked to do something in your job that we will not cover in this class. Moreover, one of the intents of this course is to help you "learn to learn" when it comes to data science. Of course, if you cannot find what you're looking for online, please email me and I can help you virtually or in person.

Course Schedule

Week	Topic	Tools	Readings (Sakai)	To Do
1	**What are Analytics?** • Stages of Analytics • Opportunities, Challenges, & Limitations		Boudreau (2017) Huselid & Becker (2006) Cascio & Boudreau (2008)	
2	**Working with Data: Questioning Data** • Measurement basics • Threats to validity		Shadish, Cook, and Campbell (2001)	Assignment #1 *Quiz on readings*
3	**Working with Data: Reporting Data** • Advanced functions & pivot tables • Telling a story with data	Excel Tableau		*Complete Tableau Tutorial*
4	**Working with Data: Reporting Data** • Dashboards • Benchmarking • Efficient reporting	Tableau		Deck #1 due *Make a dashboard series from Tableau data*
5	**Getting Data: Survey Design** • Construct validity • Sampling techniques & bias	Qualtrics Survey Monkey	Aamodt (2007) Morrel-Samuels (2002)	Assignment #2 *Quiz on readings*
6	**Getting Data: HRIS & Archival Data** • Organizational structure of data • Accessing databases & scraping	SQL R & RStudio		Assignment #3 *Finish Datacamp Intro to R*
7	**Getting: Combining Data** • Merging, aggregating, leading/lagging	SQL R & RStudio		Assignment #4 *Finish Datacamp Intro to SQL*
8	**Getting Data: Text & Qualitative Data** • Coding & Natural language processing	R & RStudio		
9	**Answering Questions: Individual-level predictive models** • Flight Risk/CWBs			Deck #2 due *Combine text and HRIS analysis*
10	**Answering Questions: Workforce planning** • KSAO & FTE prediction			
11	**Answering Questions: Performance Management** • Performance Management • Unit & team performance		Harrison & Klein (2007)	Deck #3 due
12	**Future of Analytics** • Machine Learning			
13	**Future of Analytics (cont)** • Big Data • Organizational Network Analysis			Assignment #5 *Finish Datacamp Kaggle ML*
14	**Future of Analytics (cont)** • Assumptions of big data • Limits & Generalizability		Overton (2016)	
15	**EXAM**			

Suggested Further Reading:

Becker, B. E., Huselid, M. A., & Ulrich, D. (2001). *The HR scorecard: Linking people, strategy, and performance*. Harvard Business Press.

Cascio, W., & Boudreau, J. (2010). *Investing in people: Financial impact of human resource initiatives*. Ft Press.

Franks, B. (2014). *The Analytics Revolution : How to Improve Your Business By Making Analytics Operational In The Big Data Era*. Hoboken, New Jersey: Wiley.

Huselid, M. A., Becker, B. E., & Beatty, R. W. (2005). *The workforce scorecard: Managing human capital to execute strategy*. Harvard Business Review Press.

Kavanagh, M. J., & Johnson, R. D. (Eds.). (2017). *Human resource information systems: Basics, applications, and future directions*. Sage Publications.

Tonidandel, S., King, E., & Cortina, J. M. (Eds.). (2015). *Big data at work: The data science revolution and organizational psychology*. Routledge.