

LEAD 703: Data Analytics and Leadership for Social Innovation

School of Strategic Leadership Studies
College of Business | James Madison University
Spring 2024

Thursday 4:00-7:00pm, Hartman Hall 3008

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Office: 3040I Hartman Hall

Office Hours: Tuesday 2pm-4pm and Thursday 1pm-4pm or by appointment; virtual zoom office hour will be available upon request

Note: This course was received a course development grant supported by the Center for Social Value Enhancement Studies (www.cses.re.kr) in 2024.

Course Description

Managerial leaders across public, nonprofit, and for-profit sectors have access to large-scale datasets to address complex societal issues. This increasing expansion of data and digital ecosystems has influenced the scope and breadth of analytic approaches required for social innovation. An informed data-driven decision-making will provide managerial leaders with insights on how to target programs, cooperate with various stakeholders, and allocate resources appropriately. The purpose of this cross-disciplinary data science course is to equip students with the basics of programming and its applications to leadership for social innovation. The class utilizes an open-source language R software. The course covers the fundamentals of programming, including merging data sources, wrangling processes to clean datasets, and analyzing datasets.

In the first part of the course, we will cover theories and impact practices that can be applied to address complex societal challenges. For theories of the social sector, we take a close look at the lenses focusing on the role of the market, the state, and institutional environment in advancing social innovations through managerial leadership. For impact practices in the social sector, we pay attention to private action for public good, such as social entrepreneurship, ESG, and corporate philanthropy. In the second part of the course, we learn analytic techniques and use publicly available data sources targeted to advancing managerial leadership practices in social impact scaling. We finish the course with a discussion of ethical challenges in data leadership for social innovation.

Course Objectives & Expected Outcomes

The course is organized through lectures, discussions, examples with reference code, lab activities, and projects that are designed to prepare students to work with complex datasets, effectively deliver analytic results, and conduct reproducible data projects. One of the unique values expected from this course is the potential to foster inclusive learning experiences for the latest generation as well as traditional student groups by utilizing open data science tools and hands-on programming. Additionally, another educational benefit from this course is the skillset for reproducible research by using trackable scripts and open sources, which contributes to the

improvement of transparency in the data workflow. By the end of this class, I expect students will be able to:

- Acquire, transform, and analyze various types of data using R packages
- Appreciate data-enabled analytic opportunities for social innovation and conduct reproducible research
- Perform basic scripting using functions and arguments available in R packages

Textbook & Readings

Matloff, N. (2011). *The art of R programming a tour of statistical software design*. No Starch Press.

Long, J.D., & Teeter, P. (2019). *R cookbook* (2nd edition). O'Reilly Media, Inc.

Note: All other readings are available at the Canvas site.

Grading Scale

A	96-100	A-	92-95	B+	88-91	B	84-87
B-	80-83	C	76-79	F	75 or below		

Grading Method

1. Lab activities: 45%
2. Mid-term quiz: 10%
3. Data project: 45%

Lab activities: All lab assignments are due at the beginning of class on the date specified below. Students should submit their lab assignments using R markdown in PDF format.

<u>Lab #</u>	<u>Activity</u>	<u>Due date</u>
Lab 1	Rmarkdown	Feb 29, 2024
Lab 2	R basic functions& building blocks	Mar 14, 2024
Lab 3	Data structure I	Mar 28, 2024
Lab 4	Data structure II	Apr 4, 2024
Lab 5	Data wrangling	Apr 11, 2024
Lab 6	Descriptive statistics & plotting	Apr 18, 2024

Mid-term quiz: Students will take one quiz that covers basic material discussed in the lectures and labs. The quiz will be administered on Apr 18, 2024.

Data project: Students will have an opportunity to work on a data project where they create data structures and apply relevant analytics. Your project will be evaluated based on the identification of social problems, the analytical rigor employed in the analysis, and the transparency in scripting.

Important deadlines for data project:

- A one-page summary of outline is due on Feb 22, 2024.
- Data analysis produced by your R script is due on May 2, 2024. Additionally, students will make a presentation of their project. Your R script and presentation slides should be posted on Canvas.

Requirements for Written Work

All written assignments should be written in a clear and concise manner. All written documents need to be typed, double-spaced, and proofread before submission. Writing assistance is available at the JMU Writing Center (<https://www.jmu.edu/uwc/>). The written assignment must be submitted electronically on Canvas before the beginning of the class. I expect students to plan ahead and submit assignments on time. If a student has a legitimate reason (e.g., medical and family emergencies) to miss class, please notify me as soon as possible. Students are responsible for keeping up with the class requirements and submitting assignments on time.

Course Policy

Please avoid distractive practices such as tardiness, texting and ringing cell phones, excessive side conversations with peers, and using social media while class is in session. While class is in session, laptops are not used unless it is for note-taking purposes. Students are not welcome to check email or perform activities that are not related to the class. Such disruptions are considered a lack of professionalism and may affect your participation grade. Other Course Policies: Please see <http://www.jmu.edu/syllabus> for information on the following course policies.

- Attendance policy
- Academic honesty/Honor Council statement
- Adding/Dropping courses policy
- Disability accommodations
- Disruptive behavior policy
- Inclement weather policy
- Religious accommodations

Course Calendar

Part I. A Framework for Data Analytics and Leadership in Social Innovation

<u>Week</u>	<u>Readings</u>	<u>Subject</u>
WK 1	Canvas packet	Introduction
WK 2 - 3	Canvas packet	Theories of the social sector - Market, the state, and institutional environment - Legal, political, and economic pillars - Revenue sources and financing strategies
WK 4 - 5	Canvas packet	Impact practices in the social sector - Social entrepreneurship - Environment, social, and governance (ESG) - Corporate philanthropy

Part II. Building Blocks for Data Analytics and Leadership in Social Innovation

<u>Week</u>	<u>Readings</u>	<u>Subject</u>
WK 6	Matloff Ch 1 Long & Teeter Ch 1, 2, 16	Data project with open-source data <i>*Project outline due (post in Canvas)</i>
WK 7	Matloff Ch 2, 3, 4	R basic functions <i>*Lab assignment #1 due (post in Canvas)</i>
WK 8	Matloff Ch 5 Long & Teeter Ch 5	Data structure I
WK 9	Matloff Ch 6	Data structure II <i>*Lab assignment #2 due (post in Canvas)</i>
WK 10	Matloff Ch 10 Long & Teeter Ch 4	Data wrangling I
WK 11	Matloff Ch 11 Long & Teeter Ch 6	Data wrangling II <i>*Lab assignment #3 due (post in Canvas)</i>
WK 12	Matloff Ch 6	Descriptive analysis <i>*Lab assignment #4 due (post in Canvas)</i>
WK 13	Canvas packet	Plotting <i>*Lab assignment #5 due (post in Canvas)</i>
WK 14		In-class quiz <i>*Lab assignment #6 due (post in Canvas)</i>
WK 15	Canvas packet	Data-driven management and ethics
WK 16		Student presentation <i>*Project analysis due (post in Canvas)</i>