PM 516a: Introduction to Biostatistical Consulting

Units: 1
Term: Fall 2024
Location: Online, Mondays 5:00-5:50pm
Instructor: Trevor A. Pickering (tpickeri@usc.edu)

Office hour times and locations will be posted on Blackboard.

Course Overview

Course Description

This course serves as an introduction to biostatistical consulting. It will help statisticians and data analysts develop the necessary skills for successfully interacting with non-statistician collaborators. We will focus on two main goals: 1) developing the qualities necessary for an effective statistical consultant and 2) working with an investigator on an actual analysis problem (determining research questions and scope, formulating and implementing our analysis, and conveying our findings).

Learning Objectives

Through this course, students will become familiar with the process of statistical consulting. Students will learn to:

- Understand the importance of statistical consulting and its usefulness in the public health environment
- Apply techniques to improve their understanding of an unfamiliar topic and translate researchers’ questions into a statistically testable set of hypotheses
- Evaluate the best statistical approaches to address collaborator’s questions and apply such techniques
- Apply effective communication by clearly explaining statistical concepts
- Understand ethical considerations faced by statisticians
- Create analyses and results for dissemination to the client and other stakeholders

Course Preparation

Prerequisites PM510 or equivalent course.

Recommended Preparation The course assumes a familiarity with basic statistics and regression analysis through the level of PM511a. However, students will be matched with projects commensurate with their level of statistical skill.

Course Requirements

Communication

Brightspace (slides, data sets, assignment submission), USC e-mail (formal communication), Slack (informal communication)

Required Textbook

Note: Textbook may be available through the USC Libraries (libraries.usc.edu)
Required Software

Students must have proficiency in at least one statistical program, but may choose which use for this course (e.g., R, SAS, Stata, SPSS)

Assessments

There are three broad categories of activities for this course:
- Skills development for consultants, which will prepare the student to interact with a client and improve the quality of their consultations.
- Skills development for presenting statistical results, which will improve the effectiveness of the statistician with being able to communicate results to their client.
- Participation in a real consultation as a group with an investigator client at USC.

The course is graded credit/no credit and there is no point breakdown. Instead, students must successfully complete all the following:

Weekly Activities

Students will participate in weekly activities to improve their consulting and statistical analysis skills. To get the most of these activities, students must complete required pre-class preparation, which may include reading articles, excerpts from the textbook, or watching videos. Students will use the information from these pre-class preparation activities in the live session, and will receive credit if they actively participate in at least 10 sessions. Partial credit will be given if the student attends but does not actively participate in a live class session.

Investigator Meeting

Students will be meeting with a collaborator at USC (e.g., from Keck School of Medicine, Children's Hospital Los Angeles, etc.) and will work on a project as a group. Any meeting with the investigator is mandatory. Because this course teaches skills applicable in a consulting setting, students must be on time for the meeting and must be an alert, active participant with their camera on.

Final Presentation

The final day of class will be a presentation to the client collaborator. Students will present in groups, and each student must contribute to the presentation. At the end of the meeting, there will be a brief period for the students and client to provide feedback on the experience.

Late Submission Policy

Assignments cannot be completed outside the in-class context. However, there may be opportunities for alternate make-up assignments in rare circumstances.
## Alignment Grid

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>Learning Activities</th>
<th>Assignment/Assessment</th>
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</thead>
<tbody>
<tr>
<td>By the end of this course, students are expected to be able to:</td>
<td>The learning objective will be facilitated by:</td>
<td>This learning objective skill is measured by:</td>
</tr>
<tr>
<td>Understand the importance of statistical consulting and its usefulness in the public health environment</td>
<td>Weekly activities emphasizing statistical consulting in public health</td>
<td>Weekly activity assessments and in-class discussion</td>
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<tr>
<td>Apply techniques to improve their understanding of an unfamiliar topic and translate researchers' questions into a statistically testable set of hypotheses</td>
<td>Weekly activities emphasizing translating research questions into statistical analyses</td>
<td>Weekly activity assessments</td>
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<tr>
<td>Evaluate the best statistical approaches to address collaborator's questions and apply such techniques</td>
<td>Weekly activities covering choosing the correct analytical method</td>
<td>Weekly activity assessments and group meetings</td>
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<td>Apply effective communication by clearly explaining statistical concepts</td>
<td>Weekly activities outlining ways to communicate statistical concepts, investigator meetings</td>
<td>Weekly activity assessments, group meetings, and final presentation</td>
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<tr>
<td>Understand ethical considerations for statisticians</td>
<td>Weekly activities describing ethical considerations and scenarios</td>
<td>Weekly activity assessments and in-class discussion</td>
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<tr>
<td>Create analyses and results for dissemination to the client and other stakeholders</td>
<td>Weekly activities and meetings regarding the final project</td>
<td>Weekly activity assessments and final project</td>
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## Course Schedule

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<th>Week</th>
<th>Topic</th>
<th>Before Class</th>
<th>In Class</th>
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<tr>
<td>1</td>
<td>Communication</td>
<td>Relationships &amp; Interactions, Active Listening, Tips That'll Make Others Open Up To You, Textbook 2.1, 2.2</td>
<td>Communication Activity</td>
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<tr>
<td><strong>No Class</strong></td>
<td>Labor Day</td>
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<tr>
<td>2</td>
<td>The Practice of Statistical Consulting</td>
<td>What to Ask in A Consultation</td>
<td>Training Videos Discussion</td>
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<td>3</td>
<td>Exploratory Analysis</td>
<td>Data Quality Control Exercise</td>
<td>EDA Review</td>
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<td>4</td>
<td>Practice Consultations</td>
<td>The PICOT Format, Textbook 4.1-4.4</td>
<td>Practice Consultations</td>
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<td>5</td>
<td>Investigator Meeting</td>
<td>Intake Form</td>
<td>Investigator Meeting</td>
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<td>6</td>
<td>Statistical Mistakes</td>
<td>Ten Common Statistical Mistakes, Guideline for Reporting Results</td>
<td>Statistical Mistakes Exercise</td>
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<td>8</td>
<td>Check-In I</td>
<td>Exploratory Data Analysis, Choosing the Right Statistical Test</td>
<td>Workshop</td>
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<td>9</td>
<td>Practice Consultations II</td>
<td>Myers-Briggs Personality Test, How Each Personality Type Communicates</td>
<td>Practice Consultations</td>
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<tr>
<td>10</td>
<td>Presenting Statistical Information</td>
<td>How to Graph Badly, Rudiments of Numeracy</td>
<td>Graphs and Tables Exercise (MDM)</td>
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<td>11</td>
<td>The Statistician’s Role</td>
<td>STROBE and CONSORT</td>
<td>Communicating Results Video</td>
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<td>12</td>
<td>Check-In II</td>
<td>Statistical Consulting Clients, What to Expect When You Consult</td>
<td>Consulting Videos</td>
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<td>13</td>
<td>Ethics</td>
<td>The Potti Case, Chocolate Is Good</td>
<td>Ethics Discussion</td>
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<td>14</td>
<td>Final Presentation</td>
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<td>Presentation and Debriefing</td>
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Statement on Academic Conduct and Support Systems

Academic Conduct:
Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” https://policy.usc.edu/scampus-part-b/. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Support Systems:
Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. https://engemannshc.usc.edu/counseling/

National Suicide Prevention Lifeline - 1-800-273-8255
Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. http://www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender-based harm. https://engemannshc.usc.edu/rsvp/

Sexual Assault Resource Center
For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: http://sarc.usc.edu/

Office of Equity and Diversity (OED)/Title IX compliance – (213) 740-5086
Works with faculty, staff, visitors, applicants, and students around issues of protected class. https://equity.usc.edu/

Bias Assessment Response and Support
Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. https://studentaffairs.usc.edu/bias-assessment-response-support/

The Office of Disability Services and Programs
Provides certification for students with disabilities and helps arrange relevant accommodations. http://dsp.usc.edu

Student Support and Advocacy – (213) 821-4710
Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. https://studentaffairs.usc.edu/ssa/

Diversity at USC
Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. https://diversity.usc.edu/

USC Emergency Information
Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. http://emergency.usc.edu

USC Department of Public Safety – 213-740-4321 (UPC) and 323-442-1000 (HSC) for 24-hour emergency assistance or to report a crime
Provides overall safety to USC community. http://dps.usc.edu