Teaching Portfolio

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This teaching portfolio is designed to showcase my adaptability and innovation in teaching methodologies, with a strong emphasis on inclusivity and accessibility, particularly in the post-COVID educational landscape. In the portfolio are the following:

1. Syllabi
   Two syllabi for my proposed courses (attached to page 2 and 3), including an undergraduate course on data analysis and a graduate course on meta-analysis. Each syllabus contains the course description, textbook information, lecture outline, and assignments.
2. Tutorial Video
   A detailed video tutorial I created and shared on YouTube, showcasing my hands-on approach to teaching R coding. This video serves as an example of my ability to explain complex statistical concepts clearly and engagingly through digital platforms: https://www.youtube.com/watch?v=2wbXTFvaRnM&t=766s
3. Educational Website
   An interactive website I developed to facilitate the teaching of data analysis and R programming in my proposed undergraduate course. The website is designed to support both in-person and remote learners, featuring resources that students can access asynchronously: https://quantpsych.shinyapps.io/coding/

Proposed Undergraduate Course Syllabus

Course Information

Course Title: Introduction to Statistics and Data Analysis

Course Description

This course introduces undergraduate students in the field of social and behavioral sciences to foundational concepts in statistics and data analysis. The purpose of the course is to equip students with essential skills to analyze data from both experimental and non-experimental research designs. Students will learn how to generate research questions, formulate statistical hypotheses, and use the R statistical software to analyze data. Throughout the course, emphasis will be placed on a conceptual understanding of statistical principles as well as interpreting statistical results to make informed decisions in research.

Textbooks

Howell, D. C. (2012). *Statistical methods for psychology* (8th ed.). Belmont, CA: Wadsworth. ISBN: 9781111835484

Tamhane, A. C., & Dunlop, D. D. (2000). *Statistics and data analysis: From elementary to intermediate.* Upper Saddle River, NJ: Prentice Hall.

Lecture Outline and Readings

Week	Topic	Reading
1	Introduction and Review of Probability; R and RStudio	TD ch.1, 2
2	Summarizing and Exploring Data	TD ch.4
3	Standardized Values and the Normal Distribution	HD ch.3
4	Sampling Distribution	TD ch.5
5	Hypothesis Testing	TD ch.6
6	One-Sample T-Test	TD ch.7
7	Independent-Sample T-Test and Paired Sample T-Test	TD ch.8
8	Power	HD ch.8
9	Simple Linear Regression and Correlation (I)	TD ch.10
10	Simple Linear Regression and Correlation (II)	TD ch.10
11	One-Way ANOVA (I)	HD ch.11
12	One-Way ANOVA (II)	HD ch.11
13	Categorical Data and Chi-Square	HD ch.6

**HD = Howell (2012) book

**TD = Tamhane and Dunlop (2000) book

Assignments

Assignments consist of three parts:

1) *Textbook problem sets*: Students will solve a number of selected problems in the Tamhane and Dunlop (2000) or Howell (2012) book after each week's lecture.
2) *Individual project-based assignments*: Students will complete two distinct data-analysis projects using a simple linear regression and one-way ANOVA, respectively. The instructor will pick the datasets and provide them to the students.
3) *Final group project*: Students will work in groups to collect their own data or choose to use secondary data collected by others. They will formulate a meaningful research question and use appropriate statistical methods to analyze their data. They will write up a report and present their findings during the last class.

Proposed Graduate Course Syllabus

Course Information

Course Title: Introduction to Systematic Review and Meta-Analysis

Course Description

Systematic reviews and meta-analyses have become essential tools in fields like healthcare, education, and policy, where evidence-based decision-making is increasingly prioritized. This graduate-level course provides an in-depth introduction to these methods focusing on both theoretical concepts and practical applications. Advanced topics such as network meta-analysis will also be covered. Additionally, students will learn how to write meta-analysis reports in APA format and use R software to conduct quantitative analyses through assignments.

Textbooks

Cooper, H. (2017). *Research synthesis and meta-analysis* (5th ed.). Sage. ISBN 9781483331157
Harrer, M., Cuijpers, P., Furukawa, T.A., & Ebert, D.D. (2021). *Doing Meta-Analysis with R: A Hands-On Guide*. Boca Raton, FL and London: Chapman & Hall/CRC Press. ISBN 978-0-367-61007-4.

Lecture Outline and Readings

Week	Topic	Reading
1	Introduction to Systematic Review and Meta-analysis; R and RStudio	HC p.1-29, HCFE ch.2
2	Framing the Question; Inclusion Criteria; Literature Search; Coding Sheets	HC p.30-109
3	Documenting Search Results; Assessing Risk of Bias	HC p.110-188, HCFE ch.15
4	Effect Sizes in Observational Designs and Experimental Designs	HCFE ch.3
5	Fixed-Effect and Random-Effects Model; Between-Study Heterogeneity	HCFE ch.4
6	Outlying and Influential Studies; Sensitivity Analysis; Forest Plot	HCFE ch.5, 6
7	Publication Bias; Funnel Plot	HCFE ch.9
8	Moderator Analysis: Subgroup Analysis and Meta-Regression	HCFE ch.7, 8
9	Power Analysis; Reporting and Reproducibility of Meta-Analysis	HCFE ch.14, 16
10	Multivariate Meta-Analysis	HCFE ch.11
11	Network Meta-analysis	HCFE ch.12
12	Bayesian Meta-Analysis	HCFE ch.13

** HC = Cooper (2017) book
** HCFE = Harrer et al. (2021) book

Assignments

Group Project: Students will be required to collaborate on a semester-long meta-analysis project and to prepare a comprehensive written report in adherence to APA format. The report must include the following sections: problem formulation, data collection and evaluation, data analysis, and a discussion section highlighting how their meta-analyses contribute to understanding the chosen research topic. Additionally, each group will give a 15-minute presentation summarizing their project's goals, process, and key findings during the last two classes.

Homework 1: Report an initial search for the meta-analysis project using at least three databases.
Homework 2: Examine and critique effect size calculations in a published meta-analysis.
Homework 3: Report research question(s), literature review, and data collection and screening of the meta-analysis.
Homework 4: Perform moderator analyses using datasets from published meta-analyses in R.
Homework 5: Final report of the meta-analysis project and group presentation.