

Supporting Statistics Research Postgraduates to Teach Quantitative Data Analysis to Postgraduate Students Without a Statistics Background

A collaboration between the Department of Statistics and Centre for Learning
Enhancement And Research (CLEAR), The Chinese University of Hong Kong

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Workshop Teaching Plan (Updated February 2024)

Presenting and teaching statistics differ significantly between non-background students and statistics majors. The website and textbooks below serve as an references of suitable presentations for students without a background in statistics.

- Statistics Online by The Pennsylvania State University
 - <https://online.stat.psu.edu/statprogram/graduate-programs>
- Hair, J. F. (2009). Multivariate data analysis.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. sage.

This form provides a step-by-step guide for setting up your workshop for research students without a statistics background. It facilitates the development of your workshop, including workshop content and pre-workshop video(s); and other necessary information uploaded to the online learning platform. **Please email your completed teaching plan to Dr. Wright (jawright@cuhk.edu.hk) once you have finished.**

Workshop title: _____

Name of faciliator: _____

Duration (**either** one 3-hr workshop repeated once **or** one 6-hr workshop split into two sessions): _____

Part I(a): Introduction

You can draft the introductory part of your workshop by following the "Overview" and "Objectives" format found in PSU's online notes. As an example, refer to the Multiple Regression section from PSU (<https://online.stat.psu.edu/stat501/lesson/5>). Be sure to present your explanation in a manner that's understandable for students without a background in statistics or mathematics.

- *Overview*
Present your selected statistical methodology in straightforward, everyday terms. Include the motivations for using these methods.
- *Objectives*
Upon completion of your workshop, students should be able to:

Part I(b): Assumptions and data requirements

- Specify the data requirements, including the measurement level of the variables, minimum sample size, ratio of independent to dependent variables, and distribution assumption.
- Suggest related or alternative statistical methods that are suitable when the above conditions are not met. This will guide students in choosing appropriate statistical techniques for their datasets and research purposes.

Part I(c): Workshop outline

- Divide your workshop into sub-sections, and avoid to cover too many sub-sessions. 4 sub-sessions should be sufficient for a 3-hr workshop.

Part II(a): Key concepts

- Explain 2-3 key concepts involved in your chosen statistical methods. The explanations should be clear and comprehensible for students without a relevant background. Avoid using mathematical notations in your definitions and explanations.
- These explanations are recommended to be included in the pre-workshop videos to support your discussions during the in-person workshop. You can assume that students have viewed these videos before the workshop, thereby eliminating the need to thoroughly repeat the key concepts during the workshop.

Part II(b): Prior statistical, mathematical or programming knowledge required to understand the workshop's content

- Some advanced methods presume students' understanding of basic statistical methods, fundamental statistical concepts, and standard operations of statistical software. Yet, not all students may have prior knowledge of these topics.
- It's suggested to find out and cover these background knowledge in pre-workshop videos for students to review before workshop attendance.

Part III: Examples

Provide two examples that demonstrate the application of the specified statistical methods. These examples can be drawn from research articles or textbooks. One example should be from the fields of engineering, medicine, or science, while the other should be from the arts and humanities. These examples will serve as motivating factors in pre-workshop videos or will be discussed as demonstrations during the workshop. For reference, you may refer the examples provided on <https://online.stat.psu.edu/stat501/lesson/5/5.2>. This will help students without a statistical background understand the application of these methods.

- Problem:
 - Specify the research questions
 - State the statistical questions derived from the research questions
- Data:
 - Describe the dataset
- Methods:
 - List the package/function in SPSS (and optionally R) for the analysis
- Solution:
 - Which part of output should we pay attention to?
 - Report the results from the software output
 - What do we learn from the output?
 - Interpret the findings and discuss their implications for the research questions.

Part IV: Workshop run-down

- The face-to-face workshop should allocate sufficient time for participants to practise statistical methods to real-life examples. It's recommended to include at least 45-minute in total for hands-on.
- Restrict the amount of presentation slides used throughout the workshop. This is particularly useful for attendees without a statistics background, as it reduces cognitive load and mathematical anxiety. It also ensures the workshop does not exceed its time limit and that each slide is adequately discussed.

	No. of Presentation slides	Estimated time allocated (minutes)
Ice-breaking		
Teaching		
- Introduction and outline		
- Explanation of basic ideas and concepts of the statistical methods		
- Demonstration of statistical methods using statistical software		
- Examples		
Total		
	Number of session(s)	Estimated time allocated (minutes)
Hands-on practice		
Question and Answer		
Breaks		
Total		