QUANTITATIVE RESEARCH METHODOLOGIES AND TECHNIQUES I

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OBJECTIVES AND CONTENT

“Did you ever notice that, no matter where you stand on popular issues of the day, you can always find statistics or surveys to back up your point of view-whether to take vitamins, whether day care harms kids, or what foods can hurt you or save you? There is an endless flow of information to help you make decisions, but is this information accurate, unbiased?” Barbara Walters gave this introduction to a March 31, 1995, segment of the popular prime-time ABC television program 20/20. The story was titled "Facts or Fiction?--Exposés of So-Called Surveys." The program illustrated how the results arising from surveys and statistical analysis that might seem not right, might be just so, wrong or misleading.

This course if focused on providing students with a robust statistical knowledge, with the aim of addressing and tackling different research questions based on the analysis of data. The focus is on understanding what the role of statistics in managerial decision making is. We will introduce and use descriptive and inferential statistics, illustrating how sample data can be used to estimate, make decisions, predictions, or other generalizations about larger populations.

While on one side the course will help the student to understand the theory behind some fundamental statistical techniques, on the other hand, we will see how a widely used statistical software, i.e., SPSS can be used to perform all the computation required by the statistical analysis. More importantly, we will learn how the results and the output should be interpreted.

PROGRAM

We will use the following textbook as reference (in the syllabus, all the numbers in parentesis next to each topic refers to the textbook below. The format used below is (chapter.section)):

- McClave, J.T., Benson, P.G., & Sincich, T. (2014). Statistics for business and economics (12th ed). Upper Saddle River, NJ: Pearson.

I strongly encourage you to read the indicated chapters and paragraphs prior to the beginning of the course. How to read these chapters is, of course, a matter of personal choice. However, my suggestion would be to just have a preliminary reading of the material, to acquire an idea of which topics we will be studying during the course. Details about how to compute the different statistics will be covered in class.

In addition, we will use the following book to learn how to use SPSS, the statistical software used in the classes. (With respect to the SPSS manual, you do not need to read it before the course. We are going to use the manual as a reference book during the course itself):

- SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS (Open University Press)

FURTHER REFERENCES

For your future applied work, you will probably need a more in-depth coverage of the material. To that aim, the following list of textbooks is given.

- Linear regression and ANOVA. Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003).
- Applied multiple regression/ correlation analysis for behavioral sciences (3rd edition). Mahwah, NJ: Lawrence Erlbaum Associates. (easy to follow and very comprehensive, few formulae)

Read before Session 1

I would encourage you to have a look at the following two readings. They both provide a good overview of what we are going to learn during the course, and how these statistical techniques can be employed to address research and business questions:

- Chapter 10 of the SPSS manual, "Choosing the right statistic"
- The paper provided in the link below

Just have a look at both readings, to grasp an overview of what is awaiting.

SESSIONS 1 - 4

Sampling, Confidence Intervals and Hypothesis Testing

- Random sampling and central limit theorem (5.1-5.3)
- Confidence Intervals (6.1) Confidence interval when population variance is known (6.2)Confidence interval when population variance is not known (6.3)Confidence interval for population proportion (6.4)Determining the sample size (6.5)How to use SPSS for confidence interval

- Hypothesis testing (7.1-7.3)
    - Hypothesis testing about a population mean: large sample (7.4)
    - Hypothesis testing about a population mean: small sample (7.5)
    - Hypothesis testing about a population proportion (7.6)
    - Type I and type II errors (7.8)
    - Testing for two means (8.1): independent samples (8.2), paired sample (8.3)
    - Comparing two population proportions (8.4)
    - How to use SPSS for hypothesis testing

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SESSIONS 5 - 8

Analysis of Variance (ANOVA)

- Comparing more than two means (9.1)
- Completely randomized design: Single factor (9.2), post-hoc analysis (9.3)
- Randomized Block Design (9.4)
- Factorial experiments: Two factor models (9.5)
- One-way and two-way Contingency Tables for Categorical Variables (10.1-10.3)
- A word of caution about Chi-square tests (10.4)
- How to use SPSS for ANOVA and Categorical Data Analysis

SESSIONS 9 - 12

Regression Analysis and Model Building

- Regression models and the Least Squares Approach (11.1-11.3)
- Simple linear regression and its assumptions (11.3), residual analysis (12.11), multicollinearity (12.12)
  Overall significance of the model: Coefficient of correlation and determination (11.5, 12.3)Using the model for estimation and prediction (11.6)A complete example (11.7)
- Multivariate linear regression (12.1)
  First-order models (12.2-12.4)Models with interaction terms (12.5)Models with quadratic terms (12.6)Models with categorical variables (12.7-12.8)Comparing nested models (12.9)
- Model building and stepwise regression (12.10)
- How to use SPP for linear regression

SESSIONS 13 - 14

Time Series

- Exponential smoothing (14.2)
- Forecasting trends: simple linear regression (14.7), seasonal regression models (14.8)
- Autocorrelation and the Durbin-Watson test (14.9)

SESSION 15

Final Exam.

EVALUATION CRITERIA

Grades will be assigned as follows:

Criteria	Percentage	Comments
Final Exam	50 %	
Class Participation	25 %	
Individual work	25 %	

Class Participation Policy

Class participation provides the opportunity to practice speaking and persuasive skills, as well as the ability to listen. Comments that are vague, repetitive, unrelated to the current topic, disrespectful of others, or without sufficient foundation will be evaluated negatively. What matters is the quality of one's contributions to the class discussion, not the number of times one speaks.

Outstanding Contributor: Contributions in class reflect exceptional preparation. Ideas offered are always substantive, provide one or more major insights as well as direction for the class. Challenges are well substantiated and persuasively presented. If this person were not a member of the class, the quality of discussion would be diminished markedly. Grade : 90-100

Good Contributor: Contributions in class reflect thorough preparation. Ideas offered are usually substantive, provide good insights and sometimes direction for the class. Challenges are well substantiated and often persuasive. If this person were not a member of the class, the quality of discussion would be diminished. Grade : 80

Adequate Contributor: Contributions in class reflect satisfactory preparation. Ideas offered are sometimes substantive, provide generally useful insights but seldom offer a new direction for the discussion. Challenges are sometimes presented, fairly well substantiated, and are sometimes persuasive. If this person were not a member of the class, the quality of discussion would be diminished somewhat. Grade : 60

Non-Participant: This person says little or nothing in class. Hence, there is not an adequate basis for evaluation. If this person were not a member of the class, the quality of discussion would not be changed. Grade : 40

Unsatisfactory Contributor: Contributions in class reflect inadequate preparation. Ideas offered are seldom substantive, provide few if any insights and never a constructive direction for the class. Integrative comments and effective challenges are absent. If this person were not a member of the class, valuable air-time would be saved. Grade : 20

Note: I obtained these guidelines from the Harvard Graduate School of Education. In turn, these have been learned from someone else. Although the original attribution for the guidelines has been lost, they continue to be so useful to so many.

BIBLIOGRAPHY

https://ie.on.worldcat.org/courseReserves/course/id/10003177

https://ie.on.worldcat.org/courseReserves/course/id/11957049