Cluster	Course Title	Instructor	Credit	Semester
S	Advanced Data Analysis	CHEN chen	3	2015 Summer

Course Description

As a course in the module of Research Skills in the AELC, advanced data analysis intends to provide students with some common intermediate (including some basic if needed) statistical techniques used in educational and psychological research. To learn such statistical techniques not only helps students to understand the basic concepts behind these quantitative techniques, but also motivates them to acquire more skills and experience in specific methodologies that are relevant to their own practices and research projects. Besides, this course also tends to cultivate students' critical thinking in analyzing and evaluating various research reports and conclusions on education and student development. All the knowledge and skills are necessary for any future educational leaders in Asian region.

In order to achieve the above purpose, advanced data analysis consists of 14 sessions, among which 12 sessions ranging from multiple regression, mediator and moderator analysis, logistic regression, non-parametric tests, to multivariate analysis of variance (MANOVA) and factor analysis. Moreover, this course also introduces how to clean up data prior to run main analysis (data screening) and how to replace missing data by the most respectable method, multiple imputation (MI) in particular. The remaining 2 sessions are related to students' research projects, which are intended to encourage them to apply what they have learned into analyzing their own research data.

Objective

After participating in and completing the course, students are able to:

1. Know more about the basic concepts behind the learned statistical techniques

2. Know more about the advantages and disadvantages of the learned techniques

3. Select appropriate statistical techniques to analyze and report their data

4. Feel prepared to face the unexpected, equipped with a set of skills enabling them to adapt to the inevitable surprises of data analysis

5. Understand mistakes made in data analysis, learn from the mistakes, and move onward.

Leaning Method

This course is delivered by two parts: classroom lectures and lab practices. For each session, the lectures include the basic concepts behind the relevant statistical techniques, an example to illustrate how to run the data analysis with SPSS, and the part of "how to report research results". The lab practices then provide students with exercise opportunities to operate what they have learned in the classroom.

Contents
1) Review of univariate and bivariate statistics (Lecture and lab practice)
2) Clean up your data: Data screening (Lecture and lab practice)
3) Multiple regression-1 (Lecture and lab practice)
4) Multiple regression-2 (Lecture and lab practice)
5) Mediator and mediating effect (Lecture and lab practice)
6) Moderator and moderating effect (Lecture and lab practice)
7) Logistic regression (Lecture and lab practice)
8) Non-parametric tests (Lecture and lab practice)
9) Students' research project proposal (Discussion)
10) ANOVA and ANCOVA (Generalized linear models) (Lecture and lab practice)
11) Multivariate analysis of variance (MANOVA) (Lecture and lab practice)
12) Factor analysis (Lecture and lab practice)
13) Missing data and Multiple imputation (Lecture and lab practice)
14) Students' research project presentation (Oral presentation)

Requirements
1. Students who take this course are assumed to be familiar with basic statistics or have finished the elementary statistics course. 2. Students are required to design and conduct preliminary studies during the course period, use the appropriate statistical techniques to analyze their data, and to give presentations at the end of the semester. 3. Students are required to write short reports about their studies. 4. Students are suggested to read references recommended for the course.

Evaluation
・Attendance (60%) ・Research project conducting and presentation (20%) ・Final report (20%)

Textbooks and Papers
References Connolly, P. (2007). Quantitative data analysis in education: A critical introduction using SPSS. London; New York: Routledge. Field, A. P. (2005). Discovering statistics using SPSS: (and sex, drugs and rock'n'roll) (2nd ed.). London: SAGE. Miles, J., & Shevlin, M. (2001). Applying regression & correlation: A guide for students and researchers. London: Thousand Oaks, Calif.: Sage Publications. Tabachnick, B. G., & Fidell, L. S. (2007). Using multivariate statistics (5th. ed.). Boston: Pearson/Allyn & Bacon.