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行政院國家科學委員會補助專題研究計畫

赴香港參加PISA工作坊

計畫類別：☑ 個別型計畫　　□ 整合型計畫

計畫編號：NSC 95-2517-S-004 -001 -

執行期間：　95 年 3 月 1 日至 95 年 4 月 30 日

計畫主持人：邱美秀

成果報告類型(依經費核定清單規定繳交)：☑精簡報告　□完整報告

本成果報告包括以下應繳交之附件：

☑赴國外出差或研習心得報告一份

□赴大陸地區出差或研習心得報告一份

□出席國際學術會議心得報告及發表之論文各一份

□國際合作研究計畫國外研究報告書一份

處理方式：除產學合作研究計畫、提升產業技術及人才培育研究計
　　　　　畫、列管計畫及下列情形者外，得立即公開查詢
　　　　　□涉及專利或其他智慧財產權，□一年□二年後可公開查詢

執行單位：國立政治大學教育學系

中 華 民 國 　95　 年 　7　 月 　13　 日

中文摘要

此多層次分析工作坊由 Roel Bosker 博士主講，PISA 主辦、香港中文大學協辦。其內容主要包括多層次分析之理論、並以 PISA 資料庫為例，利用 HLM 統計軟體進行多層次分析。此工作坊引介了一個可用以分析來自不同層次資料(例如來自學校與學生)的理論與工作，擴大了研究者分析的廣度，也能據以分析包含 PISA、TIMSS、與 TEPS 等大型資料庫的資料。

Introduction

The workshop, Multilevel Analysis using the PISA database, was organized by Hong Kong PISA Center (situated in The Chinese University of Hong Kong), HKIER & OECD/PISA Secretariat. The speaker was Dr. Roel Bosker. This workshop on multilevel analysis using the PISA database took place from 30th March to 1st April 2006 in Hong Kong.

Objectives and rationale

The understanding and application of multilevel models is essential for analyzing education survey data such as the PISA and TIMSS data, in which students are clustered within schools, classes, districts and countries. Since simple linear regression models fail to take into account the potential effects of the hierarchical statuses, they may give a misleading representation of the efficiency and effectiveness of education systems. The primary aim of this workshop was, therefore, to give participants a basic understanding of multilevel analysis. It also aimed to familiarize participants with multilevel analysis using the PISA 2003 data.

Topics and structure.

This workshop covered the basics and practices of multilevel analysis. It addressed the issues of testing across level relationships and across level interaction effects for the PISA data. The software used was the HLM 6.02 student version. This 3-day workshop dealt with theoretical issues of multi-level analysis. It also provided

hands-on practice experiences. The topics covered in the workshop are shown below:

The first day: 09:00-17:00 March 30 Room HTB B5

☐ the why's of multilevel analysis ☐ random effects models as opposed to fixed effects models ☐ partitioning the variance in between and within school components ☐ estimation of the intra-school correlation ☐ data handling in HLM6 ☐ hands-on exercises ☐ mixed effects models – fixed AND random effects ☐ the relationship between ANCOVA and multilevel models with student level covariates ☐ estimation of fixed cross level effects ☐ hands-on exercises

The second day: 09:00-17:00 March 31 Room HTB B5

☐ testing of effects ☐ testing of model fit ☐ weighing the data ☐ working with plausible values as outcomes ☐ hands-on exercises ☐ exploring potential cross level interaction effects: random slopes models ☐ the logic of centering predictor variables ☐ hands-on exercises ☐ testing for cross level interaction effects ☐ hands-on exercises 1

The third day: 09:00-17:00 April 1 Room HTB 201

☐ building models – some strategies ☐ cross country analyses: 3-level models ☐ hands-on exercises ☐ exploring one's own questions ☐ hands on, short presentations and feedback ☐ non linear models ☐ other software for multilevel analysis and further reading

References

Chapters 1-6 in Snijders, T.A.B., & Bosker, R.J. (1999). *Multilevel Analysis. An Introduction to Basic and Advanced Multilevel Modeling.* London / Thousand Oakes / New Delhi: Sage.
Chapter 13 in the *PISA 2003 Data Analysis Manual*.

Reflections

1. Broadening data-analysis repertoire. This workshop on multi-level analysis has broadened my data-analysis repertoire. Researchers in general use convenient sampling procedure but do not take into account the affect of school or class

effects. By multi-level analysis, more precise and correct analysis results are likely to be obtained.

2. Broadening international academic experiences. There were scholars from 10 countries attending this workshop. From formal and informal discussions, we have not only learnt the teaching contents but also broadened our international perspectives on research and data analysis.

Suggestions

1. Professional version of HLM needed. The workshop uses the software of HLM 6.02 student version. The student version of HLM allows an analysis of limited samples. A professional version is highly needed in order to analyze data of a large number of samples, such as those in the PISA and TIMSS.

2. International workshops hosted by Taiwan. Workshops on secondary analysis methodologies can also be organized by Taiwan. This provides more opportunities for Taiwanese scholars to conduct this kind of research. It also offers opportunities for international scholars to visit and know more about Taiwan.