**實證為基礎之健康照護管理研究方法工作坊**

**Workshop on Structural Equation Modeling**

 **(English mixed with Chinese will be used for the workshop)**

1. **簡介Introduction**

研究方法是每一位研究者在剛進入研究領域需要培養的知識及技巧，從研究問題之形成、資料的蒐集、研究工具的選擇、研究過程的掌握，到研究結果的解釋與評論，這是一門一氣呵成的功夫。

東海大學企管系療癒環境管理與研究中心與台中榮總高齡醫學中心特別邀請在實證健康照護管理研究方法領域深耕多年，目前任教於美國中佛羅里達大學公共衛生學院之萬德和教授蒞臨講授，增進與會專家及研究者在健康照護實務研究領域之技巧與知識。

本工作坊介紹健康照護領域進階的原理與研究方法，特別是在結構方程模式(Structural Equation Modeling, SEM)技巧與因果關係建模的研究工具。在兩天的課程中，講授主題包括因果思維、路徑分析、驗證性因素分析與測量模型、共變數結構模型、潛在成長曲線模式、多階層模型與分析，以及SEM工具在介入性研究的應用。此外，除講解實證研究方法內容，萬德和教授亦會分享他在研究方法領域的研究與教學，以及國際期刊論文寫作的經驗，歡迎有興趣之各領域研究者參與。

 This research workshop introduces advanced principles and methods employed in health services research. Emphasis is placed on the application of structural equation modeling techniques and research methods to the development of causal models. Topics include causal thinking, path analysis, confirmatory factor analysis/measurement model, covariance structure model, and latent growth curve modeling, multilevel modeling and analysis, and SEM application in intervention studies.

1. **主講者Moderator**

Thomas T. H. Wan, Ph.D. 萬德和教授大學畢業於東海大學，而後取得美國University of Georgia之社會學碩、博士學位及Johns Hopkins University 之公共衛生碩士。萬教授曾任美國Virginia Commonwealth University 醫務管理學系主任，也是該校Arthur Graham Glasgow 講座教授；在他的經營帶領之下，該系研究所獲「美國新聞和世界報導」評選為全美前五名。從該校退休後，他轉任University of Central Florida，並創辦公共事務博士班，並擔任健康與公共事務學院研究副院長。在他47年的學術生涯中，亦曾任教於康乃爾大學、馬里蘭大學等校。

萬教授目前是許多美國著名學術期刊之主編、副主編，並兼任美國四家資訊科技與資訊應用公司的顧問，也是台灣國家衛生研究院審查委員。萬教授的研究興趣主要以管理流行病學、長期照護研究、健康服務評估、健康資訊學及臨床結果研究為核心，刊登在許多知名國際期刊，文章數量已超過兩百篇，此外，已出版多冊書籍並執行許多產學研究計畫。

Dr. Thomas T. H. Wan is a professor of public affairs, health management and informatics, and medical education at University of Central Florida. He is an Associate Dean for Research for the College of Health and Public Affairs. His research expertise includes healthcare informatics, population health and health systems analysis. He graduated from Tunghai University in 1965 with a degree in Sociology, received both MA and Ph.D. in Sociology from University of Georgia, and completed his post-doctoral work with a degree in MHS in 1971. He received a major NIH research grant to assess Affordable Care Act on rural health disparities and outcomes, a research grant from the Pabst Foundation for evaluating the use of a web-based artistic toolkit for reducing caregiving burden for caregivers of Alzheimer and related disorders, and a research grant from the Florida Hospital Creation Health Center to perform systematic review and meta- analysis of human factors influencing therapeutic outcomes of poly-chronic conditions. The effectiveness of care management innovations and practice for chronic diseases can be understood and achieved by modifying risk factors for avoiding readmissions. He has published a total of 14 books, 200+ articles and 23 book chapters.

1. **參加對象 Participator**

 管理、健康照護，以及社會科學等相關領域，對於統計與實證研究方法論有興趣之研究者、實務專家，以及碩博士班研究生。

 Researchers, practical experts, and graduated students of management and healthcare, and social science or related fields who are interested in statistic and evidence-based methodology and application are eligible for participation.

1. **研習時間及地點Dates and Locations**

 2018年8月9-10日；東海大學第二校區管理學院M242

 August 9th~10th , 2018；Room M242, College of Management, Second Campus of Tunghai University

1. **報名方式及期限Registration and Deadline**

 報名網址Registration Website：http://event.ithu.tw/2018040026

 報名截止日期**2018年6月23日** - Deadline for Registration is **June 23, 2018**

 (座位有限，請盡早報名Due to limited capacity for meeting room, please register in advance)

**主辦單位/ Main Organizer:：**

 東海大學療癒環境管理與研究中心Center for Healing Environment Administration and Research (HEAR)

 台中榮總高齡醫學中心Center for Geriatrics and Gerontology

**協辦單位/ Co-organizer:：**

 東海大學企業管理學系

 Department of Business Administration, College of Management, Tunghai University

**指導單位：**

科技部 Ministry of Science and Technology (MOST)

1. **研習內容 Workshop Outline**

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| **Date**  | **Class Outline (Required)**  | **Assignments**  |
| **8/9****Morning** | **MODULE 1:** **Conduct of causal inquiry**Session 1.Introduction to Causal Thinking, Causal Analysis, and Path Analysis |  **Principle:**Review Regression (<http://www.youtube.com/watch?v=k_OB1tWX9PM>)- Wan’s EBHCM, chapters 3 and 4, pp.33-70. **Application:** |
| **8/9****Afternoon** | Session 2. Introduction to LISRE: Measurement Model /Confirmatory Factor Analysis | **Principle: Measurement Model**-Wan’s EBHCM, chapters 6 & 7.- Byrne’s SEM, chapters 3 & 4- Sample size estimation: <http://www.danielsoper.com/statcalc3/calc.aspx?id=89>**Application**-Pai, Chih-Wen and Wan, T.T.H.“Confirmatory Analysis of Health Outcome Indicators: The 36-Item Short-Form Health Survey (SF-36).”Journal of Rehabilitation Outcomes Measurement , 1(2): 48-59, 1997. |
| **8/10****Morning** | Session 3. SEM with Latent Variables: Covariance structure modeling | **Principle:**-Wan’s EBHCM, chapters 8 & 9. -Byrne’s SEM, chapters 6 and 9**Application:**- Lee, K. and Wan, T.T.H. “Information System Integration and Technical Efficiency in Urban Hospitals.” International Journal of Healthcare Technology and Management 5(6): 452-462, 2003.-Wan, T.T.H., Lin, Y.J. and Ma, A. “Integration Mechanisms & Hospital Efficiency in Integrated Health Care Delivery Systems.” Journal of Medical System 25: 127-143, 2001.-Wan, T.T.H. and Lin, Y. J. “Social Capital, Health Status, and Health Services Use Among Older Women in Almaty, Kazakstan.” Research in the Sociology of Health Care 21: 163-180, 2003. |
| **8/10****Afternoon** | Session 4. Longitudinal Analysis: Latent Growth Curve Modeling | **Principle:** Wan’s EBHCM, chapter 12  Byrne’s, SEM, chapters 11 & 12.* 1. **Application**

-Wan, T.T.H. and Wang, B.L. “A Growth Curve Modeling Approach to Integrated Healthcare Networks’ Performance.” Health Care Management Science 6(2): 117-124, 2003.-Wan, T.T.H., Zhang, J. N., and Unruh, L. “Predictors of Residents’ Outcomes in Nursing Homes.” Western Journal of Nursing Research, 28 (8): 974-993, 2006. |
| **8/9- 8/10** | **STATISTICAL LAB EXERCISES**Following statistical exercises will be conducted, using a single dataset provided to students. Detailed descriptions and instructions are stored in the CD (directory: lab exercises).1. Path Analysis: Predictors of Intraorganizational Collaboration
2. Confirmatory Factor Analysis: Measurement Model of leadership
3. Covariance Structure Analysis: Predictors of Teamwork
4. Latent Growth Curve Modeling of Pain (2nd data set on pain scores in four waves
 | **Lab Exercises:** Four exercises are designed to help students gain practical experiences in applying multivariate statistical methods to a variety of study problems. A dataset for 3 exercises is provided.  |
|  | ***Discussion for Each Lab Exercise***Discussion 1. Path AnalysisDiscussion 2. Confirmatory Factor Analysis/ Measurement ModelDiscussion 3. Covariance Structure ModelDiscussion 4. Growth Curve Modeling | * What is path analysis?
* How can you specify the causal relationships among multiple variables?
* How can path analysis be used in your discipline?
* What are the strengths and limitations of path analysis?
* What is confirmatory factor analysis (CFA)?
* How is CFA different from conventional factor analysis?
* Can you give an example of the latent variable in your study?
* How can CFA be used in your proposed term project?
* How do you determine the goodness of fit of the CFA model?
* What are the strengths and limitations of CFA?
* What is covariance structure model?
* Can you give an example that illustrates this modeling approach?
* What are the strengths and limitations of covariance structure model?
* What is GCM analysis?
* How is it different from other longitudinal analysis?
* Can you apply GCM andl analysis in your research project?
* What are the strengths and limitations of GCM and analysis?
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**參考讀物 Suggested Texts**

* 書籍Books：
1. Byrne, B.M. (2016, 3rd edition).Structural Equation Modeling with AMOS. New York: Routledge. (SEM)
2. Wan, T.T.H. (2002). Evidence-Based Health Care Management: Multivariate Modeling Approaches. Boston: Kluwer Academic Publishers, (EBHCM)
3. A free web-based document for learning AMOS: <http://ssc.utexas.edu/consulting/tutorials/stat/amos/>
4. **\*療癒環境－身心靈的健康照護環境設計(Healing Environments：Design for the Body, Ming & Spirit)**

 \*此書籍為萬教授整理其研究團隊過去健康照護機構環境設計累積的實證研究結果，撰寫成之專書，歡迎來自各領域之研究專家購買閱讀，工作坊當日能彼此相互交流。

**補充讀物Supplementary Readings：**additional readings on multivariate modeling can be viewed from the following link: www.statmodel.com/references.shtml

1. Arbuckle, J.L. and Wothke, W. AMOS 4.0 User’s Guide. Chicago: SmallWaters Corporation, 1999.
2. \*Bollen, K. A. Structural Equations with Latent Variables. New York: John Wiley and Sons, 1989.
3. Bollen, K. A. and J. S. Long. Testing Structural Equation Models. Thousand Oaks, CA: Sage Publications, Inc., 1993.
4. Kline, R.B. Principles and Practice of Structural Equation Modeling. 2nd edition. N.Y.: The Guilford Press, 2005. (SEM)
5. \*Long, J. S. Confirmatory Factor Analysis. Beverly Hills, CA: Sage Publica­tions, Inc., 1983. (CFA)
6. \*Long, J. S. Covariance Structure Models: An Introduction to LISREL. Beverly Hills, CA: Sage Publications, Inc., 1983. (CSM)
7. Jaccard, James and Choi K. Wan. LISREL Approaches to Interaction Effects in Multiple Regression. Thousand Oaks, CA: Sage Publications, 1996.
8. Menard, S. Applied Logistic Regression Analysis. Thousand Oaks, CA: Sage Publications, Inc., 1995.
9. Muthén, L K. and B. O. Muthen. Mplus User’s Guide: The Comprehensive Modeling Program for Applied Researchers. Los Angeles, CA: Muthén & Muthén, 2001.
10. 10. Bagozzi, R. P. Causal Models in Marketing. New York, NY: John Wiley and Sons, 1980.
11. Bryk, A. S. and S. W. Raudenbush. Hierarchical Linear Models. Newbury Park: Sage Publications, 1992.
12. Dunn, G., B. Everett, and A. Pickles. Modeling Covariances and LatentVariables Using EQS. New York: Chapman and Hall, 1993.
13. Everit, B. S. An Introduc­tion to Latent Variables Models. New York: Chapman and Hall, 1984.
14. Goldberger, A. S. and O. D. Duncan (Eds.). Structural Equation Models in the Social Scien­ces. New York, NY: Seminar Press, 1973.
15. **\***Hayduk, L. A. Structural Equation Modeling with LISREL. Baltimore: Johns Hopkins University Press, 1987.
16. Heise, D. Causal Analysis. New York, NY: John Wiley and Sons, 1975.
17. Hoyle, R. Structural Equation Modeling. CA: Sage Publications, 1995.
18. Jöreskog, K. G. and D. Sörbom. Advances in Factor Analysis and Struc­tural Equation Models. Cambrid­ge, MA: ABT Books, 1979.
19. Jöreskog, K. G. and D. Sörbom. LISREL 7:A Guide to the Program and Applications. Chicago: SPSS, Inc. 1988.
20. Loehlin, John C. Latent Variable Models. Hillsdale, NJ: Lawrence Erlbaum As­sociat­es, Inc., 1987.
21. Wan, T. T. H., Breen, M., Zhang, N. J., and Unruh,L. Improving the Quality of Care in Nursing Homes. Baltimore: Johns Hopkins University Press, 2010.
22. Hox, J. Multilevel Analysis: Techniques and Applications. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers, 2002.
23. Reise, S.P. and Duan, N. Multilevel Modeling Methodological Advances, Issues and Applications. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers, 2003.
24. Maguire, E. Organizational Structure in American Police Agencies. New York: State University of New York Press, 2003.
25. \*Heck, Ronald H., Thomas, Scott L., and Tabata, L.N. Multilevel and Longitudinal Modeling with IBM SPSS. New York: Routledge, 2010.

**\*Highly recommended for your library on SEM**

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If you require any further information, please feel free to contact Center for Healing Environment Administration and Research.

如有任何問題，歡迎來信或來電聯繫東海大學療癒環境管理與研究中心

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