Structural Equation Modeling (SEM) Using PLS-Graph Software: A Tool for Quantitative Researchers Analyzing Path-Based Models

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AMCIS 2006 Tutorial Proposal:  
Structural Equation Modeling (SEM) Using PLS-Graph Software:  
A Tool for Quantitative Researchers Analyzing Path-Based Models

Abstract: This proposed tutorial, relating to the topic of quantitative research methods, will demonstrate how to use the basic and more advanced features of PLS-Graph software in the analysis of path-based Structural Equation Models (SEM) using latent variable constructs. Instructions for obtaining the PLS-Graph software (beta version 3 build 1126) will be provided to tutorial participants.

PLS-Graph makes latent variable path modeling, using the Partial Least Squares (PLS) approach, accessible and convenient to all interested parties. The utility of the PLS method has been documented elsewhere (Chin, 1998; Chin & Newsted, 1999; Falk and Miller, 1992) as possibly more appropriate for a large percentage of the studies and data sets typically used among researchers. As opposed to covariance-based approaches (exemplified by software such as LISREL or EQS), PLS places much less restrictions on matters such as sample size and data distributions.

In order to increase the usability and accessibility of the PLS approach, PLS-Graph was developed as a self contained Graphical User Interface (GUI) based software which creates input decks compatible with the existing PLSX program developed by Lohmoller. PLS-Graph allows the user to focus more on the appropriateness of the model and data set rather than on how to get the program to run. Research articles based on data analyses conducted using PLS-Graph have been published in our leading journals, including MIS Quarterly, Information Systems Research, Decision Sciences, Journal of Management Information Systems, among others.

The tutorial will demonstrate how to assess the measurement and structural model characteristics of path-based nomological network SEM quantitative models. Techniques to assess latent model construct reliabilities, and convergent and discriminant validities will be covered. The tutorial will be written as a teaching aid for faculty, doctoral students, and for other researchers who may currently use PLS, or who may be interested in learning PLS. An annotated example with data will be provided as an additional tool to assist the tutorial participant.

Tentative Tutorial Outline:

I. Introduction to PLS-Graph, Latent Constructs, and SEM
II. Installation of PLS-Graph
III. Creating a Raw Data File
IV. Creating a New Graph
V. Floating Tools Menu
   a. Select
   b. Zoom
   c. Construct
   d. Linkage
   e. Text
VI. Floating Functions Menu
VII. Top Menu Options
   a. Generate / Extract
   b. View
   c. Extract Results

VIII. Reliability and Factorial Validity for Latent Constructs
   a. Construct Composite Reliability
   b. Confirmatory Factor Analysis (CFA)
   c. Convergent Validity
   d. Discriminant Validity

IX. Modeling Interaction Effects with (Moderating) Latent Variable Constructs

X. Advanced Features of PLS-Graph

Proposed Presenters:

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Chin Bio: Wynne W. Chin is Professor of MIS in the department of Decision and Information Sciences and Bauer Fellow in the C.T. Bauer College of Business at the University of Houston. He received his A.B. in Biophysics from U.C. Berkeley, MS in Biomedical/Chemical Engineering from Northwestern University, and an MBA and Ph.D. in Computers and Information Systems from the University of Michigan. Wynne has published in journals such as Information Systems Research, Data Base, Journal of Management Information Systems, MIS Quarterly, and Decision Sciences. Wynne is currently co-editor of Data Base and is on the editorial board of Structural Equation Modeling journal, Journal of AIS, Journal of Information Technology, IEEE Transactions on Engineering Management, and previously Information Systems Research and MIS Quarterly. Dr. Chin's substantive interests include modeling the individual IT adoption process, end-user satisfaction, and developing group process measures such as cohesion, satisfaction, and consensus to understand the impact of electronic meeting systems. More recently, he has begun work on cross-cultural analysis. His research is largely empirical and quantitative relying on lab and Monte Carlo experiments as well as surveys. Methodologically Dr. Chin focuses on construct development through the use of structural equation modeling (both covariance-based and partial least squares) as well as developing new causal modeling techniques for topics such as assessing interaction effects, multi-group analysis, and cross-validation. Dr. Chin is a co-developer (with Tim Frye) of the PLS-Graph software, licenses the use of PLS-Graph software to Universities, and has practiced and published extensively in this realm.
(2) Geoffrey S. Hubona, Associate Professor of computer information systems at Georgia State University (and visiting associate professor of information systems at Virginia Commonwealth University); mailing address: CIS Department, J. Mack Robinson College of Business, Georgia State University, Box 4015, Atlanta, Georgia, 30302-4015; phone: (404) 463-9140; fax: (404) 651-3842, e-mail: hubona@gsu.edu; WWW address: http://www.cis.gsu.edu/~ghubona/.

Hubona Bio: Geoffrey S. Hubona received a BA in Psychology from the University of Virginia (1972), an MBA from George Mason University (1980), and a Ph.D. in MIS (with a minor in Computer Science) from the University of South Florida (1993). He currently holds faculty appointments as an Associate Professor of computer information systems at Georgia State University and as a Visiting Associate Professor of information systems at Virginia Commonwealth University. His research interests include the user acceptance of information technologies, the human perception of computer visualizations, and usability of website design. He has published journal articles in the International Journal of Human-Computer Studies, ACM Transactions on Computer-Human Interaction, IEEE Transactions on Systems, Man and Cybernetics, Part A: Systems and Humans, DATA BASE for Advances in Information Systems, International Journal of Technology and Human Interaction, and the Journal of Information Technology Management. Dr. Hubona is an experienced quantitative researcher who has published articles analyzing latent path models using PLS-Graph. He is also the PLS-Graph coordinator for the dissemination, licensing and use of PLS-Graph software at Georgia State and Virginia Commonwealth Universities.

Special Requirements for Presentation: We will need a projector to show a powerpoint presentation from our laptop. We will provide the laptop. We will likely also need an internet connection (wireless or LAN) for the laptop.