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Structural Equation Models in IS Theory and Measurement

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AMCIS 2009: WORKSHOP PROPOSAL

Workshop title:	Structural Equation Models in IS Theory and Measurement
Duration	1.5 hours () Other: half-day (3.5 – 4 hours)

Abstract and Keywords

Structural Equation Modeling (SEM) is taking on an increasingly important role in the examination of theory and measurement issues in information systems. Despite its popular use and the many software packages that exist for the researcher, SEM is a complex technique that provides many pitfalls for the unaware researcher. This workshop provides a gentle introduction to SEM from basic principles. It also covers some of the advanced issues that the researcher might encounter, not only from a statistical but also, and more importantly, from an ontological and epistemological perspective. The workshop is targeted at PhD students and IS researchers new to SEM and little to no statistical knowledge. Demonstrations and hands-on examples make use of the open source R system for statistical computing, which will be provided to all participants.

Keywords: statistics, measurement, theory, structural equations

Workshop leader/presenters' information

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Presenters' background/brief bio and expertise related to the workshop

Joerg Evermann received his PhD in Management Information Systems from The Sauder School of Business at The University of British Columbia. Before becoming an assistant professor with the Faculty of Business Administration at Memorial University of Newfoundland, he was a lecturer with the School of Information Management at Victoria University of Wellington. Joerg's research interests are in conceptual modelling and IS development, and data integration. He has published in leading international journals such as Information Systems Journal, IEEE Transactions on Software Engineering, IEEE Transactions on Knowledge and Data Engineering, Information Systems, Journal of Database Management, and Requirements Engineering Journal. Joerg has taught statistical data analysis and research methodology to PhD students both at Victoria University and at Memorial University.

Mary Tate is a senior lecturer at Victoria University of Wellington, New Zealand. Before joining Victoria Mary had an 18-year career in IT practice, holding a variety of roles including web channel manager, service delivery manager, business analysis manager, and self-employed IT consultant. Mary's research aims to explore what happens when you include technology in the relationship between organisations and customers. She has convened a mini-track at HICSS in this area for the past four years, and has published in the Journal of Information Research, the Journal of Internet Commerce, E-Government: an International Journal, and the Australasian Journal of Information Systems, as well as numerous book chapters and conference papers. Mary recently completed a major research project which featured a "failed" SEM. Following this, Mary embarked on a 2-year reading program in conjunction with Joerg on the finer points of SEM, which she is now looking forward to sharing with other researchers.

Special requirements

Note: Regular equipment includes a computer, data projector and screen.

- () Computers with CD-ROM drives need to be available for participant use
- () Internet access
- () Others, please specify

Target Audience

This workshop is targeted at PhD students and IS researchers. Little to no existing statistical knowledge is necessary. The second section of the workshop may also be of interest to those with some basic experience of SEMs, and instrument development and validation using EFA and CFA.

Maximum number of participants: 30

Description of workshop, and envisioned activities during the workshop (Do not exceed 3 A4 pages):

OBJECTIVES OF THE WORKSHOP

The workshop will provide an introduction to covariance based SEM modelling and analysis from basic principles. Participants only require knowledge of basic statistics, such as regression and covariance. The workshop is intended to both show the simplicity inherent in the modelling method and as such further its application, and also to point out some pitfalls that may await the researcher who applies SEM without due consideration. The content covered by the workshop is:

- Basic SEM terminology and modelling
- Covariance and Covariance algebra
- Model Parameters
- Describing models using the R statistical software
- Model identification
- Model estimation
- Model evaluation
- Model diagnostics
- Practical, hands-on examples using the R statistical software
- Handling common methods bias
- Second order factors
- Formative measures
- Sample size issues
- Multivariate normality (testing in R, bootstrapping in R)
- Publishing SEM research
- Comparison to PLS
- Categorical variables

JUSTIFICATION OF THE IMPORTANCE/CURRENCY/NEED FOR THE PROPOSED WORKSHOP

While the increasing availability of easy-to-use software tools furthers the application of structural equations modelling, many researchers remain unaware of current issues and debates in model formulation and model evaluation. This workshop is intended to help the researcher to go beyond the battery of model fit statistics that is

usually provided by SEM software and tackle some of the harder issues that arise when an initial model is not textbook-perfect.

FORMAT OF THE SESSION

The workshop will be delivered in a mixture of presentation and interactive, hands-on participation. If computers can be provided for the audience, or participants bring their own, the open-source R statistical package will be distributed for use with example data.

PRESENTATION FORMAT

The material will be presented by both presenters using example, interspersed with brief hands-on examples for audience participation.

WAYS IN WHICH THE AUDIENCE IS ENCOURAGED TO PARTICIPATE

CD-Roms or memory sticks pre-loaded with the open source statistical software R and all required data files will be provided, either on provided computers, if available, or to the audience to use on their own laptop computers.

OUTCOME MEASURES

- Understanding key SEM concepts as documented in the objectives
- Awareness of current research issues in SEM modelling
- Successfully completed workshop exercises