

Title: Quantitative Research in Information Systems Technology (IST)

Instructors:

Class hours: Friday 3 hours (2+1)

Duration: 8 weeks

Course description:

This course is intended to prepare doctoral students in understanding the nature, assumptions and logic of quantitative research methodologies. The course will focus on issues related to design, concepts, analysis, interpretation, and evaluation of quantitative research procedures for information systems and technologies research.

Its major objective is to enable students to design information systems research, experiments and surveys including quantitative analytical parameters. Students will work in teams on an original research paper and will be expected to submit a short research paper. Research articles selected from a variety of research paradigms will be used throughout the course, addressing a diversity of IST topics.

Learning objectives:

Students will be expected to:

- Understand the nature of quantitative procedures
- Become familiar with quantitative research designs, and array of concurrent methods, to understand their uses, strengths, and limitations.
- Identify various ways of collective quantitative data (survey, cross-sectional, longitudinal, etc.)
- Have a working knowledge on data analysis and strengths of various techniques
- Understand how to summarize, compile, interpret and report quantitative data
- Evaluate a research paper that reflects knowledge of quantitative methods in a research design.

Evaluation and Course Activities

1. Class attendance, participation- 25%
(Regular attendance and active participation in the discussions)
2. Exercise and Home work- 25%
(Responses to question and answer sessions, and tasks assigned for home)
3. Short Paper on a Specific Method- 25%
(Critiquing a specific paper in terms of research methodology, analytical aspect, strengths and weaknesses, interpretation, or further improvement)
4. Evaluating the Research Paper- 25%
(A 2-4 pages short paper. Could be an extension of item three above, or a separate paper on theme of team interest)

Week 1: Introduction, course overview, research topics

(No reading)

Introduction and course overview

Identification of a possible research topics

Week 2: IST Research Overview

(definition, concept, overview)

Readings:

- Book-1: Trochim, W.M.K. & Donnelly, J.P. (2008). *The Research Methods Knowledge Base*, Chapter-1. (<http://www.atomicdog.com>, or <http://www.socialresearchmethods.net/kb/index.php>)
(Language of Research, Philosophy of Research, Ethics in Research, Conceptualizing)

Sample empirical paper (for discussion):

- Paper-1: Dennis, A.R. & Valacich, J.S. (2001). Conducting Research in Information Systems, *Communications of the AIS*, 7, Article 5, July 2001.

Additional recommended readings (Home work):

- Paper-5: Banker, R.D. & Kauffman, R.J. (2004). The Evolution of Research on Information Systems: A Fiftieth-Year Survey of the Literature in Management Science. *Management Science*, 50(3), March, 281-298.

Week 3: IST Research Methodologies

(cross-sectional research vs. longitudinal research, from conceptualization to operationalization, choosing proper method)

Readings:

- Reading_1-Paper-7: Quantitative Positivist Research Methods in Information Systems (<http://dstraub.cis.gsu.edu:88/quant>; Please read the following links: Welcome, Philosophical Perspectives, General Research Approaches).
- Paper-6: Palvia, P., E. Mao, A.F.Salam, & K.S. Soliman. (2003). Management Information Systems Research: What's there in a Methodology? *Communications of the AIS*, 11, 289-309.

Sample empirical paper (Home work):

- Reading_1: Williams, C. (2007). Research Methods, *Journal of Business and Economic Research*, 5-3:65-72

Additional recommended readings (Optional):

- Paper-7: Lei Li (2007). Section-1.4, Generating user-centric Dynamic and Adaptable Knowledge Models for World Wide Web, PhD Dissertation, Georgia State University
- Working_paper_2: Caplinskas, A. & Vasilecas, O. (2004). Information systems research methodologies and models, *International Conference on Computer Systems and Technologies - CompSysTech '2004*, IV.4-1- 6.

Week 4: Measure instruments, Reliability, Validity

(ensuring reliability and validity, data collection- secondary data collection, identifying sources of data, ensuring reliability and validity- putting secondary data in its proper context, referencing and citation, data treatment, coding and data input, data validation, pre-analysis)

Readings:

- Book-1: Trochim, W.M.K. & Donnelly, J.P. (2008)1. *The Research Methods Knowledge Base*, Chapter-3. (<http://www.atomicdog.com>, or <http://www.socialresearchmethods.net/kb/index.php>) (Construct validity, reliability, levels of measurement)
- ADDITIONAL-Book-2: Devellis, R.F. (2003). *Scale Development: Theory and Applications*, Sage Publications Inc. Chapters 1, 2, 3 & 4; <http://books.google.com/books?id=BYGxL6xLokUC&printsec=frontcover>

Sample empirical paper (Homework):

- Reading_1-Paper-7: Quantitative Positivist Research Methods in Information Systems (<http://dstraub.cis.gsu.edu:88/quant>; Please read the following link: Issues of measurement).

Additional recommended readings (Optional):

- R-Paper-8: Nunnally, J.C., and Bernstein, I.H. (1994). *Psychometric Theory*, New York: McGraw Hill, Chapter 3.

- V-Paper-13: Bagozzi, R.P., Yi, Y., and Phillips, L.W. (1991). Assessing Construct Validity in Organizational Research, *Administrative Science Quarterly*, 36, 421-458.
- OPTIONAL-Paper-15: Petter, S., Straub, D. & Rai, A. (n.d.). Specification and validation of Formative Constructs in IS Research (A working paper)

Week 5: Questionnaire design, Survey techniques

(compiling themes, identifying dependent and independent variables, measurements and scales, questionnaire design, pilot testing and refining)

Readings:

- QD-Paper-12: Practical guide for better questionnaires
- Book-1: Trochim, W.M.K. & Donnelly, J.P. (2008)1. *The Research Methods Knowledge Base*, Chapter-3.4 (<http://www.atomicdog.com>, or <http://www.socialresearchmethods.net/kb/index.php>) (Types of surveys, selecting the survey method, constructing the survey, interviews, plus and minus of survey methods)

Sample empirical papers (Homework):

- ST-Working_paper-5: Pervana, G. & Cecez-Kecmanovicb, D. (2001). The Status of Information Systems Research in Australia: Preliminary Results, *Proceedings of the Twelfth Australasian Conference on Information Systems*

Additional recommended readings:

- Book-3: Bradburn, N.M., Sudman, S. & Wansink, B. (2004). Asking questions: the definitive guide to questionnaire design : for market research, political polls, and social and health questionnaires, John Wiley and Sons; <http://books.google.com/books?id=YXKbTx2j9i4C&printsec=frontcover>
- ADDITIONAL-Book-4: Fowler, F. (2002). *Survey Research Methods*, Sage Publications Inc. Chapters 1, 4, and 5; <http://books.google.com/books?id=72pHgJvNS5gC&printsec=frontcover>
- Paper-10: Sally Barnes (2001). Questionnaire Design and Construction, Institute for Learning and Research Technology
- QD-Paper-11: James L. Esposito (2002). A Framework Relating Questionnaire Design and Evaluation Processes to Sources of Measurement Error

Week 6: Sampling

(identifying units of analysis, using lists and databases, sampling theory- different methods and techniques)

- Book-1: Trochim, W.M.K. & Donnelly, J.P. (2008). *The Research Methods Knowledge Base*, Chapter 2. (<http://www.atomicdog.com>, or <http://www.socialresearchmethods.net/kb/index.php>)
- ADDITIONAL-Book-5: Ross, K.N. (2005). (Ed.) *Sample design for educational survey research*, Quantitative Research Methods in Educational Planning, UNESCO.

Sample empirical paper (Homework):

- Paper-19: Charles Teddlie and Fen Yu (2007). Mixed methods sampling: a typology with examples, *Journal of Mixed Methods Research* 2007, 1-1:77-100

Additional recommended readings (Optional):

- Book-4: Fowler, F. (2002). *Survey Research Methods*, Sage Publications Inc. Chapter 2. <http://books.google.com/books?id=72pHgJvNS5gC&printsec=frontcover>
- Book-6: Sekeran, U. (2000). *Research Methods for Business: A Skill-Building Approach*, 3rd edition, Wiley, Chapter 11

- Paper-20: Scheuren, F. (2004). What is a Survey? (Booklet)

Week 7: Data analysis techniques

(inferential statistics- probability theory, hypothesis testing (z-test, t-test), anova, chi-square, u-test, h-test; advanced statistics- cluster analysis, factor analysis, conjoint analysis)

Readings:

- Book-1: Trochim, W.M.K. & Donnelly, J.P. (2008). *The Research Methods Knowledge Base*, Chapter 5. (<http://www.atomicdog.com>, or <http://www.socialresearchmethods.net/kb/index.php>) (Conclusion validity, Data preparation, Descriptive statistics, Inferential statistics)
- Reading_1-P7_Quantitative Positivist Research Methods in Information Systems (<http://dstraub.cis.gsu.edu:88/quant/>; (Please read the following links: Data Collection Techniques, Data Analysis Techniques).

Sample empirical paper (Homework):

- Paper-22: Ololube, N.P. (2007). The relationship between funding, ICT, selection processes, administration and planning and the standard of science teacher in Nigeria, Asia Pacific Forum on Science Learning and Teaching, 8-1:1-29

Additional recommended readings:

- Reading-2: <http://www.itl.nist.gov/div898/handbook/> (Chapter-3: section 3 & 4)
- OPTIONAL-Book-6: Uma Sekeran (2000). *Research Methods for Business: A Skill-Building Approach*, 3rd edition, Wiley, Chapter 12

Week 8: Evaluation of IST research

Readings:

- Book-1: Trochim, W.M.K. & Donnelly, J.P. (2008). *The Research Methods Knowledge Base*, Chapter-1.5 (<http://www.atomicdog.com>, or <http://www.socialresearchmethods.net/kb/index.php>) (Evaluation research)
- Paper-23: Eric L. Dey and Joseph M. Fenty (u.d.). Instruments and tools of evaluation

Sample empirical paper (Homework):

- Report_1: Meta-study on lessons from existing evaluations as an input to the Review of EU spending, European Commission, 2008
- Report_2: Young People and Emerging Digital Services: An Exploratory Survey on Motivations, Perceptions and Acceptance of Risks, Institute for Prospective Technological Studies, 2009

Writing:

- A 2-4 short paper focusing a specific research topics