

LIR 590

SocioTechnical Systems In Two Parts: Theory and Fieldwork School of Labor and Employment Relations University of Illinois at Urbana-Champaign **Fall 2009**

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125 LER

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Course Hours: Tuesdays, 8:00 to 10:50AM, Room 43

Office Hours: 11:00 to 12:00 Tuesdays or by appointment

Course overview and objectives:

LIR 590 is focused at the intersection of social and technical systems in the context of historical and contemporary systems: production, social, biological, industrial and infrastructural. Understanding this intersection or point at which innovation is implemented is a critical value-add in today's dynamic business world. The course has two parts: theory and fieldwork.

In the Part One, readings will trace the course of change from craft production to mass production to knowledge-driven work systems. Early socio-technical systems experiments from the 1950s through the 1970s are examined, along with consideration of the implications for complex engineered systems and today's accelerating rates of technological change.

Systems thinking, systems architecture, and related systems principles will be introduced as a framework for analysis. A range of systems change initiatives will be introduced, such as lean production, six sigma, re-engineering, service systems, innovation networks, and others, illustrating their applications in different domains. Classes will feature a mix of case studies, class debates, lectures, and guest speaker presentations. Assessment will be based on short papers, active class participation, and a system analysis project.

Part Two is a fieldwork project. Class members work in teams to solve real world problems supported by sponsoring organizations. This part of the course provides students the opportunity to build working relationships with students from other disciplines. In addition the teams will practice skills of value in their future careers. This section will have the following main parts:

1. Team training in a selection of topics that includes teambuilding, site specific training, field methods, class related skills, tools for use in analysis and theoretical grounding in organizational theory, safety, and culture.

2. Actual onsite field work at a sponsor site doing analysis and research as needed to produce the deliverables required for a successful completion of the project.
3. Students will learn how team members with other skills sets from other disciplines view the work. Working together will allow the students to examine the assumptions of their training and how these assumptions may be enhanced to add value.
4. Team members will have an opportunity to apply the sociotechnical systems theory they learned in Part One.

The project based fieldwork will also allow the students and faculty to observe an organization or work place using a systems framework to aid analysis. Important themes from the theory class will provide a continued basis for discussion:

- sociotechnical theory
- systems thinking and theory
- collaboration theories
- workplace as system
- the embedded nature of culture and technology

Objectives

The class will provide the students an opportunity to explore through a systems lens the intersection/interface of the social and technical aspects of the workplace.

Students will acquire a thorough understanding of the interdependencies of a sociotechnical system and will be able to use this knowledge to analyze systems they encounter during their work lives.

The course will provide the participants with better understanding of the contributions of others in their workplace with different skill sets and expertise.

Students will acquire a new set of tools and techniques to address challenging issues such as technological innovation and multicultural and multidisciplinary interaction in the workplace.

Course materials

There is a Course Packet of required readings for each class session during Part One. Students are expected to be familiar with the readings so that they can participate fully in class discussion.

Short reflections

Six short two to three page reflection papers will be submitted – one each in weeks two-seven of class. These papers offer students the opportunity to reflect on how one of each week's readings relates to their future careers. **Papers will be graded on their thoughtfulness and engagement with the issues or topics in the article. Students are expected to compare and contrast their own experiences with the content of the articles.**

The papers should be structured and carefully written i.e. proper spelling, grammar, citations and punctuation are expected. Please double space and leave one inch margins all around to allow space for comments. The grades for these papers will be averaged and represent 30% of the grade. The papers will receive points (one-five) based on the quality of the thought and analysis included.

Part One: Major Class Assignment

Teams will select a system related to the industry, organization or problem they will be working on in the second half of the semester and complete a systems analysis. The system analysis project will be done collaboratively by the members of the project team.

Each analysis will include:

- a description of the system or industry that contains the relevant demographics and statistics about that system
- a visual representation/map of the system that identifies and makes visual the critical components of the system
- identification of the *exogenous and endogenous variables* of the system
- a list of the critical stakeholders in the system and their major interests
- a description of the technology used in the system
- a description of the interdependencies between the socio and the technical aspects of the system
- a discussion of how you imagine (in your future professional role) you might interact with the system (each team member is expected to complete this item)

Teams will prepare these analyses and present them to their classmates and invited guests during class on week eight on October 13. The presentations **must** include the components listed above. An outline of the presentation from each team is due in class in week six. The instructor will return these with comments the following week.

Teams should approach this presentation as they would an executive presentation for an employer (it will serve as practice for the presentation to the sponsor organization at the end of the fieldwork). This means appropriate business casual dress, use of presentation technology, and appropriate materials. The presentation should be polished and coherent. The team may use the presentation media of their choice so long as it can be integrated into the SLER system. Pay attention to the details of appropriate design of the slides or presentation materials. Each presentation is expected to be 25 to 30 minutes including a short period for questions at the end.

Short reflection papers and class participation are based on the work of the individual student. The major class assignment will receive a team grade and everyone on the team will receive the same grade for that assignment.

The system analysis project will represent 50% of the grade. The grade will be awarded based two components; 1) on how well teams fulfill the content requirements (see below) and 2) team presentation skills, clarity, enthusiasm, and use of technology.

Class participation

Students are vital element of the system of the class. Their participation will support and sustain the dialogue in the class since they are considered to have stakeholder status equal to the presenters, professors, or guests. Participation is 20 % of the grade. Participation is understood to mean the ability to comment on and participate in discussion of the readings, performance during in class exercises, and other collaborative efforts.

Schedule and Readings

Readings for this class have been carefully selected to provide a theoretical base for using sociotechnical systems theory. The readings fit into the broad thematic areas identified as core to the course (sociotechnical theory, systems thinking and theory, collaboration theories, workplace as system, the embedded nature of culture and technology, and technology update).

Session 1: Aug. 25: Why are sociotechnical systems important to you?

Eric L. Trist, 1981, The Sociotechnical Perspective: The Evolution of Sociotechnical Systems as a Conceptual Framework and as an Action Research Program, in *Perspectives on Organization Design and Behavior*, Andrew VandeVen and William Joyce, (eds), Chapter 2, pp 19-31, pp 39-75.

Lisl Klein, 1993, On the Collaboration Between Social Scientists and Engineers; Dynamics and Models, from *The Social Engagement of Social Science*, Volume 2, pp 369 -384.

Dominique Vinck, 2003, Social Technical Complexity: Redesigning a Shielding Wall from *Everyday Engineering*, pp13-27.

Session 2: Sep. 1: What theory must you know to understand the foundations of sociotechnical systems ?

****Applications for the team and fieldwork portion of the class are due (don't forget to attach your IRB training completion certificate)**

Frederick Taylor, 1911, *Scientific Management*, Chapter 1, pp 5-29

Joan Woodward, 1965, *Industrial Organization: Theory and Practice*, (Chapter 3), pp 35 – 49.

Matthew B. Crawford, 2009, The Separation of Thinking from Doing, (Chapter 2) pp 37-53, from *Shop Class as Soulcraft: An Inquiry into the Value of Work*

Session 3: Sep. 8: How do I use knowledge of work organization systems?

****Teams assigned and system projects selected**

Cutcher-Gershenfeld, et al., 1998, *Knowledge-Driven Work: Unexpected Lessons from Japanese and United States Work Practices*, Chapter 1, pp 3-17.

Larry Hirschhorn, Phillip Noble, and Thomas Rankin, 2001, *Sociotechnical Systems in an Age of Mass Customization*, *Journal of Engineering and Technology Management* V 18, pp 241-252.

Thomas P. Hughes, 2004, *Human-Built World: How to Think about Technology and Culture*, Chapter 4, Technology as Systems, Controls, and Information pp. 78-109.

Session 4: Sep. 15: How does the development of a technology change my work?

****Meet with sponsor representatives**

Steven H. Appelbaum, 1997, Socio-technical systems theory: an intervention strategy for organizational development, Management Decisions, (35/6) pp 452 – 463

Thomas P Hughes, *Edison and Electric Light*, in *The Social Shaping of Technology*, second edition, (eds.) Donald MacKenzie and Judy Wajcman, 2002, Open University Press, London, England, pp50 -63

Wagner James Au, 2008, *Avatar as Entrepreneur*, Chapter 9 The Making of Second Life: Notes from a New World, HarperCollins Publishers, New York NY., pp142-162

Session 5: Sep. 22: How will knowledge of sociotechnical systems help me implement change and innovation?

Saul Rubenstein and Thomas Kochan, 2001, *Learning from Saturn*, Chapter 2, pp 13-39.

Harald Rohracher, 2001, *Managing the Technological Transition to Sustainable Construction of Buildings: A Socio-Technical*

Perspective, Technology Analysis and Strategic Management, V 13, No. 1.

Frits Pil and Takahiro Fujimoto, Lean and reflective production: the dynamic nature of production models, in *International Journal of Production Research*, Vol. 45, No. 16, 15 August 2007, pp. 3741-3761

Session 6: Sep. 29: How do I analyze the systems around me?

****System project outline due and additional information about presentation grading will be handed out.**

Paul Adler, New Technologies, New Skills, *California Management Review*, Vol. XXIX, Number 1, Fall 1986, pp 9-28.

Donald Tapscott and Anthony D. Williams, *The Global Plant Floor*, in *Wikinomics: How Mass Collaboration Changes Everything*, 2006 Penguin Books, New York, NY pp213-238

(optional audio interview with Donald Tapscott)
<http://www.npr.org/templates/story/story.php?storyId=6711038>

Alice M. Sapienza, Discerning and Assessing Organizational Culture from Managing Scientists: Leadership Strategies in Scientific Research, 2004, Wiley-Liss, pp.196- 221.

Session 7: Oct. 6: What is the future of sociotechnical systems?

****System project outline comments returned**

Donald Tapscott and Anthony D. Williams, *The Wiki Workplace*, in *Wikinomics: How Mass Collaboration Changes Everything*, 2006 Penguin Books, New York, NY pp239-267

Alice M. Sapienza, Leading Change from Managing Scientists: Leadership Strategies in Scientific Research, 2004, Wiley-Liss, pp.222-240.

Further articles to be determined and distributed in Session 6

Session 8: Oct. 13: Team Presentations

If you chose to make handouts for those who attend, please bring copies for the class or we can copy them, if you get them to us 24 hours ahead.

Attire for this session is *business casual*. You will be presenting before your class mates, faculty leads, and other guests.

Each team will make 20-25 minute presentations of their system analysis using appropriate technology and covering the following items.

- a description of the system or industry that contains the relevant demographics and statistics about that system
- a visual representation/map of the system that identifies and makes visual the critical components of the system
- identification of the *exogenous and endogenous variables* of the system
- a list of the critical stakeholders in the system and their major interests
- a description of the technology used in the system
- a description of the interdependencies between the socio and the technical aspects of the system

Part Two: Fieldwork

1. You must complete and submit an application if you want to participate in a fieldwork project.
2. You will be required to complete the Institutional Review Board training and submit the completion certificate with your application to for the fieldwork.
3. Based on your application and your experience, you will be assigned to a project team.
4. Attendance at the dedicated weekend training session on October 17 and 18 is required. The training runs from 9:00 to 4:00 approximately on both days. Training is at the School.
5. There will be a first meeting of the project teams with representatives from the sponsoring sites during class on September 15..
6. Each project team will be assigned a faculty lead who will help guide the team and oversee their work. She or he will also participate in the grading for the fieldwork projects.
7. The projects teams and faculty leads will meet for a progress report to the full group during the 8:00 to 10:50 time period on November 17.

Course materials

The following text is required for this course and will be available in the bookstore.

[Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences](#) (Third Edition) by Irving Seidman (2006) published by Teachers College Press, Columbia University, New York.

Other readings will be provided as needed

Student Deliverables

1. Students will work in a team to complete a customer sponsored project. Each semester the projects will vary. Students will be provided introductory information for the problem they will be working on.
2. The second part of the deliverables for this team are video journals or logs. Each team member will be required to tape at least three journal or log entries during their work on this project. The journal entries will report on lessons the students learned during their work, insights they have gained, or dilemmas they uncovered but don't know how to resolve. While it may be impractical to try to schedule these moments or dilemmas, students should try to do them as they occur and regularly record entries. It would make the editing process much easier if the entries were submitted to the STS office on a regular basis. We suggest students try to do one at the beginning, middle, and end of the fieldwork period. These journal entries will become the basis for reusable learning materials that will be made available to other ILIR classes, UIUC classes, corporate sponsor training classes or alumni web-based training classes. The STS program will be responsible for the editing of the journal entries in conjunction the students. The video journals will belong to the STS Program but may be used by the students in their job search or careers if they can be completed in a timely manner.
3. Students will be responsible for attending regular meetings to check in with the faculty leads in the project. Success in this project depends on the effective participation and interaction of each of the people involved. There will be breakdowns in communication and moments of irritation with others on the project. We will each need to minimize these moments and try to find constructive responses. Part of the grade for this effort will be determined by how well the team performs as determined by the team members, the faculty leads, and the sponsors.

Course Grading

In this course the grades will be decided in the following way:

- a) 40% of the grade will be determined by the student's contribution to the work of the team and the deliverable produced for the sponsor. This component of the grade will include data gathering, performance on field work techniques, and contributions to process as well as final product.
- b) 40% of the grade will be determined by the student's performance and completion of at least three video journal entries. These entries will be judged on the appropriateness of the content and the presentation. **Content** may include insights gained during the project, examples of lessons learned about the STS theoretical basis of the course or about the fieldwork process, or may be dilemmas that are formulated as well developed problem statements ending in a question. **Presentation** includes professionalism of manner and appearance, attention to the confidentiality and privacy concerns of the site and project participants,

and the appropriate use of the technical equipment to provide reusable output.

- c) 20% of the grade will be determined by issues of team member performance such as reliability, attendance at meetings, participation in team activities, sharing the work load, contributing to the team's performance through civil and courteous behavior, and overall professionalism in the project context.

Schedule and Readings

Readings or other materials may be part of the weekend team training session and then assigned as needed to response to issues raised as the project moves forward. Team members must be responsible for doing the readings as they will be targeted and selected to deal with specific project issues.

Session 9: Oct. 20:

Session 10: Oct. 27:

Session 11: Nov. 3:

Session 12: Nov. 10:

Session 13: Nov. 17: Team Presentations

Session 14: Nov. 24: Thanksgiving Break Week

Session 15: Dec. 1:

Session 16: Dec. 8:

Three video journals completed by last day of finals: Friday, December 18, 2009.