Socio-Technical Systems

Click to add text

Information Systems Failure

Study by Lucas (1975) of over 2000 systems in 16 companies found:

> "It is our contention that the major reason most information systems have failed is that we have ignored organisational behaviour problems in the design and operation of computer-based information systems."

Other researchers have made similar findings.

Bostrom & Heinen 1997 (1)

Reasons for failure

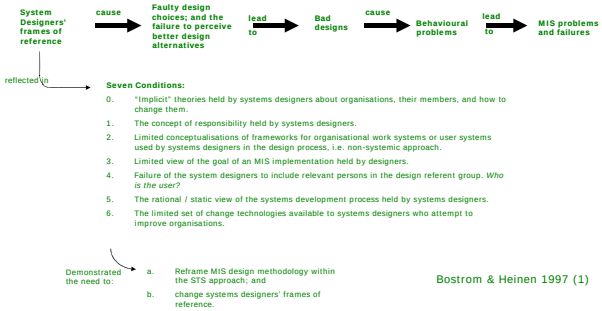
Information technology is commonly blamed, because it is seen as inflexible.

However, IT is neutral. What has more effect is System Designers implicit theories.

Most subscribe to "Theory X".

Bostrom & Heinen 1997 (1)

Rationale for Socio-Technical Design Methodology



Bostrom & Heinen 1997 (1)

Principles of Socio-Technology

Joint optimisation of Social and Technical system

- Social
  - Attributes of people (attitudes, skills, values, etc.)
  - Relationships among people
  - Reward systems
  - Authority structures
- Technical
  - Processes, tasks, technology
- Optimisation of one at the expense of the other is sub-optimal

Quality of Work Life

Participation

Semi-autonomous work groups

Munkvold (2000)

Quality of Work Life

Historically only included:

- Wages
- Hours
- Physical conditions.

These are still included in the concept, but it is expanding to include other concerns such as :

- Meaningful and satisfying work
- Control and influence
- Opportunities for learning

Working definition: involves an interesting, challenging and responsible job as perceived by the job holder

Example methodology – Pasmore (1988)

1. Define scope of system to be re-designed
2. Determine environmental demands
3. Create vision statement
4. Educate organisational members
5. Create change structure
6. Conduct socio-technical analysis
7. Formulate re-design proposals
8. Implement recommended changes
9. Evaluate changes / re-design

Munkvold (2000)

Applying Socio-Technical Principles

Make the system designer's frame of reference more explicit

Focus more on the inter-relationship between social and technical design

3 stages:

1. *Strategic design process* – making the goals and responsibility of the project explicit
2. *Socio-technical design process* – joint consideration of technical system requirements and social system requirements
3. *Continuing management process* (action research process) – constant monitoring of the new system to see if it is meeting its goal, with necessary adjustments being made.

Munkvold (2000)
Bostrom & Heinen 1997 (2)

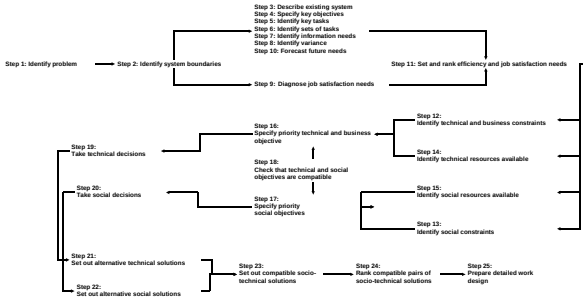
Mumford – ETHICS

(Effective **T**echnical and **H**uman **I**mplementation of **C**omputer-based Work **S**ystems**)**

1. Essential systems analysis
2. Socio-technical systems design
3. Setting out alternative solutions
4. Setting out compatible solutions
5. Re-working socio-technical solutions
6. Preparing a detailed work design

Munkvold (2000)

Stages of the ETHICS Methodology



Source: Hirscheim, R. "Realizing emancipatory principles in information systems development: The case for ETHICS." MIS Quarterly, March 1994.

Four fundamental objectives of ETHICS

1. Encourage participation
2. Improve the general conditions of work
3. Produce systems that are "technically efficient and have social characteristics that lead to high job satisfaction"
4. Follow the socio-technical philosophy of trying for joint optimisation

http://www.enid.u-net.com/C1book1.htm#The Design Challenge

Mumford – ETHICS

Specifies the formation of two design teams, focussing on technical and social design.

Facilitator used to overcome obstacles related to:

- lack of trust,
- conflicts of interest,
- time pressure and stress
- low morale
- effects of authority
- communication gaps

Does not seek to increase Quality of Work Life at the expense of economic efficiency – increased QWL will increase quality and efficiency.

Munkvold (2000)

Criticisms of Socio-tech

- Emphasis on balance and consensus ignores political conflicts in organisations
- Participative design will only function when employee numbers are small

Munkvold (2000)

Use of STS in Organisational Design

Changed environment in the last two decades:

- Increasing global competition
- Deregulation of markets
- Increasing customer selectivity on price, quality and service
- Environmental protection issues
- Rapid technological development

Munkvold (2000)

Organisational Design

New organisational forms fashionable, e.g.:

- virtual organisations
- dynamic networks

key characteristics in common

- Focus on business processes instead of traditional functional organisation
- Focus on team organisation
- Decentralised decision-making
- IT as an important enabler
  - Sometimes deflects attention from other important organisational factors such as power and authority.

Munkvold (2000)

Total Quality Management (TQM)

Based on quality theories of W. Edwards *Deeming*, Joseph *Juran* and Kaoru *Ishikawa*.

Became very popular in US, initially in industry, but then in other organisations: health care, public service, voluntary organisations, education…

Now fashionable in most of the industrial world.

TQM philosophy

- Primary purpose of an organisation is to stay in business - so that it can:
  - promote the stability of the community
  - generate products and services that are useful to customers
  - provide a setting for the satisfaction and growth of organisation members.
- Focus on preservation and health of the organisation
- 4 interlocking assumptions - about quality, people, organisations and the role of senior management

Assumptions

- Quality is less costly to an organisation than poor workmanship
- Employees naturally care about the quality of their work, and will take initiatives to improve it.
- Organisations are systems of highly interdependent parts.
  - Cross-functional problems must be addressed collectively by representatives of all relevant functions
- Quality is ultimately and inescapably the responsibility of senior management.

Change Principles

- Focus on work processes.
- Analyse variability. Identify root causes of variability and control them.
- Management by fact. Collect data, use statistics, test solutions by experiment.
- Learning and continuous improvement.

Interventions

- Explicit identification and measurement of customer requirements.
- Creation of supplier partnerships.
- Use of cross-functional teams to identify and solve problems.
- Use of scientific methods to monitor performance, and to identify points of high value for performance improvement.
  - Control chart
  - Pareto analysis
  - Cost-of-quality analysis
- Use of process-management heuristics to enhance team effectiveness.
  - Flowcharts
  - Brainstorming
  - Cause-and effect diagram

TQM in practice – techniques

- Use of short-term problem-solving teams to simplify and streamline work practices.
- Training in quality practices:
  - Interpersonal skills
  - Quality-improvement processes and problem-solving
  - Team leading and building
  - Running meetings
  - Statistical analysis
  - Supplier qualification
  - Benchmarking
- Top-down implementation.
- Developing relationships with suppliers.
- Obtaining data about customers:
  - Free-phone complaint lines
  - Market research
  - Focus groups

Additional interventions

Competitive benchmarking – gathering information about 'best practices' from other organisations. Serves several functions:

- Determining what customers can expect from the competition
- Learning alternative work processes
- Indicating quality-improvement goals

Employee involvement:

- Suggestion schemes
- Quality meetings between managers and employees
- 'Quality days'
- Self-managing teams

Divergences

- Reduced use of scientific methods
- Relating reward systems to achievement of quality goals

Relating BPR to STS

Similarities:

- (re)design of business processes
- Use of semi-autonomous teams
- Empowerment

Differences:

- Radical change (BPR) vs. continuous change (STS)
- Purpose of team-building and empowerment in BPR is to support business goals, rather than to improve quality of work life.
- While re-engineering has led to improvements in performance, it has failed to produce the number of highly-motivated employees needed to ensure consistently high-performing organisations.

Relating TQM to STS

Key principles:

- Customer focus
- Focus on work processes
- Use of cross-functional teams
- Employee involvement
- Self-management
- Analysis of variability
- Benchmarking
- Learning and continuous improvement

Focus on empowerment conflicts with strong focus on top-down implementation.

References - 1

Munkvold, Bjorn Erik (2000) Tracing the Roots: *The Influence of Socio-Technical Principles on Modern Organisational Change Practices* in Coakes, Willis & Lloyd-Jones (eds) *The New SocioTech*, Springer, London.

Bostrom, Robert. P. & Heinen, J. Stephen (1977 September). "MIS Problems and Failures: A Socio-Technical Perspective. Part I: The Causes," MIS Quarterly, pp. 17-32.

Bostrom, Robert. P. & Heinen, J. Stephen (1977 December). "MIS Problems and Failures: A Socio-Technical Perspective. Part II: The Application of Socio-Technical Theory," MIS Quarterly, pp. 11-28.

Hirscheim, R, (1994 March). "Realizing emancipatory principles in information systems development: The case for ETHICS." MIS Quarterly, pp 83-109.

Mumford, Enid (on-line) "Designing Human Systems: The ETHICS Method" http://www.enid.u-net.com/C1book1.htm

References - 2

Lucas, Henry C. (1975) *Why Information Systems Fail*, Columbia University Press, New York. (658.403/LUC)

Pasmore, William A. (1988) *Designing Effective Organisations*, John Wiley & Sons. New York.

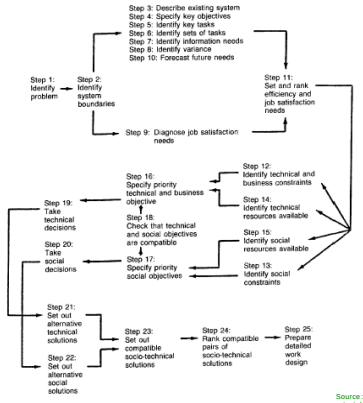


Figure 1. Schematic of the Stages of the ETHICS Methodology

Source: Hirscheim, R, "Realizing emancipatory principles in information systems development: The case for ETHICS." MIS Quarterly, March 1994.