A Systemic Investigation of Complex IS Framing and Specification

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The Design Process

- Traditional model of decomposition
- Observed strategy of “opportunism”
- Explanatory model of convergence, between design problem and solution.

- But what converges?
  - How do you define or “frame” the design problem and the design solution?
  - Dimensions and process.
How the individual understands, or “frames” the design problem

How the individual understands, or “frames” the design solution (the designed IS)

Time & learning
Multiple Perspectives Of “The Problem”

- IS problems tend to be defined by groups of people from different work-backgrounds and “knowledge domains”.
- Individuals interpret models in many different ways, depending upon work-background.
- Knowledge about “the problem” is distributed between group members and only understood in part by each person.
The Problem of “The Problem”

“Good work ...but I think we need just a little more detail right here.”
Framing in IS Literature

- Concept comes from cognitive psychology
- Orlikowski & Gash (1994) used concept of “Technological Frames” to represent different understandings of the role of technology in work.
- Davidson (1996, 2002) extended concept to understand how IT system stakeholders understood what IT is required and the role that this would play.
- Problem of granularity: this is behavioral and not cognitive research.
- Problem of explicit vs. implicit knowledge about IS.
3 Views Of Social Cognition

- **Socially-situated cognition:**
  - Contextual influences on individual framing

- **Socially-shared cognition:**
  - Extent of intersubjectivity in framing design (what?).

- **Distributed cognition:**
  - Ways in which different understandings are communicated and coordinated across group members.
3 Methods

- Grounded theory:
  - Thematic analysis of process focus over time

- Discourse analysis:
  - Analysis of individual discourse “framing” of problem and solution
  - Examining similarities and differences:
    - Design product
    - Design process
    - Design context – objectives of change / constraints of change / enablers of change

- Soft Systems Analysis:
  - “Surfacing” individual frames of design from these 3 aspects.
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<th>Level</th>
<th>Construct</th>
<th>Processes of Interest</th>
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<td>Individual</td>
<td>Socially-situated cognition</td>
<td>(i) How individuals frame design problems/solutions; (ii) How individuals make sense of organizational context.</td>
<td>Discourse analysis of interviews and design meeting contributions. Guided interviews using SSM techniques</td>
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<td>Group</td>
<td>Socially-situated cognition</td>
<td>How a community of professional design practice emerges.</td>
<td>Guided interviews using SSM. Analysis of shared metaphors and themes in meeting transcripts. Critical incident elicitation.</td>
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<td>Distributed cognition</td>
<td>(i) How groups externalize knowledge (<em>understanding what the group knows and how they know it</em>). (ii) How distributed and partial understandings are coordinated.</td>
<td>Guided interviews using SSM, to understand similarities and divergence in perspectives. SSM group workshop. Analysis of triggers for change in design meetings.</td>
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<td>Competing groups</td>
<td>Distributed cognition</td>
<td>How groups internalize others’ knowledge (<em>understanding who knows what and how the group can share it</em>).</td>
<td>Analysis of triggers for change in design meetings. Guided interviews using SSM to understand changes in &quot;worldview&quot;.</td>
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<td>Organizational context</td>
<td>Socially-situated cognition</td>
<td>(i) How organizational culture constrains or enables design; (ii) How competing interests of political groups are managed; (iii) How influential organizational stakeholders impact the design.</td>
<td>Analysis of triggers for change in design meetings. Guided interviews using SSM to understand changes in &quot;worldview&quot;. Ad hoc interviews, to analyze political pressures as triggers for design change.</td>
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Peter Checkland's (1981) "soft systems methodology" is a response to difficulty in applying the approach of hard systems (engineering) thinking to business problems.

SSM Emphasizes:

- **Multiple perspectives of a situation**
  - Organization goals may be in dispute. It is wrong to assume that all organizational members accept the views and goals of top management.

- **Problem negotiation**
  - Fixing “the problem” too early tends to hide problems. Making conflicts and differences explicit enables learning and consensus.

- **Human activity systems**
  - Modeling different perspectives of systems of purposeful activity, rather than IT system requirements permits a focus on the problems, rather than an over-simplified solution.
Soft Systems Methodology

- SSM is normally used in facilitated groups
- Action research, with researcher acting as facilitator, to establish shared vision, at a deep level.
- Used here as a way of interacting/modeling individual perspectives:
  - Interactive interviews
  - Individual validation of perspectives
  - Group validation workshops.
1. The Problem Situation: unstructured

2. Problem Situation: Expressed (Rich Picture)

3. Root Definitions of Relevant Systems

4. Conceptual Models

5. Comparison of Rich Picture and Conceptual Model

6. Feasible and Desirable Changes

7. Action to improve the Problem Situation

SSM: The Method

REAL WORLD

SYSTEMS THINKING ABOUT THE REAL WORLD
Gap Analysis, Of Customer Bid Process

Single viewpoint of problem situation → System transformation → Description of situation if problem were resolved

SUCCESS = A measurable indicator of problem resolution

No-one delivers on time → Team of participants working together to deliver by date

SUCCESS = 95% of bid sections delivered 48 hours before document due

Information needed to compile bid not available → Information resources available to all participants

SUCCESS = All info. required for bid is available in electronic library

Bid response is compiled at short notice, so poorly assembled → Advance notice is given, so can structured bid

SUCCESS = 95% of Bids requested with 4+ weeks’ warning
Stage 3: Root Definitions of Relevant Systems

No-one delivers on time

SUCCESS = 95% of bid sections delivered 48 hours before document due

C = Company and its customers
A = Everyone in company
T = Coordinate sections of bid AND
    Manage commitment by participants AND
    Ensure delivery of sections to deadline
W = We lose business because we deliver poorly-coordinated documents and low priority is given to bid preparation.
O = Bid process manager
E = Functional managers have other priorities for their people than bid preparation.

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Conceptual Model For Student Transfer Perspective

1. Determine customer reqs
2. Fit to available products
3. Discuss potential solutions and cost constraints
4. Determine best product configuration
5. Assign elements to individuals
6. Elements assembled & edited for style/consistency
7. Individuals define and cost elements
8. Evaluate success (impact on bottom line)

* Needs further elaboration
Comparison of Models

- Examining content of models:
  - Track convergence of individual, design “frames”

- Examining chains of causality:
  - Understand how different group members link design concepts and phenomena

- Use for validation of participant framing:
  - Facilitated workshops, to frame group design system and change definitions.
Process Findings

Mobilizing Vision

Problem Definition

Goal Reframing

Collective breakdown

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So what converges – how do we know when design is done?

• Not “product” of design

• Not “process” of design

• But problem definition, leading to new goals for change at a VERY deep level – so need SSM to understand this.
References


