Soft Systems Methodology and Cognitive Mapping: a linkage between the initial phases of SSM

ISSS17: From Science to Systemic Solutions – Systems Thinking for Everyone
Vienna 2017

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• One of the newest university in Sweden
• Established by a merger 2010
• Campus Växjö
• Campus Kalmar

• Approx. 40000 students
• Approx. 2000 employees
• ~150 fulltime programs
Background of the paper

- Paper based on PhD dissertation titled: Use of Digital Technologies in Education: The Complexity of Teachers’ Everyday Practice
  - Published October 2016

- Research aim:
  - *illuminate and advance the understanding of the complexity of compulsory school teachers’ everyday work practices using digital technologies.*

- This paper presents the combination of using Cognitive Mapping and one of the SSM modelling techniques as a linkage between the first and second phases of Soft Systems Methodology.
INTRODUCTION

- Research Area
- The teacher profession
- Using and combining SSM and Cognitive Mapping
Autumn 2011 all Swedish schools adopted the latest national curriculum, Lgr 11.

“When completing compulsory school, can use (modern) digital technology as a tool in search for knowledge, communication, creativity and learning.”

Additions related to use of digital technologies are to be implemented by July 2018.

Problematic situation: Despite high priority, implementation does not succeed by itself; several interest groups need to cooperate to enable a coherent and effective implementation and, thereby, to achieve a change process which includes digital technologies in everyday educational practices
The teacher profession

- Complex and multifaceted profession

- Philosophy of teaching
  - how teachers perceive themselves
  - beliefs and values in relation to teaching and learning

- Attitude and willingness towards use of digital technologies

- Varying subject contents with
  - varying philosophical underpinning
  - varying pedagogical and learning approaches

- External influences e.g. school leadership, organizational culture and traditions
SSM & Cognitive Mapping

- Need of an approach which allowed:
  - analyzing complexity and multi-stakeholder interests
  - understanding the worldview and the purposeful and meaningful actions of the actors in their everyday social context

- SSM enables:
  - handling the vast amount collected empirical material in a structured manner as well as enabled rich illustration of the complex situation

- Cognitive Mapping enables:
  - bridging the representation of the rich empirical material and the analysis
  - identifying a balanced level of abstraction
  - staying within the scope and aim of the specific research.
What we have done

- Focused Ethnography
- Soft Systems Analysis
- Cognitive Mapping
Focused Ethnography

- Gain first hand experience of what it means to be a human within a particular social and cultural context; observations of people in their natural occurring settings

- Short stays in the field, scrutiny of data analysis

- Methods
  - Observations of four teachers at two schools
  - Semi-structured interview with school leaders, representatives from the municipal department of education

- The emic and etic perspectives
  - emic perspective reflects the participants’, or the insiders’, points of view
  - etic perspective reflects the researchers’, i.e., the external, points of view
Soft Systems Analysis

- SSM provided a structured approach to explore and illuminate the contextual and multi-dimensional complexity of the situation.

- SSMp analysis addressed the process and intervention of the researcher, enabling to identify the purposeful focus for the SSMc.
  - Use of Cognitive Mapping for SSMp enabled identifying what was relevant for further analysis of the content and why these were relevant.

- Phase one modeling: Rich Picture technique.
- Phase two modeling: PQR, CATWOE and Activity Models
Rich Picture
Cognitive Mapping

- Used as initial models to map different actors’ thinking thinks about a problem, situation or issue.

- Enabled identifying the hierarchy of the PQR statements in the Purposeful Activity modelling; bridging the representation of the empirical material and the analysis.
How we have done

- SSMp
- SSMc
SSMp and Cognitive Mapping

- SSMp analysis was conducted of the research process.
- Cognitive Map was built on an initial understanding and was initiated adding the overall research aim at the top followed by adding lower nodes.

**Cognitive Map**

- Understand and illustrate the worldview and current situation of teachers’ use of digital technology in everyday education and teaching practices.
  - By illustrating education and teaching situations to be individual and bound by context and tradition.
  - In order to illuminate and advance the understanding of the complexity of teachers’ use of digital technology in everyday education and teaching practices.

- Demonstrate the same digital technology solution cannot be used for all teachers in educational and teaching settings.
  - By illustrating that teachers and students have varying capabilities and conditions (e.g., learning and teaching style, subject area, etc.)
  - In order to advance understanding of the complexity of teachers’ use of digital technology in everyday education and teaching practices.
SSMc and Cognitive Mapping

- Cognitive Maps was created for each actor.
  - Teachers’ Cognitive Maps represented two focuses.

- Based on the SSMp PQR-statements, relevant PQR-statements for the varying actors for the SSMc analysis was identified in the individual Cognitive Maps for further modelling.

- Modelling continued following the SSM guidelines for building Purposeful Activity models.
Learning & Outcomes
Learnings & Outcomes

- SSM enabled handling and coping with real world complexity and communicating this complexity.

- SSMp enabled organize our thinking of carrying out the ;what should to be done and how without getting deeply absorbed in the complexity.

- Combining Cognitive Mapping and SSMp enabled design the focus and emphasis for SSMc.

- Using PQR statements identified through Cognitive Mapping allowed identification of relevant levels of modeling and creation of more holistic understanding about the interconnection of varying systemic model
Selected references

Thank you!

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