Co-Construction of eHealth Services and Technology: Challenges and Solutions

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Introduction

Health care is a challenging context for ICT applications. There is no lack of studies reporting failures to merge professional, bureaucratic and technological missions, interests and focus. (1-2).

Evidence to support positive return on investments or improved quality of ICT enhanced health services is still scarce (3-4).

How could the experiences gained in various projects be structured and offered for others to support future health ICT projects to develop systems in a more appropriate way?

Methods

a) Methodology

Data from an in-depth case study on process and effects of an eHealth project were structured with theoretical concepts

The theoretical concepts were elaborated into a model of co-construction of service and technology

The model was implmented in two consequent case studies to assess its potential for formative (constructive) assessment of the eHealth projects

Evidence was collected on impacts of the model.

b) Data collected

Case study I

•Historical data (documents, interviews) on ex-ante service activity and on construction and implementation of the eService model. Empirical data (observation, interviews,documents, statistics) on the established (ex post) eService activity

Case study II

•Historical data (documents, interviews) on the early phases of the construction of the eService model. Empirical data (observation, interviews, documents, statistics) on ex-ante and ex post service activity. Empirical data (participatory observation, interviews, documents) on later phases of the eService model construction and implementation

Case study III

•Historical data (documents, interviews) on the early phases of the eService model construction. Empirical data (participatory observation, group sessions) on later process phases and implementation of the eService model

Results

Case I: a retrospective study of construction, implementation and impacts of an innovation award-winning eService for Home Health Care (7; 1)

- Impacts of the eHealth project:
  - The new eHealth model helped to outsource part of the home health care service, did not save any money compared to the old, reduced availability and quality of the service
- The construction process:
  - No analysis of the ex ante work and information processes, their developmental contradictions to be solved or indicators of change.
  - The construction process concentrated on ICT, no simultaneous re-engineering of work processes in collaboration with service providers
- Conclusions of case study I:
  - There is a need to elaborate the existing conceptual tools. Conceptualization to structure the co-construction of eService and technology and related challenges was created:

The created conceptualization to structure a service activity and its ICT-enhanced change

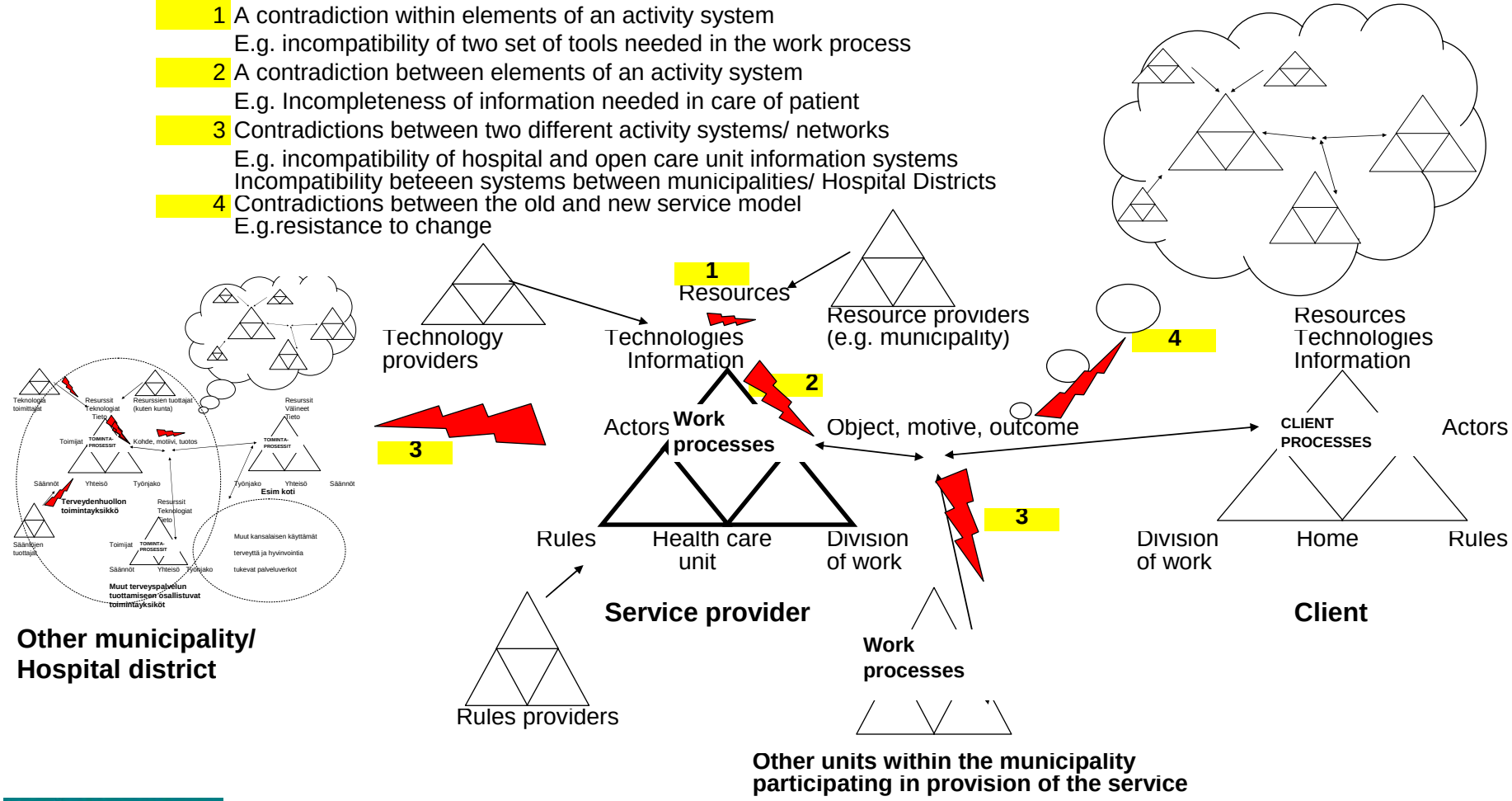
1) Network of activity systems and categories of problems triggering the change (7;1 cf. 5; 6)

1 A contradiction within elements of an activity system
E.g. incompatibility of two set of tools needed in the work process

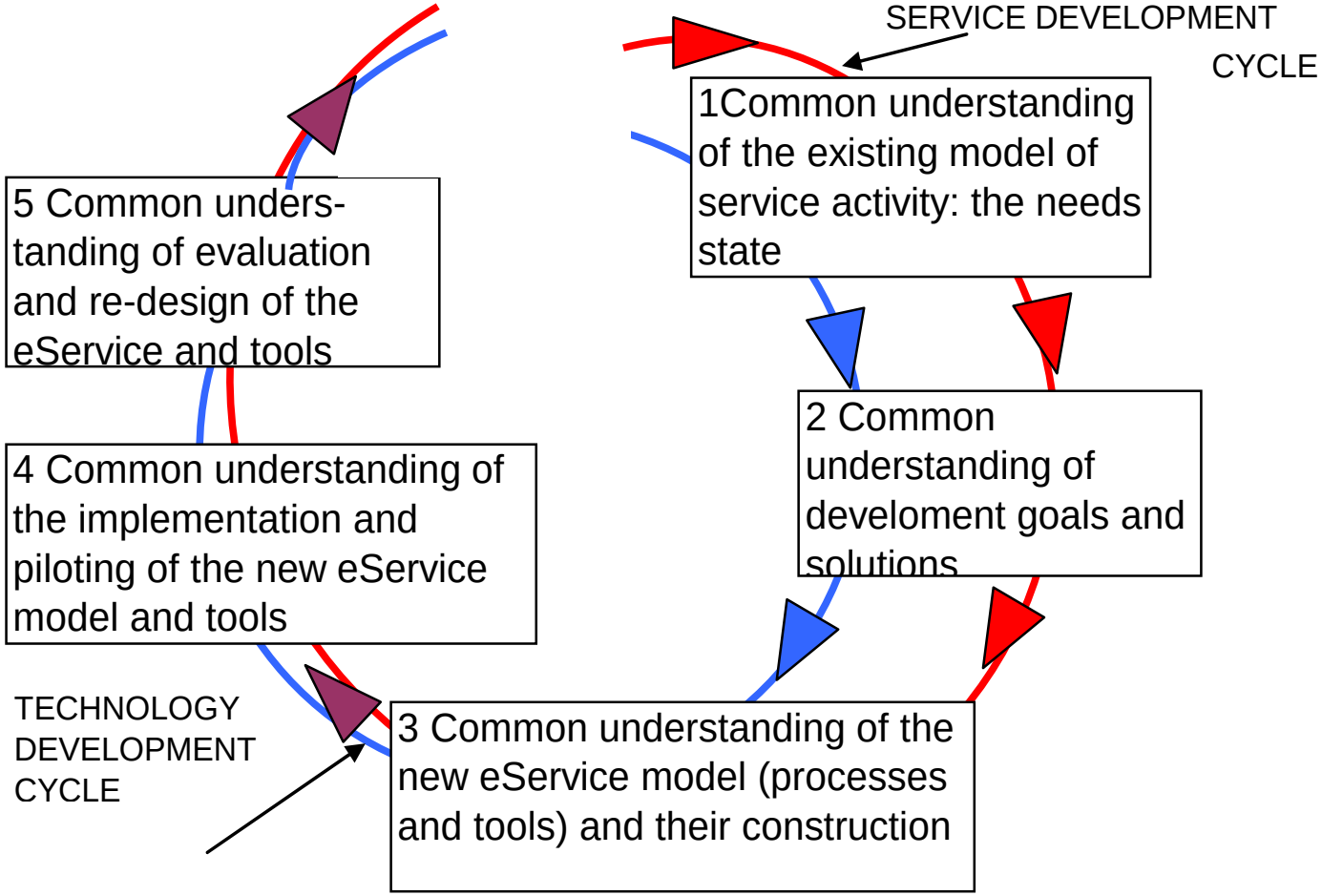
2 A contradiction between elements of an activity system
E.g. Incompleteness of information needed in care of patient

3 Contradictions between two different activity systems/ networks
E.g. incompatibility of hospital and open care unit information systems
Incompatibility beteeen systems between municipalities/ Hospital Districts

4 Contradictions between the old and new service model
E.g.resistance to change



2) A cycle of expansive learning to co-construct the service and its tools (solving the developmental contradictions) (7; 1).



Case II: Implementation of the theoretical tools to structure formative and summative evaluation of the development and piloting of a national ePrescribing system (8;1)

- The construction process
  - The project was based on a comprehensive but superficial study of prescribing service and its problems in ex ante situation. No in-depth analysis of the local service network and developmental contradictions were done.
  - There was a common understanding of the overall development goals and solutions. The construction process, however, focused on ICT and regulations, the service processes were not re-engineered
- Implementation and piloting:
  - Three out of four piloting health care organizations implemented the system, two stopped due to technical, usability and utility problems; Less than 1000 ePrescriptions were written in 2 years
  - The system did not bring short term added value to the doctors, limited value to pharmasists, no short term value to the clients due to the problems
  - ePrescribing legislation was prepared on the basis of the experiences
- Conclusions of case study II:
  - Conceptualization was used to detect problems in the co-construction phases 1-3. Feedback came too late to have an impact on the project (implementation was about to start). The system functioning, utility and usability problems were classified as contradictions within and between the network activity systems. The data was used in preparation of the ePrescribing legislation.

Case III: Implementation of the theoretical tools to support construction of a citizens eHealth service

Intervention:

Two "mirrors" offered to the project:

A structured image of the development process as co-construction

A structured literature review of concrete tools to answer the problems

- The construction process:
  - The project was based on technology providers' idea, supported by municipal strategies
  - Different studies of the ex ante work and information processes were conducted. The developmental contradictions to be solved or indicators of change were not extracted in the project planning phase
  - Technology providers started to construct the ICT solutions, service providers the envisioned work processes. Little concrete collaboration between them
  - "Return to the basics": service providers analysed the ex ante work and information processes, problems to be solved, indicators of change to steer the re-engineering of work processes and ICT development
  - The implemented new eService model was well accepted, technologies still require re-engineering
  - Diffusion of the system is planned with re-engineered technologies

Conclusions of case study III

- Problems pointed out in the co-construction phases 1-3 caused the service provider to analyse the old work and information processes, problems to be solved, to select indicators of change and to steer the re-engineering of work processes and ICT development. The technology provider did not re-engineer the technology that they had developed prior to the intervention
- The conceptual tools provided a tool for the project manager to structure the overall change and evaluation and information required in the process. The literature review offered some concrete tools for data collection.
- More detailed tools and support from different sciences (especially management, work and information sciences, economics, evaluation) would have been needed to direct informed data collection and analysis
- The project manager would also have required support for using the conceptual tools to structure the overall change and information required.

Discussion and conclusions

- The created conceptualization proved useful for classifying problems in the co-development and piloting of eHealth solutions. It also showed promise in classifying types of information that are required to answer the problems.
- eHealth projects would benefit from early adoption of a commonly agreed, adequately detailed and structured understanding of:
  - the multiple objects, interests and foci of development.
  - the context where the new tools, rules and practices will be implemented,
  - the development contradictions in the context, estimates of cost benefits of technology as a solution to them
  - the process and methods of co-construction.
- Management and execution of the co-construction requires a lot of cross-diciplinary information and methods. The projects need to build a balanced network of actors who have adequate knowledge and the required skills for supporting the project in the required data collection and analysis as well as management of the entity.
- More cross-diciplinary studies are required to elaborate the essential questions to ask and necessary information to be collected in different phases of different eHealth projects in order for the projects to succeed.

References

1 Hyppönen H. eHealth services and technology: challenges for co-development. Human Technology 2007;3(2):188-213.

2 England I, D. S, S. W. Information technology adoption in health care: when organizations and technology collide. Aust Health Rev. 2000;23(3):176-85.

3 Shekelle P, Morton S, Keeler E. Costs and Benefits of Health Information Technology. AHRQ Publication No.06-E006. Rockville, MD: The Southern California Evidence-based Practice Center, Agency for Healthcare Research and Quality; April 2006.

4 Hailey D, Ohinmaa A, Roine R. Study quality and evidence of benefit in recent assessments of telemedicine. J Telemed Telecare. 2004; 10(6):318-24. Review.

5 Engeström Y. Learning by expanding: An activity-theoretical approach to developmental research. Helsinki: Helsingin Yliopisto; 1978

6 Engeström Y. Collaborative expertise: expansive learning in medical work. Cambridge: Cambridge University Press; 2002.

7 Hyppönen, H. (2004). Tekniikka kehittyy, kehittyvätkö palvelut? [Technology develops: What about services?] Doctoral dissertation, University of Helsinki, Finland. (Research Report 134). Helsinki, Finland: National Research and Development Centre for Welfare and Health.

8 Hyppönen, H, Salmivalli,L, Nykänen, P.,Ruotsalainen, P, Pajukoski, M. (2007) Testing a theoretical framework for interdisciplinary IS evaluation: The case of Finnish Electronic Prescription. Int. J. Health Care Technology and Management, Vol. 8, Nos 1-2, 2007.

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