Co-construction of inter-organizational processes and process identities
The role of process simulations in innovating the Future School

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Abstract

This research deals with the emergence of inter-organizational process innovations in a network of comprehensive schools. We argue that inter-organizational process innovations also require the emergence of new process identities. Our research is action research oriented: we have arranged and studied three process simulations to support the co-creation of process innovations in a school network. The paper studies the formation of collective identity during the process simulations. Our results indicate that the inter-organizational process innovation and the collective process identity are created together, through dynamically shifting, facilitated general and particular discussions that use effective boundary objects in a continuum of process simulations. More research is needed to study how the situated collective identity and the innovative process ideas transfer from the simulation to the real school network.

1. Introduction

Our societies are getting more and more interconnected, in their living environments, in their economies, and in their social interactions – i.e. in their futures. Accelerated by the rapid development of ICT, these complex networks are an opportunity, but also a threat. They increase vulnerability on societal and on global scale, like the global economic and environmental crises demonstrate. There is a growing need for systemic innovations towards networks that produce sustainability, globally and locally.

New networks for increased interaction are developing also in education. Learning happens in formal school settings as well as informally, and many new actors are getting involved in the education networks. The networks create great opportunities for innovations. Systemic, networked school innovations can provide new and better learning and wellbeing for the whole community, life-wide and life-long, and thus contribute to social sustainability.

The big question is: how can these educational innovations be developed and managed? Innovating the networked operational processes of the future school requires a wide collaboration of teachers, students, administrators, parents, governmental and municipal agencies, companies, third sector organizations, and other network actors. To become a successful innovation, the future school has to be co-created.
This research deals with the innovations of inter-organizational processes in a network of comprehensive schools. Our research is action research oriented: we have arranged and studied interventions called process simulations to support the co-creation of process innovations in a school network.

We apply the concept “process” in a double meaning: 1) as the operational processes of the studied schools and 2) the development of these operational processes as an evolving innovation process. We argue that the innovation process also requires the emergence of new process identities. The paper studies the formation of collective identity during the process simulations, where the networked operational processes of the future school are co-developed.

2. Co-constructing inter-organizational processes and networks

The dynamics of process innovations

The central idea of process-oriented organizational structures is to connect the functionally specialized operations from their vertical “silos” into collaborative customer-oriented processes to serve the customers quicker, with better quality and lower cost (e.g. Davenport 1993, Smeds 1994). Process thinking has expanded from intra-company processes to inter-company collaborative processes and public-private networks. The old functional units do not disappear in process orientation, but remain as ‘competence centers’, and the new process structure coordinates the functional competences towards the joint customer (see e.g. Hamel and Prahalad 1994).

Processes require specific management attention. Often a "process owner" is nominated, whose task is to manage and to continuously develop the cross-functional process. The process-oriented new horizontal organizational “layers” are often enabled by ICT that increases the coordination and communication capacity of the organizations. (e.g. Davenport 1993, 2000)

Process structures are novel for the organizations, at least from the point of view of the implementing organizations. They can with good reason be called innovations. All definitions of innovation stress the role of implementation, and of the creation on added value. Ideas and inventions are required in the first place, but without successful implementation that adds value, we cannot speak of innovation (e.g. Urabe 1988, Davenport 1993, Utterback 1994, Leonard Barton 1995, Boer and During 2001).

In process innovation, the employees in the different units that are going to collaborate in the novel process have a lot of the required, often experiential knowledge that should be included into the co-creation of the process innovation. At the same time, the employees are the critical actors in implementation. During the implementation of the novel inter-organizational process, the members of the different communities of practice start accumulating and organizing new experience, but also negotiate and construct the new identity and meaning of the new inter-organizational “constellation of communities of practice”, affecting and changing the process design (Lave and Wenger 1991, Wenger 1998). The initial process design thus acts as a “boundary object” for the further development of practice, as well as of the design itself (Smeds and Alvesalo 2003).
Boundary objects in process innovation

Boundary objects (Star 1989, Carlile 2002) can be intentionally used in process development meetings and workshops to help the participants jointly transform their practice-based knowledge. Pragmatic boundary objects - models, maps, prototypes - are especially important. They are concrete enough to so that the interacting individuals can together apply what they know and transform the current knowledge at the boundary. Simultaneously, pragmatic boundary objects help them to start to redefine their new process-oriented tasks and work identity (cf. Wenger 1998). Wenger stresses that in contemporary organizations, multiple work identities are required. Following Wenger, we hypothesize that process structures require that the people bear in addition to functional "specialist" identities, also cross-functional "customer-oriented" process identities, network identities, and probably many more - and that all these have to co-exist.

The role of boundary objects in groups’ and communities’ collaboration has been widely researched in the recent years, e.g. in multi-professional negotiations (Lallimo et al. 2007), distributed work groups (Sapsed & Salter 2004), innovation processes (Koskinen 2005), new product development (Carlile 2002), and strategic change and reorganization (Fenton 2007). According to Fenton (2007) visualized process maps that serve as boundary objects enable a group of people to envision their future, enable the different stakeholders to understand the upcoming changes, and make the change more concrete for the stakeholders. Smeds et al. (2006) and Ewenstein and Whyte (2009) argue that visual representations serving as boundary objects can be used not only for conveying existing knowledge but also for developing it in collaboration.

Also scenarios can be used as boundary objects for collaborative development. Scenarios are narratives or 'stories about people and their activities' (Carroll 2000). Scenarios are commonly utilized as a method in participatory design (Carroll & Rosson 2007) or cooperative design (Kyng 1995). Scenarios aim to capture essential elements of the real-world situations, e.g. work processes (Kyng 1995), and they also act as a catalyst for communication and as design tools (Erickson 1995). Scenarios include the setting or context where the actions are situated, and the actors that have goals and objectives they pursue through the actions described in the scenario. Scenarios are at the same time concrete and flexible; they typically describe both the problem and a potential solution but at the same time they may be incomplete so that they can be elaborated and further developed. With the help of scenarios it is possible to envision future solutions. Scenarios serve as a media, a boundary object for the interaction between people. (Carroll 2000)

In this research, we refer to visualized process maps, visualized text citations, and narrative scenarios as boundary objects for facilitated process simulations, where the future process and collective identity of the networked school are collaboratively constructed.

Collective identity in inter-organizational collaboration and innovation

Hardy et al. (2005) state that effective inter-organizational collaboration requires the formation of a collective identity. According to their literature synthesis, two types of conversations are needed to construct the necessary ties for a collective identity (Hardy et al. 2005, 63-65):
1) Conversations in which joint 'issues' are constructed. These conversations produce generalized membership ties that connect participants to shared issues and vision that has relevance for each partner’s home organization and legitimizes the collaboration.

2) Conversations that refer to specific persons, places and objects, and help the participants to position themselves as connected in identifiable ways. These conversations produce particularized ties that relate participants directly to each other, and help them to determine what roles and responsibilities they take in the collaborative process (Hardy et al., 2005, p. 64).

We argue that the construction of collective identity is not only a prerequisite of effective inter-organizational collaboration, but also of inter-organizational process innovation. To co-create and implement a networked process innovation, a new collective “process identity” has to emerge, and this happens during collaborative process development, where the discussion of the participants shifts from general 'issues' to the participants' individual roles and tasks, and relates these two levels dynamically to each other. The two discussion types, shifting from one to the other during the innovation process, create together the collective "process identity".

In this research, we study the co-construction of collective identity during process simulations –thus we study "situated identity" (Castanheira et al. 2007), and not the emergence of identity in real life, such as in the everyday operations in the school network. An important question is to what extent this situated identity carries to the real life, and to the successful implementation of the new process in the networked school.

3. Facilitating networked process innovations with process simulations

Innovation is basically a social knowledge creation process (Nonaka and Konno, 1998), a process of innovative knowledge co-construction (e.g. Bereiter and Scardamalia 1993; Paavola et al. 2004). According to Van de Ven (1986), an innovative idea is created when the developers together possess holistic knowledge about the system to be developed (law of requisite variety, Ashby 1968), and sufficient human interaction exists between the related units and hierarchical levels to amplify and select the ideas to be implemented ('hologram' structure, Van de Ven 1986).

We have applied dialogue-based process simulations as interventions to facilitate and to research collaborative knowledge creation for process innovations. The method has been developed as a result of more than 150 simulation projects since 1998 (see e.g. Smeds and Haho 1995, Haho and Forssén 2001, Smeds et al. 2006).

The SimLab™ method for business process development (e.g. Smeds et al. 2005) provides an interactive learning environment and functions as a platform to build common understanding and to co-create innovative development ideas. The core of the participative group simulation is a carefully prepared and facilitated discussion about the process.

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1 We use here the concept discussion instead of conversation, because the simulations are purposeful development interventions with facilitated discussions, and not 'free floating’ conversations.
process in front of a 10 meter visual process model. Actors from all partner organizations involved in the process are present in the simulation. A true customer-driven process development requires also the inclusion of the end customer in the simulation. After the discussion in front of the process model, typically separate group works are organized, that go into more detail in the discussion of roles and responsibilities in the process.

During the simulation, a mutual understanding about the process as a whole and about the roles and activities in the process start to build up, and development ideas start to emerge. - The SimLab simulation creates a “ba” for inter-organizational learning (Nonaka 1995), or a virtual “community of practice” (Wenger 1998) (cf. Smeds and Alvesalo 2003) that applies boundary objects for facilitated knowledge co-creation in process innovation (Smeds et al. 2006). A typical simulation project is illustrated in Fig. 1.

3 to 6 months

Figure 1: The SimLab™ process simulation project (Smeds et al. 2005)

In a process simulation project, the researchers

• collect through individual interviews the process knowledge of the members of the different communities of practice that now are forming a novel inter-organizational constellation; often people from many units, functions and hierarchical levels, including customers. This practice-based knowledge forms the basis for the collaborative innovation (e.g. Wenger 1998; Paavola et al. 2004)
• prepare, based on the interviews and other material, visual process maps, other visualizations, and narrative process scenarios to be used as pragmatic boundary objects in the simulations (Carlile 2002)
• invite the members of the novel constellation, plus other stakeholders of the process innovation, into the one-day process simulation for a creative dialogue around the networked process innovation
• facilitate the process dialogue, applying the boundary objects to help the participants to formulate their new tasks and roles in relation to each other in the new collaborative process (their particular ties), as well as to discuss and construct the shared overall meaning of the collaboration relationship as a whole (the general ties), thus supporting the co-construction of a collective inter-organizational process identity (Hardy et al. 2005).
• help the virtual community of practice to co-construct, through the discussion, a shared understanding of the inter-organizational process, and to co-create new process ideas (Alin and Smeds 2010).

• collect the data from the simulation day (audio- and video-recordings, and the feedback questionnaires) and analyze it from a practical development viewpoint, and for scientific research. Typically the data contain many well-grounded process improvement ideas and challenges, and often also strategic questions concerning business models.

4. Three successive process simulations: co-constructing collective identities and process innovations for the Future School

In this paper, we report findings from a study incorporating three process simulations in a particular school network, formed by five comprehensive schools that participate in the InnoSchool research project. InnoSchool conceives the innovative school for the future as “an educational service integrator” that collaborates with its network partners to provide its community with educational services. This conceptualization challenges the existing operational processes in and around the comprehensive schools, and calls for innovative identity co-construction on all levels in the network.

When we started our research in 2007, the five schools (so called Kuninkaantie schools, located in northern Helsinki, Finland) had started to collaborate to provide the community with regionally consistent comprehensive education on grades K-10, ages 6 to 16. Taken together, the schools employed over 100 teachers and five principals and taught around 1800 students. In the partner network of these five schools, there were other schools, different branches of administration of the City of Helsinki, NGOs, companies, local clubs and associations, third sector actors and other interested stakeholders. The schools had just begun with a five individual pilot projects to develop new inter-grade and inter-subject teaching methods and processes.

The simulation projects started with data collection through thematic group interviews and individual interviews, accompanied by modeling sessions with the central actors of the network, and followed by a careful preparation of the simulation day (including the preparation of the boundary objects: the process maps, scenarios, and visual text citations).

In the three simulations, we applied the SimLab™ process simulation method to facilitate the process development of the innovative Future School (simlab.tkk.fi; Huhta et al. 2009). Pragmatic boundary objects (process models, network maps, scenarios, and visual text citations) were used first to facilitate the ‘general discussions’ of teachers, principals, administrators, company people, and students, to share knowledge and then to co-construct ideas for the future processes and the school network (thus producing generalized membership ties for the participants). Second, the boundary objects supported also the ‘particular discussions’ that concerned the new tasks, roles and even work-related identities of the individuals in new networked school processes (thus producing particularized ties).
In the following we analyze how the simulation discussions dynamically shifted between these levels, from phase to phase within each simulation day, and from one simulation to the next, and helped to co-create collective identity.

**Simulation 1: Visioning regionally consistent comprehensive education**

Simulation 1 (2007) focused on the visioning of the overall objective and the process of regionally consistent comprehensive education, and related the five pilot projects of the school network to this vision. The simulation discussion went on in three phases.

**Phase 1:** The general discussion started with envisioning how the future regionally consistent comprehensive education could look like. The discussion was supported by visual boundary objects, namely visualized text citations from interviews concerning the vision. The facilitators presented the contents of the visualized text citations to the participants and facilitated the discussion by asking questions and opinions from the participants.

The discussion started with abstract educational and pedagogical concepts, such as future curriculum design, characteristics of a good learning environment, project-based pedagogy in general, and the goals of comprehensive education. Then, the discussion moved towards the region, and the construction of a collective identity began as the participants were talking about what the regional collaboration would require and how the regional and professional identity could be established to enable the future collaboration. The degree of concreteness was growing as the discussion proceeded, for example, the participants talked about how the Kuninkaantie region could be developed as a safer learning environment for the students, and how project-based learning could be implemented in the region. The participants perceived and analyzed their operational environment and its possibilities, which developed their regional identity. However, the discussion stayed still on a relatively abstract and general level, and the conversations produced a descriptive vision of the future way of educating the students in the regional school network. No actual implementation plans were created. The participants had created a common ground and vision, and begun to construct their collective identity. They became aware of their role as the constructors of the new educational collaboration in the Kuninkaantie region.

**Phase 2:** The general discussions shifted to a scenario describing a fictive school week in the future. The scenario was presented to the participants as a visualized process model that had been designed by the researchers based on information gathered from the interviews with the schools’ teachers and other actors. The scenario was written from the perspective of a pupil. The scenario and the related process model presented a possible solution instantiating the ideas of the regionally consistent comprehensive education. The discussion was again led by facilitators asking questions and eliciting opinions. More specifically, as the scenario was situated in the future (year 2013), the participants were asked to recall how the future way of operating was reached from the perspective of year 2007. Here, we applied a specific method called ‘recalling the future’ (Kokko 2006).

The conversations could be located in between 'the general' and 'the particular': the discussions were more concrete than in the previous phase of the simulation,
but not yet as concrete as in the following, third phase of the simulation day. The first phase vision discussion had created a common ground, now the discussion was more fluent, and the participants seemed to define themselves through "the Kuninkaantie identity". For example, the participants tried to relate their own schools to the new Kuninkaantie area collaboration, they described more flexible teachers' working time arrangements that allowed to spend time also for developing their own work, the teachers described how teachers' collaboration was organized in a novel way between class and subject matter teachers, and how technology and administration were supporting the schools better than earlier. In addition, the participants described requirements and constraints mostly oriented towards their partners, e.g. the department of education towards the city, or towards the teachers' vocational organization. They did not yet identify and define tasks or roles related directly to themselves.

To sum up, the conversations moved from the general towards the particular and the visions were gradually concretized through co-construction. The collective identity was gradually being co-constructed in the discussions, as the participants began to talk about themselves as the Kuninkaantie teachers or Kuninkaantie schools, not as representatives of their individual home schools.

**Phase 3:** After the general simulation discussions, the participants were engaged in group works. They planned concrete actions, and developed further the plans for their five pilot projects in inter-grade and inter-subject teaching, focusing on how to best serve the students. They were supported by the facilitators and pre-defined group assignments. Based on the general discussions and the collective identity building in the two earlier phases of the simulation, they could now efficiently produce particularized membership ties.

In the group works, the participants reflected and related their own work to the general discussions and were therefore able to identify their own roles in the overall development process. For example the teachers of the special education experienced that they have an important role in the development, because their students are already moving between the schools. They can act as examples to other teachers and bring together the representatives and organizations of different municipal branches. Together with the understanding about their new role, the teachers became aware of the benefits gained from the regional collaboration. They were able to reflect the situation of their own school on the other schools. On the other hand, they also acknowledged the challenges connected with the new role.

The teachers acknowledged the significance of the collaboration between subject and class teachers and their concrete possibilities to realize the collaboration. Moreover, they saw that they need to do things together, compared with the former autonomous work practices. This clearly motivated them towards the development. Although they had varying opinions about the practical next steps, the previously distinct teachers started to see themselves as teachers of comprehensive education.
At the time of the first simulation, the pilot projects were in their beginnings, so the ‘development teachers’ were still forming their roles in the project groups. Some of them were active participants and took more responsibility in the pilot projects, whereas others remained more passive. The decision making in the groups was democratic. The development teachers realized their different roles and responsibilities compared with the other teachers in the schools.

**Simulation 2: Merger of two schools**

Simulation 2 (2008) concentrated on the merger of two of the schools, the re-organization and integration processes, as well as on the visioning of the mission, educational objectives and management principles of the merged school. The simulation proceeded in three phases

*Phase 1:* The general discussion began with envisioning the joint educational objectives and operational ideas of the future merged school. The boundary objects, namely visualized text citations stemming from the strategies of the schools and of the municipal school administration illustrated these topics. They were presented to the participants by a facilitator who also asked questions and elicited thoughts from the participants.

The discussion started on quite an abstract and conceptual level. The participants were talking about the students’ sound self-esteem and its importance as an educational goal, tolerance of diversity in schools, motivating the students to study and learn, the future success of the students and its significance as a goal of education, sustainable development and environmental issues, collaboration with families, and taking into account the students’ needs. This discussion was creating a common ground for the participants and contributing to building their collective identity. The discussion included also particular conversations, especially when the participants discussed pre-defined topics in pairs.

*Phase 2:* in a general discussion, the boundary object, i.e. the visualized process model of the merger, was presented to the participants. The model showed the roles, central events and decision points and the timeline of the change. After the walk-through of the process model there was a short general discussion that included short questions and answers. Then, the participants were divided into groups for pre-defined group works where the more detailed conversations took place in the third phase of the simulation day.

*Phase 3:* The discussions in the parallel groups concerned the management and organization of the school as a work community, the wellbeing of the student community, the communality and wellbeing of personnel, and the participation of the students in the new merged school.

Based on the general discussions and the building of collective identity in the previous phases 1 and 2, the groups were able to develop the merging process further, and bring the discussion more to the level of particularized ties. The participants could discuss their roles, hopes and worries concerning the merging process. They related their own role to the merging process and started to see
themselves as the part of the new merged school. They realized that joint responsibility is needed to guarantee well-being at school. They defined the students’ well-being, and the development-orientation of teachers, as two important objectives for the school. Familiarity of the teachers and prevention of bullying were seen as important factors in the well-being of students.

**Simulation 3: Visioning the network, and project based learning environment**

Simulation 3 (2009) focused firstly on the visioning of the larger public-private network around the schools and its value creation potential. The second topic was the future operational process as well as the implementation process of a project-based learning environment that was being planned.

Before the simulation, a “project day” was arranged for a selected group of teachers. The “project day” focused on the development of the project-based learning environment, and collected background information for preparing the second simulation topic. - The simulation proceeded in four phases.

**Phase 1:** The general discussion began with the presentation of two boundary objects, i.e. two school network models (the Kuninkaantie school network, and the Mesa school network, a comparative case from the USA), their comparison and related discussion.

The discussion focused on pre-defined themes (e.g. public-private collaboration, collaboration with families, and collaboration with third sector and other regional actors), with an aim to develop the network collaboration and to define the enablers and added-value of the networked collaboration, as well as to share good practices between the two school networks. The discussion was facilitated and the participants of the simulation were commenting and generating ideas related to their own Kuninkaantie development project, based on the presented networks. The discussion included also discussions about particular roles and tasks, especially when the participants discussed pre-defined topics in pairs.

In the discussions, the participants identified missing actors to be included in the network, important actors and their significance, and development items. For example, the participants generated ideas about close collaboration with the firms in the region and with a local newspaper. Also closer collaboration with families and new ways of involving parents in the school's life were discussed. Especially, the possibilities for utilizing the school's environment for teaching and learning came up in the conversations. The discussion was in between the general and the particular; the ideas generated resembled visions but were not that abstract. They did not include implementation plans, roles, or responsibilities.

**Phase 2:** After the general network discussion, the topic was deepened in facilitated group works with pre-defined assignments.

In the group discussions, the role of the teachers as collaborators with network partners was highlighted. The teachers analyzed the benefits of the public-private collaboration and realized that the collaboration is often based on personal relationships. When the teachers participate in the planning and development of
the school network, they become more committed to the networked collaboration. On the other hand, they realized the time and resource limits of collaboration. The participants realized the need of different new roles in the school network: subject-based and regional collaborators (usually teachers), contact people from the schools, other collaborators, and some kind of superintendent, a “King of Kuninkaantie” or “chief networking officer”?

Phase 3: The future operational model of a project-based learning environment was envisioned and discussed, based on two boundary objects: a fictive narrative scenario and a visualized process model of the use of the project-based learning environment.

The facilitators presented the boundary objects, i.e. the process model and the narrative scenario, in parallel, after which a facilitated general discussion followed. In this discussion, the ‘recalling the future' method (Kokko 2006) was again applied. The scenario described how a school day could be planned and realized in the future learning environment in the year 2014. The participants were asked to describe how they felt about the activities and roles depicted in the scenario and to describe how this future way of operation could be reached.

The participants' discussions begun to move towards more concrete issues, such as evaluating the learning management tool in use, or how the students could be involved in planning their studies. In addition, the participants envisioned the use of novel learning technology and collaboration with a science center. Moreover, the participants also identified problems and requirements to be taken into account in the development work. To summarize, the discussions shifted between the general and the particular, moving from abstract visions towards the concrete. However, the concrete level was reached in the next, fourth phase of the simulation day.

Phase 4: The participants developed their new operational processes and the practical objectives of the project-based learning environment further in smaller parallel groups.

After the general discussion, the participants defined different roles and resources that would be needed in the operational process of the project-based learning environment that would engage different teachers, students and other users. For example the roles and responsibilities for project room maintenance, ICT-support and reservations need to be defined. Based on the earlier general discussions, the participants developed concrete ideas concerning the collaboration with network partners such as a science center and companies, and the use of novel learning technology. The participants also highlighted the importance of sharing the knowledge about the project-based learning environment to all teachers in the Kuninkaantie school network. They developed concrete means how this could be done: through communication and education, applying the virtual collaboration space, in the peer meetings, or in the pedagogical café meetings organized by the schools or the educational department. According to the participants, all teachers should be committed to the development of regionally consistent comprehensive education, not just the teachers participating in the pilot projects and the simulations.
5. Conclusions

The three simulation cases demonstrate that collective process identities were co-constructed during the process simulations that were organized as interventions to support process innovations towards a future school network.

In each of the simulations, the facilitated discussions shifted between 1) general discussions that addressed the envisioning of the future operational processes of the school network and 2) the group and individual level discussions that were more concrete and detailed, and addressed how the future processes would be organized and achieved in practice, and what they would mean for the participants.

The general discussions formed a common ground for a shared understanding about the inter-organizational process to be developed, as well as for collective identity construction. These discussions proceeded on a rather abstract level, and gradually, through facilitation and reference to the boundary objects, the discussed issues shifted towards a more concrete level. In simulations 1 and 3, narrative scenarios and visualized process maps were used to envision, depict and co-construct the future way of operating, and a special method 'recalling the future' (Kokko 2006) was used to elicit different perspectives from the participants and to co-develop the path to the future, i.e. the crucial steps and actions to be taken by different actors that would make the envisioned model true. In the simulation project 2, no scenario was used, but the visualized process map of the coming merger was walked through and discussed with the help of the facilitator. Additionally, in the simulations 1 and 2, text citations visualized as “speech bubbles”, and in the simulation 3, network models, were used for envisioning the future. These pragmatic boundary objects were always used in the general discussions, where after more detailed group discussions took place.

In simulations 1 and 2, we find that the general discussions of the ‘middle phase 2’ had an important contribution to the co-construction of the collective identity. For example in simulation 1, the 'Kuninkaantie identity' started to grow as the general discussions about the regionally consistent comprehensive school network proceeded and applied the future school week scenario as boundary object. The participants from the five different schools talked about requirements and concrete ideas and actions to be taken, but did not yet identify their roles, responsibilities, and tasks needed to implement these ideas. However, the ties that they were creating were already reaching from the general to the particular. When the participants started in their speech to relate themselves primarily to the Kuninkaantie region and not to the schools they came from, we can say that they had co-constructed - for the first time - a collective identity in this simulation.

On the basis of our study we argue that the boundary objects (process maps, visualized text, scenarios, etc) served as important catalysts for the discussions. Especially the scenarios helped to 'make alive' the future processes and enabled the participants to detach themselves from the current practices and to orientate towards a future way of operation. The scenarios also worked as a communication media and a design tool (Erickson 1995, Kyng 1995); the scenarios were able to convey information to the participants with various backgrounds and enabled the participants to co-create a vision and implementation plans for the future collaborative Kuninkaantie education (cf.
Ewenstein & Whyte 2009). Thus the scenarios could support the general discussions that built generalized membership ties, but they also enabled the forming of particularized ties. We can say that at least in the process simulation interventions, scenarios contribute efficiently to the creation of collective identity.

In the simulations, the particularized ties emerged partly in the ‘middle phases’ of the facilitated general discussions, but especially in the group discussions. However, the emergence of these particularized ties in the group work discussions always built on the shared understanding created by the preceding general discussion about the development vision and objective, mediated through the ‘middle phase’.

In the simulations we also see the following pattern: supported by the general shared understanding from the general facilitated discussions that use the boundary objects, the processes are co-developed and co-created in detail in the group discussions. The processes also develop from one simulation to the next, in the studied Kuninkaantie school network case from general visioning to concrete networked processes that apply the project based learning environment. Thus, we can state, based on our results, that inter-organizational process innovation and the collective process identity are created together by the dynamically shifting discussion types that use effective boundary objects over a continuum of simulations.

This result is tentative, and has to be tested in further in-depth case studies. There are also many limitations to our research. The participants of the simulations co-construct collective work identities, but at the same time they hold many parallel identities (e.g. teacher, parent, manager). These identities co-exist and affect also the discussions and the co-construction process. We have not studied this conflict in our research, but concentrated only on the expressed emergence process-oriented work identities.

A main limitation of the study is the situated nature of the collective identity and of the process ideas that emerge in the simulations (cf. Castanheira et al. 2007). Does the co-constructed collective identity migrate to real life? And do the process ideas that were developed in the simulations get implemented in the school network so that they create value added? To answer to these questions, follow-up studies of the Kuninkaantie school network in the form of in-depth interviews of the simulation participants are needed.
References


