An activity theory perspective on creating a new digital government service in Finland

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Abstract

Digitalization of government services is a central goal in many countries. At policy-making level, digital government services are often expected to simultaneously reduce cost and provide citizens with better and more versatile services. Development of new digital government services, however, often involves companies, which typically have differences in their approach to the development and implementation of new digital services compared to the public sector. This study applies activity theory as a lens to identify the similarities and differences between the private and public sector in the development and implementation of a new government digital service. The aim is to identify the contradictions that can lead to expansive learning in the activity system encompassing a national level digital government service for the social welfare and healthcare of citizens in Finland.

1. Introduction

Digitalization of government services is a central goal in many countries. The promise of e-government is typically either to support citizen engagement and participation in government or to develop quality government services and delivery systems that are economic, efficient, effective, and equitable [1]–[3]. A national initiative for developing a government digital service for the social welfare and healthcare of citizens in Finland was launched to optimize health system performance. The initiative followed the Institute for Healthcare Improvement (IHI) "Triple Aim" framework: the simultaneous improvement of patient experience of care (including quality and satisfaction), improvement of the health of the population, and the reduction of per capita cost of healthcare [4], [5].

However, development of new digital government services is a challenging task, as it usually needs not only technological capabilities, but also faces issues in terms of both culture and process [6]. Further, these kinds of developments are often joint efforts between public and private sectors, which have differences in their approaches to the development and implementation of new digital services, and this can lead to potential conflicts and hinder the achievement of the set aims [6]. On the other hand, these kinds of conflicts can also act as triggers for co-learning, if understood and used in a goal-oriented way.

The aim of this study is to identify the potential contradictions arising from the differences between public and private sector organizations, and further, to convert them into triggers for change and possibilities for co-learning through the lens of activity theory. The study first reviews the known differences between public and private sector digital service development and then introduces social-cultural-historical activity theory [7], [8] as a framework for identifying potential contradictions between activity systems of private and public sector organizations. Each identified contradiction in turn can be considered a trigger for

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change, which can lead to expansive learning in the development and implementation of new government digital services. A case study of the national level digital government service for the social welfare and healthcare of citizens in Finland is then presented, applying the activity theory lens. Finally, case-specific and transferable learning is outlined in the development of government digital services in social welfare and healthcare involving multiple private and public sector organizations.

2. Public-private sector differences in development of digital services in social welfare and healthcare

At a general level, comparative studies of public and private sector organizations have traditionally identified differences in three broad areas: (1) environmental factors, (2) relationships of the organization to the actors in its environment, and (3) internal structures and processes [9]. The private sector has been argued to be more agile and resourceful, less bureaucratic, and to have a stronger motivation to proactively innovate when compared with public sector organizations [9]–[14].

Private sector organizations have also been more active in implementing Lean [15], [16] and Agile software development methods [17]–[19] in the development of new digital services, whereas public sector organizations, especially in healthcare, have been used to more traditional plan-driven software development [20], such as the waterfall process model [21]. On the other hand, public sector healthcare organizations have to deal with more strict legislation, e.g., a certain type of software has to comply with medical device regulations [22], privacy of health data must be respected and complied with [23], and in the implementation of the digital service, patient care cannot be compromised. It is claimed that public organizations represent a bureaucratic infoculture characterized by supremacy rules, formal procedures, and hierarchy. Adopting a market infoculture entailing plurality, exchange, competition, and cooperation would facilitate the public sector in accomplishing the goals of e-government [6].

These differences within the aims, practices, rules, and processes potentially cause conflicts between public and private organizations and affect the activity system as a whole.

3. Activity theory

Activity theory distinguishes between temporary, goal-directed actions, and durable, object-oriented activity systems (Figure 1) [7], [8], [24]. In this context, 'activity' has a broader meaning than 'action' or 'operation' (consider an ice hockey game as an activity and hitting a puck as an action, for example). In this case, the activity is the creation of a new digital government service as a whole. As applied in activity theory, the concept of activity means linking events to the contexts within which they occur [25]. The process of the creation, use, and utilization of knowledge in networked organizations is not a spontaneous phenomenon [26]. According to socio-cultural historical activity theory, there has to be a triggering action, such as the conflictual questioning of the existing standard practice in the system, in order to generate expansive learning [8], [27], [28]. In this study, the creation of a new national digital government service could be considered as the triggering action. Expansive learning produces culturally new patterns of activity, and the object of the learning activity is the entire system (i.e., the new digital government service) in which the learners (i.e., the project members and stakeholders) are working [29]. Figure 1 below illustrates the systemic structure of collective activity according to Engeström.

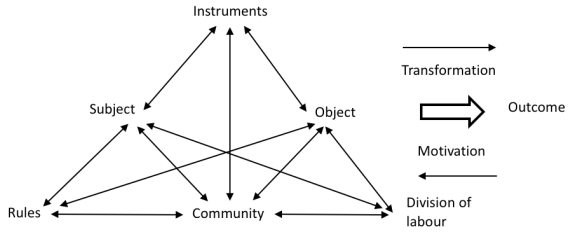

Figure 1. Systems of collective activity, adapted from Engeström [8].

In Figure 1, activity is described as a set of six interdependent elements:
Instruments – the artifacts or concepts used by subjects to accomplish the task.
Subject – a person or a group engaged in the activities.
Object – the objective of the activity system as a whole.
Community – social context and all the people involved.
Division of labor – the balance of activities among different people and artifacts in the system.
Rules – the guidelines and code for activities and behavior in the system [30]–[32].

This study adopts the idea that the problem with management decisions often lies in the assumption that orders to learn and to create new knowledge are

given from above [8]. The enabling of knowledge sharing is required in order to generate new knowledge in a networked organization. In the case of a digital government service, there is either an external or an internal need for learning in the entire activity system (e.g., a new digital government service development project). The external triggering action may be a value conflict with stakeholders, for example, and the internal triggering action could be, for instance, the product owner's lack of experience, or conflict within the project organization (e.g., personal chemistry).

Engeström [8] suggests that the motivation to learn is embedded in the connection between the outcome and the object of the activity. The object of the collective activity (e.g., the project plan and sprint plan) is transferred to the practical outcome (e.g., an information system) (Figure 1). Achieving practical results through this transformation creates the motivation to change. Findings from research conducted among experienced project managers have confirmed that the motivation to share knowledge exists, but paradoxically there is very little evidence of practical knowledge sharing in the project organization [33]. Therefore, it could be argued that there is a need for modeling action patterns in order to ensure knowledge diffusion in the activity system of the project.

In the case of the development of a new digital government service, the project organization has to effect transformations that are not yet in place. In other words, it has to both learn and operate simultaneously. The theory of expansive learning at work (based on activity theory) produces new forms of work activity [29]. An essential component of such learning is shared knowledge, which accumulates in the explicit form of rules and instruments (artifacts and tools) for example, and in the tacit form of cultural, historical, social, experience-based knowledge (Figure 1).

4. Method

A case study approach was chosen as the research method for this research. The case study method was considered appropriate for this research, because it allows empirical investigation of a contemporary phenomenon within its real-life context using multiple sources of evidence [34], [35]. The case study comprises a comprehensive method that covers the logic of design, data collection techniques, and specific approaches to data analysis [35]. The strengths of case study research include [36]: 1) allowing the study of the phenomenon in its natural setting and developing a relevant theory from the understanding gained through observing actual practice, 2) enabling the questions of why, what, and how to be answered with a relatively good understanding of the nature and complexity of the phenomenon, and 3) the method is suitable for early, exploratory research where the variables are not known and the phenomenon is not yet completely understood.

The empirical data collected consisted of interviews with the project management office, the digital transformation company responsible for service design and software development, and the service providers. Among the service providers, social and healthcare professionals were interviewed from three Finnish cities. These respondents represented six different pilot sites for the implementation of the new digital government service (ODA). Altogether 12 service providers were interviewed using semi-structured face-to-face interviews between September 2017 and January 2018. In each city, the project manager was interviewed, as well as persons participating in the development and testing in different pilots (Table 1). In addition, three project team members from the digital transformation company were interviewed during the same time period, and the project leader from the project office was interviewed during September 2017 and again during June 2018. Investigator triangulation was used to develop a comprehensive understanding of the phenomena, with two researchers participating in the interviews [37], [38].

Table 1. New digital government service pilots and interviewees.

Pilot (P)	Interviewees
P1: Symptom assessment: Urinary tract infection, City A	Responsible team member Process owner Team member
P2: Care process of the chronically ill (blood dilution)	Process owner
P1, P2: Project management office, City A	Project manager Project coordinator
P3: Service need assessment: application for dependent care allowance, City A	Process owner Main user

P4, P5: Project management, City B	Project manager
P4: Service coordination, services for the disabled, City B	Process owner Project planner
P5: Symptom assessment: respiratory tract infection, City B	Project coordinator Associate chief physician
P6: Symptom assessment: respiratory tract infection, Hospital district, City C	Project coordinator Project manager Project assistant

Prior to developing the digital government service, each pilot site conducted process development, based on Lean philosophy [39]–[41]. In addition, the pilots had identified objectives for the development work and performance indicators to illustrate the development (Table 2).

Table 2. Objectives for the new digital wellbeing service pilots.

Pilot (P)	Objective
P1: Symptom assessment: Urinary tract infection	In explicit cases the patient receives care without visiting the healthcare center, receives prescription in 3 hours after completing the assessment in the service Indicator: number of self-assessments vs. number of appointments with doctor
P2: Care process of the chronically ill (blood dilution)	All patients capable of using the digital service, specifying the dose of medicine by themselves (based on explicit criteria) Indicator: Decline in physical visits and phone calls
P3: Service need assessment: application for dependent care allowance	Easy, transparent, efficient, and customer friendly process. Fewer unnecessary applications. Indicator: number of rejected applications (%)
P4: Service coordination, services for the disabled	Increased accessibility, fluency of the process and more systematic action, increase in the number of electronic applications Indicators: handling time, number of electronic applications
P5: Symptom assessment: respiratory tract infection	Decrease in number of phone calls and visits to emergency medicine (for this group of patients) Indicator: variation in visits related to respiratory tract infection to emergency medicine
P6: Symptom assessment: respiratory tract infection	Digital government service along with instructions for self-care replaces some of the visits to doctor or nurse Indicator: Digital government service (ODA) accounts for 30% reduction in phone calls (guidance), and 10% reduction in patient visits to doctor or nurse

5. Results

Understanding the main stakeholders is key in any service creation project. Therefore, based on the interviews, Figure 2 presents a high-level overview of the main stakeholders and their relationships in the new digital government service creation following the e-government and e-commerce relationships framework [14].

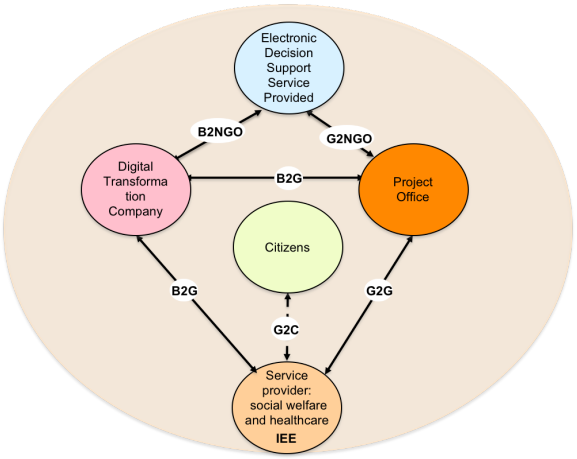

Figure 2. Main stakeholders and relationships in creation of digital government service.

Although the citizens are at the center of the new digital government service, they were not directly involved in the early phase of the new service creation. The main reason behind this is that in order for citizens to be able to digitally evaluate their health condition and need for care, first there needs to be an application that has been carefully tested and validated by medical professionals in order to provide accurate information for citizens. The role of the project office was to ensure that this was accomplished. Other key stakeholders include a digital transformation company (DTC) responsible for the development of the digital government service, a non-governmental organization (NGO) responsible for the development of the knowledge base and algorithms for evidence-based decision support service providing accurate recommendations based on the information that the citizen inputs into the system, and service providers that provide the citizens with social welfare and healthcare services.

The investigated activity system of the development and implementation of the new digital government service is described in Figure 3. The electronic decision support service provider was omitted from the more detailed case study, as it was the task of the DTC to integrate the results of the decision support into the digital service. Furthermore, the social welfare and healthcare service provider gave feedback on the decision support directly to the DTC and via the project office.

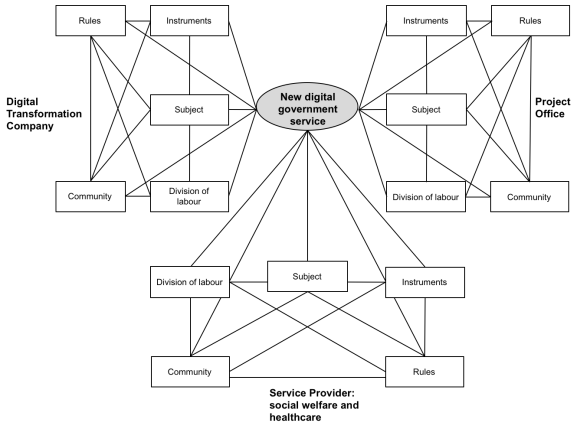

Figure 3. Three interacting activity systems in the development of digital government service pilots, and central identified conflicts.

The three interacting activity systems shared the goal of developing a new digital government service for citizens' social welfare and healthcare. The service provider (owner of the processes) was responsible for defining the success indicators for each of the digital government service pilots (Table 2). The targeted outcome was mutually agreed to be an easy-to-use information system that would be adopted nationally by Finnish citizens and social welfare and healthcare service providers.

Interviewees from these three activity systems were asked to evaluate the benefits and challenges related to the development process. The pilots highlighted the fact that introduction to the Lean philosophy was a focal benefit related to the development work. According to the interviewees, Lean aids process development and helps professionals to realize how a digital service can facilitate working more efficiently and economically. Each pilot had to do a value stream mapping [42] exercise at the beginning to discover the typical lead time of the service. By doing this exercise and performing corrective actions, benefits were realized from process development even before the implementation of the information system. One interviewee also pointed out that value stream mapping helps to identify "quick wins", for example, sending an SMS immediately after diagnosis to a patient waiting for a prescription for medicine can significantly improve flow efficiency [39], [43] and reduce waste, which simultaneously improves the patient experience and reduces cost (manual work of the physician).

The biggest challenge related to project scheduling. According to the interviewees, the schedule for the development tasks for the service provider should be available about 6 to 8 weeks in advance. Development activities were mostly done in addition to other duties (e.g., consulting hours), which indicates that development tasks had to be scheduled in the shift plan. Schedule delays or missing schedules may result in situations where there are no personnel available to test versions of the digital service, or to give the necessary feedback. In some pilots, dedicated personnel were disappointed because the development work did not proceed as scheduled, and they could not participate later on. Consequently, some pilot members had difficulties in recruiting personnel to test versions of the digital service. Some pilot members expected the testing schedule from the project office, and reported disappointment when no such a schedule was delivered. The interviewees pointed out that the pilot members received quite extensive tasks and requests to comment on different aspects of the digital service at short notice, but the professionals did not have the time or competence to contribute (e.g., doctors were asked to give opinions about technical aspects of the service). Some interviewees considered the progress of the project to be extremely slow.

Communication posed another identified set of challenges in the development project. According to the interviewees, there was a lack of information regarding the overall process of the project. Many interviewees pointed out that although comments were requested at short notice, no one knew how the information was utilized and contributed to the development work. In some pilots, healthcare professionals could not test the service as planned, because of delays and/or problems in technical development that the service providers were not informed of. In addition, communication challenges between different professional groups were identified; professionals in social and healthcare services had difficulties understanding the technical developers and vice versa. Communication occurred mainly via digital channels, and some interviewees would have preferred face-to-face communication to avoid misunderstandings. The project utilizes various digital communication channels (e.g., chat, Google Sheet, Slack, Rocket), which increased the confusion among pilot members.

The overall structure of the development project caused another set of challenges. The project initially included 38 different pilots altogether, which entailed separate development work and creating a pilot environment for each pilot. Moreover, many pilots concerned similar services or service processes. This was not seen as the most reasonable way of developing the service. It would have been more practical to do the development work in groups of pilots focusing on similar services (e.g., symptom assessment). During the investigation period, the project office did in fact recognize this issue and re-organized the pilots into six groups to facilitate knowledge sharing and improve coordination between the pilots. The interviewees from the service provider also pointed out that the project office coordinated the development work and acted as intermediary between service providers and technical developers in the digital transformation company. However, the interviewees wished for more direct face-to-face communication and co-operation with the technical developers, for example in the form of workshops so as to avoid misunderstandings and delays in the project. Some interviewees were concerned about the role of end-users/citizens in the development work. According to them, citizens should have been engaged at the beginning of the project in order to map out service needs and to assess whether digital services would be able to fulfill those needs in the first place.

In activity system terminology, the main contradictions in the interacting activity systems were concentrated on division of labor, object, and instruments. The activity system elements articulated by the interviewees are summarized in Table 3, after which the contradictions are presented in more detail.

Table 3. Articulated activity system elements in three interacting activity systems.

Activity system elements	Observed application of activity system elements in three interacting activity systems
Subject	Scrum Master in digital transformation company, Product Owner in Project Office, Project Managers and Process Owners in social welfare and healthcare service provider
Rules	Lean philosophy
Community	Not articulated
Division of labor	2-week software development sprints, scheduling of development tasks 6-8 weeks in advance for service provider, lack of coordination between pilots
Instruments	Google Drive, Google Sheet, chat, Slack, Rocket
Object	Project plan, Sprint plan, Product Backlog, Sprint Backlog
Outcome	Easy-to-use information system, adopted nationwide

Division of labor was perceived as a contradiction by all parties. One central issue was that software was developed in two-week sprints following Scrum [44]; however, the service providers needed to know the scheduling of development and testing tasks for its staff 6-8 weeks in advance, which is clearly in contradiction with Scrum and agile software development. Another central issue was the fact that several similar pilots were carried out in different cities with minimal coordination and knowledge sharing in between. Grouping the 38 distinct pilots into six groups of pilots (across city boundaries) was one solution to this issue.

Object, especially concerning the project plan and sprint plan, was perceived as contradictory by both the service provider and the digital transformation company. Sprints are time-boxed events, where the work in the Sprint Backlog is not a commitment, but rather a forecast, whereas, in traditional plan-driven software development, the goal is to deliver exactly what was planned within the time promised. When there is a need for the service provider to know the schedule 6-8 weeks in advance, there is an obvious challenge in incorporating agile software development principles.

Instruments were perceived as a contradiction by the service providers, who were somewhat unused to

the digital channels and were confused by the role of each tool. This contradiction was not shared by the digital transformation company, or the project office.

6. Discussion and conclusions

In this paper, the activity theory framework was applied to identify the potential contradictions arising from the differences between public and private sector organizations. It is important to identify these kinds of contradictions in order either to avoid them or, at best, to turn them into opportunities for co-learning and successful change. For the purposes of the research, a case study representing public-private cooperation in digital service development in the social welfare and healthcare service sector was carried out. The study first reviewed known differences between public and private sector digital service development based on the literature and then introduced the activity theory as a framework for identifying potential contradictions between the activity systems of private and public sector organizations.

One of the key findings from the case study is that the development work not only envisages the design and deployment of digital services, but focuses specifically on the development of operating processes by following Lean principles. Thus, in this case study, the software development process did not follow the traditional approach to developing public sector information systems where a new digital service is first introduced and then it is seen what can be done with it (if anything). Conversely, in the case study at hand, the activity was first developed and then a suitable digital service was designed. By following this kind of Lean development principle, the value-added processes are already visible in the form of smooth, customer-friendly, and more efficient processes.

The potential contradictions within the case study activity system were then identified through the lens of activity theory. Each identified contradiction in turn can be considered a trigger for change that can lead to expansive learning in the development and implementation of new government digital services.

The identified contradictions were related to: scheduling related to the **object** of the activity system; communication and communication tools related to the **instruments** of the activity system; and structure and **division of labor** of the development project.

Finally, the following case-specific and likely transferable learnings in the development of government digital services in social welfare and healthcare involving multiple private and public sector organizations were identified:

First, when agile development is new and there is no previous experience of similar projects, there has to be a building of common ground between the parties. Similarly, as with Lean principles, there is a need to understand at a practical level what is required in order for the agile development to be successful and how it is different from the traditional plan-driven methods (previous experiences and mental models).

Agile, denoting the quality of being agile, being ready for motion, and dexterity in motion [17] gives a hint that if things do not go as planned, e.g., there is a delay in commencement of testing due to a feature not being ready as forecasted, you do not have to stop and put your hands up–instead you think of what else you can do, what could move the project forward.

The public sector may be, and often is, lacking in dedicated development resources [14], which can create inflexibilities in agile development, some of which could be overcome by e.g., pooling public sector experts across city boundaries.

The best practice instruments for industry and the private sector may not be the same for the public sector. Especially in the area of software testing, there may be a need for more alternatives and, on the other hand, simpler tools to use, which do not require the user to have an extensive technical background. Large government digital service development projects could benefit from performing experiments and creating good practices of instrument use in public-private cooperation.

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