

# Challenges of organizing across multiple boundaries: an activity theoretical approach to understanding the articulation of patient trajectories in child habilitation

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**Abstract.** Based on preliminary investigations into the complexities surrounding a child habilitation centre, this paper employs Strauss' concepts of patient trajectories and articulation work in order to create a better understanding of what kind of work is going on in the interfaces between functionally juxtaposed health care institutions. 3<sup>rd</sup> generation activity theory is then used to place this into a systemic framework, and to suggest a possible approach towards providing computerized support for this highly collaborative work. Articulation of activities between activity systems is suggested as a new layer in the hierarchy of articulation work, needed to understand the organization of cross institutional collaboration.

## 1. Introduction

In this paper I choose to regard patient trajectories as the shared objects in the collaboration between diverse health care practitioners in a common goal towards the better of patients and their families. But the *concept* of patient trajectories is abstract and the actual trajectories are unknown until *after* they have unfolded. They are situated, often in multiple contexts. As such they also become

distributed. In order to support coordination and exchange of information and knowledge across the boundaries surrounding such trajectories, representations of the trajectories are needed in order to make them more tangible. Patient records and other material tools are examples of such representations. However, many of these are limited by their physical constraints, especially by their nature of only being available at one location at a time and taking time to travel between locations. ICT provides alternative methods for the materialization of such representations, allowing for dispersed and simultaneous access, thus overcoming some of the limitations of more traditional media. The introduction of electronic health records exemplifies an attempt to exploit this.

In this paper I intend to deploy activity theory in an exploration of the opportunities and challenges present when considering the development of ICT support for collaboration within the context of child habilitation. A research report from a similar context in another Norwegian region recommends the introduction of ICT for coordination and exchange of information and knowledge (Vestlandsforskning 2006, p. 11). The multiple boundaries embedded in the context is characteristic of its complexity, thus simultaneously emphasizing the need for such support and complicating the development of working solutions, illustrating the fact that the more it is needed the harder it might be to provide it.

The theoretical aim of the paper is to find out how activity theory can be used to analyze and describe the complexities of the case related to the boundary crossing nature of inter organizational patient trajectories. The empirical aim is to create a better understanding of these complexities. The latter would be an important first step in any effort to create computer support for collaborative work in the context of organizing child habilitation.

In section 2 I briefly present activity theory as an approach to understand the *context* of this work as well as Strauss' concepts of trajectories and articulation work as an approach to understand the *nature* of this work. After presenting the case and my approach in section 3 and 4, these concepts are applied in the analysis in section 5. Section 6 is a discussion on how this contributes to the studies within this field.

## 2. Central concepts: Activity systems and Trajectories

This is a brief presentation of the theoretical concepts applied in the analysis and discussion. The first three has been developed within Cultural historical activity theory (CHAT), while the last two are developed by Anselm Strauss.

### 2.1 CHAT: Activity systems, shared objects and boundaries

Cultural historical activity theory (CHAT) seems to be gaining an increasing interest in various forms of cross organizational activities (Engeström 2006.

Engeström and Kerosuo 2007). As 3<sup>rd</sup> generation CHAT regards two or more interacting activity systems as its minimum unit of analysis, this development comes as no surprise. The notion of shared objects is used to explain why different activity systems choose to interact, and indentifying these objects is therefore an essential part of understanding the interaction. While objects within CHAT relates to an activity system’s raison d’être, shared objects relates to the very reason for – or objective of – interaction between activity systems. It is the shared object that motivates the activity systems’ attempt to cross the boundaries that separate them. This is depicted as Object<sub>3</sub> in figure 1.

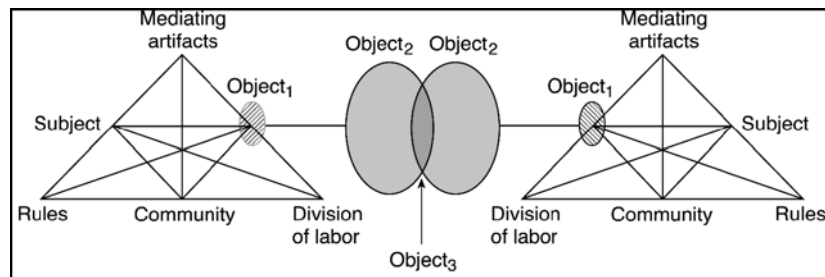


Figure 1. Two interacting activity systems as minimal model for the third generation of activity theory (Engeström 2001, p.136).

Engeström’s model is an elaboration of Vygotsky’s model of mediated action, claiming that all human interaction is mediated by cultural artifacts – material and non material tools or instruments embedding human knowledge (Säljö, 2001, p.83). 2<sup>nd</sup> generation activity theory introduced the concept of activity systems, thus emphasizing the social nature of action; activities are carried out in communities, according to certain rules and with a division of labor. 3<sup>rd</sup> generation CHAT has taken this even further by making the interaction between multiple activity systems its unit of analysis (Engeström 2001, 136). While the shared objects push the activity systems towards one another, the boundaries between them pull them apart – or at least keep them separated. In this tension we can find the contradictions that, according to Engeström, have the potential to fuel expansive learning and thus enable boundary crossing (2001). Identifying these boundaries is therefore equally important as identifying the shared objects. Kerosuo defines boundaries as “established distinctions and differences between and within activity systems that are created and agreed on by groups and individual actors during a long period of time while they are involved in those activities” (2006, p.4).

## 2.2 Strauss: Patient trajectories and articulation work

As mentioned in the introduction, I choose to see the patient trajectories as the shared objects in my case. The concept of (patient/illness) trajectory is an analytical tool that refers to “... the total organization of work done over [the

unfolding of a patients disease], plus the impact on those involved with that work and its organization” (Strauss et al. 1997, p.8). While any isolated action performed by any given actor often can be achieved regardless of other actors, the trajectory as such can not be created by any single actor. Rather it is the joint efforts of all involved actors that finally make up the trajectory.

“Because of this interdependence, any cooperative effort thus involves a number of secondary activities of mediating and controlling these cooperative relationships. Tasks have to be allocated to different members of the cooperative work arrangement: which worker is to do what, where, when? And in assigning a task to a worker, that worker is then rendered accountable for accomplishing that task according to certain criteria: when, where, how, how soon, what level of quality, etc.” (Schmidt and Bannon 1992, p.8).

Strauss’ concepts of primary and articulation work allow us to distinguish between different kinds of activities influencing the trajectories. “A trajectory is both the course of action as it evolves over time and the actions and interactions contributing to its evolution” (Fitzpatrick et al. 1995, p.4). Primary activities involved in a trajectory are normally determined by the responsible actors’ roles and professional backgrounds. But there is also a set of secondary activities necessary to coordinate the trajectory. These activities are conceptualized by Strauss as articulation work (Strauss et al. 1997). It is the concept of trajectory that makes this work visible, thus offering us an opportunity to study it and its implications. According to Strauss, articulation work is what makes it possible to “... assure that the staff’s collective efforts add up to more than discrete and conflicting bits of accomplished work” (ibid, p.151). While the trajectory is *post priori* – it is only known until the point it has already unfolded – the projected trajectory is *a priori* – it is the trajectory as planned according to scheme (ibid, p.20), but not yet realized. As such the trajectories involve different kinds of articulation work: planned/explicit and situated/implicit (Fjuk et al. 1997, p.5). While the former might be fairly predictable, the latter is typically more characterized by improvisations and ad hoc solutions.

Fjuk et al. elaborate further on types of articulation work by introducing an activity theoretical concept. While an activity is what defines and constitutes an activity system, the activity can be broken down into actions and the actions can be broken further down into operations (1997, p.8, 10). Fjuk et al. use this hierarchy to distinguish between “Articulation of actions within an activity and articulation of operations within an action” (ibid, p.10). By doing this, they take a necessary step in order to bring the concept of articulation work from the ethnographical studies of local work practices into the domain of activity theory and activity systems, at the same time shifting the focus from individual to collective activities.

### 3. Approaching the Child Habilitation Center

Looking for a case to study cross-organizational patient trajectories, I was guided to the Child Habilitation Centre (CHC) by a pediatrician I knew from a previous project. A phone call to the person he recommended me to contact resulted in an informal meeting between the two of us at the centre. During this she drew a vivid picture of the centre, their clients and affiliate organizations, as well as of the challenges they were facing in providing the kind of integrated service they would like to. Such a picture will of course not be exhaustive, but it never the less convinced me that this was a case worth while to pursue. After presenting my own interests and possible contributions, we agreed to do some thinking on our own and get back together at a later point.

This conversation, supplemented by the centers home pages on the web, a research report from a similar setting and the national strategy plan for electronic interaction in the health sector, constitutes my data at the moment. As such this can only be considered a preliminary probe of the field.

After presenting the case, I apply the theoretical concepts from the previous section in an attempt to explore and identify some key aspects derived from this limited amount of data. As the analysis is based on the assumption that the patient trajectories *can* be placed in the role as shared objects, I use this to identify the different activity systems and the boundaries separating them, as well a ‘generic topology’ of the patient trajectories. The result of this is used to theorize about the mediation of interaction between the activity systems and about what kind of work ICT mediation would have to support in this context. Finally, I propose an expansion of the current conceptualization of articulation work in a CHAT perspective, in order to increase the usefulness of deploying activity theory to the case (and maybe similar cases).

### 4. The case of child habilitation

While adult rehabilitation is about returning the patient to a previous state, child habilitation is about compensating for a lack in the patients’ natural development. Habilitation is a lifelong process, and until the patients are 18 years old, the overall responsibility for this process lies with the Child Habilitation Center described below. But as I intend to illustrate, there are many other actors involved in the patient trajectories. The following case description illustrates issues such as *multiplicity, heterogeneity and decentralization* as aspects of the complexities of the case.

## 4.1 Actors I: The care givers

The CHC is a part of Ullevål University Hospital (UUH), one of the major hospitals sorting under the South-Eastern Norway Regional Health Authority. UUH serves as the local hospital for the residents of Oslo, the capital of Norway, with a population of app. 550.000. While the CHC provides specialist services to children in need of habilitation and their families, the operative responsibility lies with the patient's local district municipal services. Oslo is divided into 15 such local district municipalities, only loosely connected through the City Government. Each municipality has its own political organs, as well as the responsibility for local budgeting. It is therefore up to the local districts how to organize their public services, as long as they comply with the general directives from central authorities.

The CHC is in a close relationship to Rikshospitalet University Hospital (RH - the National Hospital), which serves as a 3<sup>rd</sup> and 4<sup>th</sup> line service provider for their patients. In addition the CHC buys services from three independent care institutions. As the 'hub' in this network of distributed actors, the main responsibility for managing this falls upon the CHC.

A patient's trajectory through child habilitation is normally initiated by a referral from the patient's primary care services. But this includes several possible points of departure. An open letter from the CHC – providing guidelines for referrals – is addressed to this diverse list of actors and institutions:

- Head community doctors.
- Head community nurses.
- Local municipal habilitation teams.
- Ergo- and physiotherapy services.
- Pedagogical competence centers (PCC).
- Pedagogical-psychological services (PSS).
- Child- and adolescent psychiatry.

The center itself employ's a range of different professional specialties. At the time of writing, there are 4.5 physicians, 5.5 psychologists, 5 physiotherapists, 3 special educators, 3 nurses, 3 social workers and 1 nutrition specialist working within the CHC. Adding to this is the professional diversity among the external actors as well. Service providers in the district municipalities include primary physicians, community nurses, physiotherapists, ergo therapists, teachers, social workers and various other professional specializations relevant to child habilitation; all dispersed over the range of local institutional configurations.

## 4.2 Actors II: The care receivers

The above mentioned letter illustrates the diversity of different conditions the CHC relates to by defining its target group as

“Children with neurological deviations, i.e. children with evident delays, arrests or reversals in their development of motorical, sensory or intellectual abilities. Also increased/decreased muscle tonus and asymmetries that persists despite taken measures. The primary conditions are multiple disabilities, cerebral pareses, muscle diseases, early contact disabilities/autism, and psychological disabilities without a causal diagnose. Further children with unclarified syndromes, and secondary conditions after considerable prematurity/dysmaturity, head injuries or neural infections” (CHC 2008).

Bringing the patients and their families into the picture also adds another dimension. As for people in need of health care services in general, there are no other common denominators than the fact that they are in need of health care services. This is a source of diversity. In addition to this, the CHC treats a range of different diagnoses and it not only has to relate to the patients, but to their families as well, in a more salient way than within adult health care. To top this off, 55 percent of the center’s clients are families with non-western cultural backgrounds. In addition to the linguistic difficulties this creates, many of these families’ interpretations of their children’s trajectories, according to my informant, bear different meanings than those of families with Norwegian ethnicity.

### 4.3 Activities

The centre it self does evaluations, provides treatments and training, gives recommendations and may also refer the patient to other institutions, like RH or one of the three independent institutions. Recommendations, information and knowledge need to travel back to the different actors in primary healthcare, responsible for the patient in between any periods of institutional admissions. So at this point the trajectory can spur off in many different directions simultaneously. In addition to this, local actors (within primary care) can choose to involve other service providers as well, thus creating multiple hops in single branches of the trajectory. Ensuring that the patients and their families experience all this as a coherent and consistent service is emphasized by my informant as more challenging than for more linear trajectories. As illustrated in figure 2, this picture resembles a mesh or a web more than the linear chains of care described by Lindberg and Czarniawska (2006, p.298).

While the CHC is defined as a 2<sup>nd</sup> line service in the public health care system, RH provides more specialized services, defined as 3<sup>rd</sup> and 4<sup>th</sup> line. One example of this is the hospital’s Centre for Rare Syndromes, specialized in diagnosing and providing the medical treatment for certain conditions relevant to the CHC’s patients. 1<sup>st</sup> line services – at municipal level – includes activities such as follow-ups by primary physician, training programs by local physiotherapists, provision of special equipment by local ergo therapists and special education programs by pedagogical recourses (both from the schools and the resource centers (PCC & PSS)). As mentioned previously, this is the level where the operational

responsibility lies, and as such, the every day care is provided. As each municipal can have different local configurations of their 1<sup>st</sup> line services, the “real” picture is even messier than figure 2 depicts.

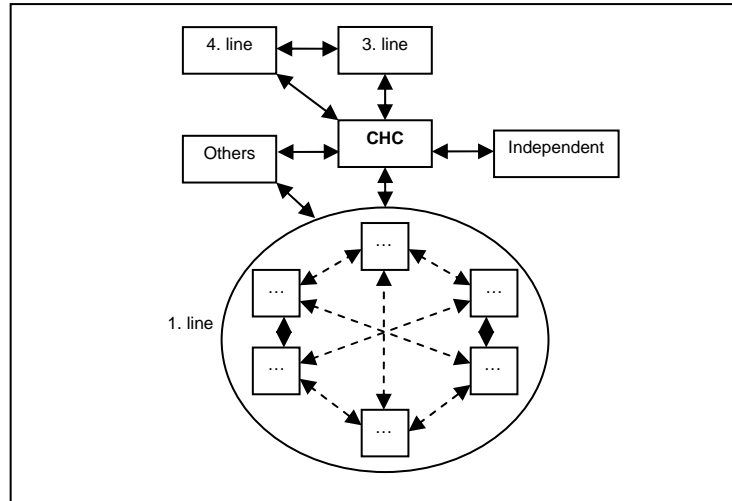


Figure 2. Trajectory hops in our messy mesh.

Today, there is no ICT support in the coordination of these activities between the CHC and the other actors (apart from telephone and fax). Instead this is achieved through mail and face to face communications. Some professional specialties have ICT support, in the form of stand alone, desk top applications, but there is currently no groupware in use at the centre. According to my informant at the center, the current solution is not working the way they would like it to, and the patient families are complaining about lack of coherence and consistency in the sum of services provided.

The center has initiated two projects, partly to address this. One is called the Patient Loop (Pasientsløyfen), where the center intends to take a more centralized role in controlling and coordinating the flow of referrals. The second is called the Family Guide (Familieveilederen), aimed at coordinating and unifying the flow of information from the health care services to the patient families during their trajectories, as a sort of ‘traveler’s guide to public healthcare’.

## 5. Identifying boundaries and shared objects

As stated in section 2, the shared object is what motivates the activity systems’ attempt to cross the boundaries that separate them. This analysis first identifies the boundaries of the case, then the impact these boundaries have on the shared object. Finally it identifies some challenges this poses in a CSCW perspective.

## 5.1 The boundaries

The composition of organizational boundaries, professional boundaries and cultural boundaries described in the previous section provides an illustration of the high level of complexity and the potential for contextual messiness of the case. As these boundaries are what separate the activity systems, it is necessary to look at what they are and how they affect the patient trajectories.

**Organizational boundaries.** Differences in local municipal configurations caters for variations in how the CHC can interface with the different local service providers, thus reducing the ability to draw on standardized procedures and previous experience in the effort to provide coherent and consistent services to the children and their families. The center's responsibility for bridging between primary and higher level care services, as well as other service providers, adds to the organizational boundaries it must manage to organize across. These different organizational boundaries contribute to the distributed and decentralized nature of the patient trajectories.

**Professional and disciplinary boundaries.** The diversity in patient conditions, as well as the uncertainty related to several of them, accounts for some of the explanation as to why there are so many potential points of departure for their trajectories. Different conditions are likely to be picked up and acted upon by different professional groups among the local municipal actors. The diverse professional composition of center employees, as well as of the external service providers, adds to the professional boundaries. This is likely to make it less possible to rely on the standardization of skills we, according to Mintzberg, would find to be the prime coordinating mechanism within more homogeneously composed hospital units (Mintzberg 1989, p.101). This assumption is confirmed by my informant within the centre. These different professional and disciplinary boundaries contribute to the heterogeneous and diverse nature of the patient trajectories.

**Cultural boundaries.** The diversity among the patients' cultural backgrounds also puts strain on existing routines for exchange of information and knowledge between caregivers and care receivers. Failing to deal with such cultural boundaries are likely to complicate negotiations for the dyadic identity identified by Coeling et al. (2003) as a central hygiene<sup>1</sup> factor for the care process. Considering the longtime relationships involved in child habilitation, this process is likely to be even more important compared to patients who only have brief encounters with the health care system. These cultural boundaries also contribute to the heterogeneous and diverse nature of the patient trajectories.

In section 4.2 I described the patients and their families as care receivers. But for many of these patients, a lot of the care is given at home by their families.

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<sup>1</sup> In his two factor theory, Fredrick Herzberg (1959) defines hygiene factors as factors that, if absent or inadequate, cause dissatisfaction, but their presence has little effect on long-term satisfaction.

This blurs the distinction between care giving and care receiving, as well as the object of their activity system. Is it care giving or care receiving? This, as well as the diversity of boundaries can make it unclear which activity system any given actor belongs to, and as such, what their object is. As a matter of fact, we can see that actors can belong to several activity systems, with potentially different objects. A doctor can be employed at the CHC, and thus be involved in its activities related to the object of child habilitation. But he is also member of a strong professional community, representing a different system with different objects. What we therefore need to focus on in the context of this paper, is the identification of a *shared* object. The different boundaries separate the activity systems. What brings them together? What is the object they all work on?

## 5.2 The shared object

The described complexities do not necessarily have a great impact on the various parts of the primary work related to the patient trajectories. Examinations and treatments are likely to be conducted pretty much as they would in any case, at least as long as the necessary information is made available in the right place and at the right time. But making that information available in the right place at the right time can be severely complicated by the complexities of the case. The same goes for other parts of the articulation work involved in making the trajectories happen, and especially the activities aimed at giving the patients and their families an experience of coherent and consistent trajectories. The growing relative importance of this aim is reflected also in the public discourse and in the policy documents giving directions for electronic interaction within the sector. The concept of seamless trajectories has been introduced and put on the agenda. Continuity of care for patients is the proclaimed vision of the health ministry's national ICT strategy for 2004-2007: "The concept 'continuity of patient care' places emphasis on coordination and continuity in provision of services and preventive care" (SHDIR 2005, p.5). The first priority in achieving this is improved flow of information while the second priority is electronic interaction with new actors (p. 10, 18), both related to the support of articulation work.

In a CSCW perspective this implies that any initiative should be aimed at supporting the articulation work involved in the patient trajectories. As mentioned previously, Fjuk et al. distinguish between planned/explicit and situated/implicit, as well as between articulation of actions within activities and articulation of operations within actions (see section 2). What they don't seem to do, however, is to take into consideration that 3<sup>rd</sup> generation CHAT sees two interacting activity systems as the minimum unit of analysis. Taking this into consideration reveals a third level of articulation work, not mentioned by Fjuk et al.: *the articulation of activities between activity systems*. By adding this level to their taxonomy, we can create a priority schema for a CSCW system that is aiming at supporting the

boundary crossing articulation work in the context of child habilitation. This is illustrated by the matrix in table 1.

Should support articulation of	Activities between activity systems	Actions within activities	Operations within actions
Planned/explicit	High	Mid	Low
Situated/implicit	High	Mid	Low

Table I. Levels of articulation work to be supported.

Moving from low to high, the number of boundaries to be crossed increase, and as such the complexity, at the same time decreasing the opportunity to rely on less formal coordinating mechanisms. The articulation of operations within actions normally takes place locally, among people who interact on a regular basis. The articulation of activities between activity systems does not. This work is more likely to be divided among actors who less frequently experience the interdependencies the articulation of the patient trajectories create.

While most groupware solutions aim at supporting primary work and the articulation of operations within actions, the focus in this case is on supporting the articulation of actions within activities and activities between activity systems. Somewhat simplified this is about the division of labor and the coordination of efforts across the boundaries between the activity systems depicted in figure 2 (articulation of activities between activity systems) as well as across the boundaries found within each activity system (articulation of actions within activities). This includes organizational, professional and cultural boundaries. As the articulation of activities between activity systems must deal with all three types of boundaries, this is clearly the most complex and challenging task to support. Articulation of actions within activities primarily needs to handle professional boundaries, like for instance the division of labor and coordination of efforts between the different professions present within the CHC it self.

## 6. Discussion – organizational interfaces

Some implications for the study of inter-organizational articulation work can be derived from the above analysis. The first argument is related to the identification of shared objects. The second is related to the mediation of (inter)actions between activity systems. Both are related to the inter-organizational interfaces.

## 6.1 Patient trajectories as shared objects

There are several advantages to choosing Strauss' concept of trajectory as the object of study. Firstly it opens up both a spatial and a temporal dimension; Trajectories unveil over time, and often includes movements between many different locations. As something being created or constructed, the trajectory also opens up for seeing the multitude of actors and actions involved in shaping it. Another advantage of making the trajectory our shared object is that it makes the interdependencies of care giving more visible.

Lindberg and Czarniawska choose to place the patients themselves in the role as (boundary) objects between interacting organizations in public healthcare (2006). Anticipating opposition to this stance they argue that "patients are in fact "objects of care'" (p.298). This is of course true, but it also puts some unfortunate constraints on the study of healthcare in some contexts. As Strauss points out, the patients and their families are in fact active participants in the processes related to public healthcare (1985, p.8, 12. 1997, p.9). In a CHAT perspective they thus constitute one of the activity systems we need to take into consideration. But in this perspective, no subject can be its own object, and from this simple principle the need to identify an alternative shared object emerges. Another limitation of Lindberg and Czarniawska's choice is that the notion of *patient* is not particularly precise – rather it is likely to be a very ambiguous notion when we study the interacting activity systems as an intervened whole. This is not a problem for the concept of boundary objects, which by definition has to be vague enough to allow for plasticity and multiple interpretations (Star and Griesemer 1989, p.393). But as a shared object we need to identify something more specific – something that is actually shared by the interacting activity systems. For the case of child habilitation, the patient trajectory seems to serve this function. Conceptually enforced by external factors such as those mentioned in section 5 – practically manifested by the individual trajectories the various actors take part in shaping. While the patient trajectory addresses the *why* related to inter organizational boundary crossing, we have to look elsewhere to address the *how*. I therefore return to the concept of mediation.

## 6.2 Functional organs

Returning to Vygotsky's claim that all human (inter)action is mediated by cultural artifacts, the technological support of articulation work becomes a highly interesting subject within CSCW. This issue is addressed by Schmidt and Bannon when they claim that the support of articulation work is what the field of CSCW should focus on (1992). But the case of child habilitation illustrates the need for concepts that can be used to understand the articulation work related to the *inter-organizational* composition of patient trajectories. *Functional organs* might represent one such concept

With the CHAT concept of functional organs, Kaptelinin and Nardi (2006, p.64) help us to shed light on some factors that can trigger breakdowns, expansive learning and the introduction of new technology to support articulation work. The interface between interacting activity systems [their boundaries] is, according to Kaptelinin, the place to look for functional organs. But a functional organ is not merely a tool; it also includes the actors' knowledge of the tool and of the context it is being deployed in. As such, the concept of a functional organ captures elements from most entities in the CHAT model depicted in figure 1. Thus the concept can resolve the problem of mediation that emerges from the model in figure 1. While the artifacts at the top of the triangles mediate the (inter)action *within* each activity system, the model does not explicitly provide insights into the mediation between activity systems. The only thing we can find in the interface *between* activity systems in this model is the object. But the object is not the mediator. Introducing the concept of functional organs offers a tool to further investigate this mediation. In the case of the CHC it then becomes tempting to claim that the existing functional organs are about to seize to function. Thus the need for new functional organs arises, opening up for the introduction of computerized support of these juxtaposed activity system's collaborative work.

## 7. Conclusions

Using 3<sup>rd</sup> generation activity theory in the analysis of the case of child habilitation has enabled the identification of multiple activity systems, as well as the *organizational, professional, disciplinary and cultural boundaries* that separates them. Identifying the shared object provides insights into *why* they interact and *what* their interaction evolves around, while the concept of functional organs provides insights into *how* they can be able to interact. Combined with Strauss concept of articulation work, this provides an initial understanding that can be useful in considering what kind of work a CSCW system potentially could or should support. But in order to do this it was necessary to add a layer to the concept of articulation work – that of *articulating activities between activity systems*. As for the case of organizing child habilitation, further field studies will be necessary in order to explore the factual usefulness of computerized support of collaborative articulation work in this context.

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