

# Adversarial Collaboration through Shared Representations

Pär-Ola Zander  
Department of Computer Science  
Aarhus University  
*poz@cs.au.dk*

Ellen Christiansen  
Department of Communication and Psychology  
Aalborg University  
*ech@hum.aau.dk*

**Abstract.** This paper is about adversarial collaboration through shared representation, and its empirical basis is data from citizens and their interaction with local government. The eGov+ research project deals with the design of service applications that support the collaboration between municipal caseworkers and citizens applying for some sort of benefit or permission using the Internet to a great extent.. By analyzing the case and drawing on literature about adversarial collaboration, we present a tentative design framework. This framework presents the key dimensions to consider when a designer is aware that the users are likely to collaborate adversarially, mediated by one or several shared representations.

## 1 Introduction

An influential stakeholder in the Danish IT industry advocates that Danish IT services should be handled with one common interface for citizens and case workers (KL 2006), i.e. all representations of cases should be shared. The first author of this paper has argued elsewhere that this is naive in some cases

(Borchorst et al 2009). However, when citizens get advice or discuss a specific case, it seems useful that the caseworker and the citizen can see the same shared representation of the case in question. It may, for instance, be a timeline that summarizes all events in a complex case with multiple hand-ins, payments from the municipality and with several actors.

The eGov+ research project deals with the design of service applications that support the collaboration between municipal caseworkers and citizens applying for some sort of benefit or permission using the Internet to a great extent.. As a first step to understand this problem area, we tried to see a specific "service" as an activity comprising operations, necessary tasks and the overall motivating goal. It turns out that as well the skill involved as the motivation, and semantics of the activity is different for the case handler and the citizen. This difference has been explained in an activity theory (e.g. Leontiev 1978) as adhering from the difference between means and ends: for the case worker the handling is the means to get the case out of the way, making 'getting out of the way' the whole point, while for the citizen the handling and the handler is an obstacle/helper on the way to the goal, which is the solution to the case. Somewhat like in trading, where the seller wants to get on to the next customer, while the customer only want this one product.

In our trying to describe casework as an encounter between two activities, we found it impossible to describe casework in one coherent narrative. This is, however, what becomes point of departure, when for example a citizen wants information about rules and regulations for maternity leave, or a permission to build a carport. The caseworker knows the requirements for making a decision, but do not know the background on which the citizen makes her request. Both parties would when be talking in general terms be able to agree that "service" is when the closure feels good for both parties, while the moment of truth for each of them is whether they get the leave/permit or whether the case is closed respectively. The case handler is rewarded for keeping to the rules and for being efficient. The citizen may interpret the request metaphorically as going to a shop to buy. Both are guided by self-interest, and this colours their experience. Consequently, their view on "service" differs, although seldom spoken out loud. Seen from the point of view of the case handler the motive is "help to meet requirements". From the point of view of the citizen is efficient delivery of benefit or permit, integrated into his everyday life. So, representations may in some instances be shared, but the total object an actor manipulates stretches beyond the digital representation and into physical reality and into the life world of the actors – none of which are shared. However, we still call it collaboration in a CSCW design context.

In this paper we suggest 'adversarial collaboration' as a more adequate term, which we will outline in this section. We define collaboration here as a set of

actions (Leontiev 1978) which are systematically interconnected, and which shape each other in terms of content, form and outcome.

The attempt to understand the case worker-citizen relationship as a common activity with shared object, and the difficulty of doing so, has made us suggest to reframe the user relationship as one of 'adversarial collaboration' (Cohen et al, 2000). They define adversarial collaboration as "Situations in which the co-authors of a document have widely divergent goals yet must collaborate in order to co-author a document" (ibid, p. 31). Here we interpret "document" very broadly, as almost any piece of persistent inscription. Not all collaboration is adversarial; only when actors have diverging goals, or diverging motives which will eventually influence the goals and norms along the collaboration process (deMoor & Weigand 2004). A use situation can be seen as a system of activities, where each activity assumes some process with a continuous outcome (e.g. a flow of readymade products or customized products) (Engeström 1990). Therefore, a case-worker-citizen collaboration over a given application belongs to different activities. In the caseworker's case, he is involved in a collective activity with other case workers, where a filed case is just a part of his stream of cases. For the citizen, the application is only a small task in the activity of raising a child.

Cohen et al deal with situations, where the adversarial nature of collaboration is completely explicit. We show how sometimes collaboration is tacitly adversarial, and that this can suddenly emerge in checkpoints and make collaboration break down. By this we hope to expand the present state of knowledge concerning adversarial collaboration.

Consequently, in this paper we present a list of adversarial collaboration dimensions derived from literature and illustrated the by eGov+ cases. The aim is to formulate the dimensions in such a way that the attention leads to a system with higher usefulness. We discuss possible alternatives and dimensions of the design space we have been operated within. Although it would also be possible to understand the user-designer as adversaries to some extent, our analysis focuses on adversarial collaboration between users and user groups. We do not expect to be able to find a formula for how all adversarial collaboration in eGovernance should be designed – that is a task that is much larger than the scope of this paper, and perhaps CSCW is too situated and applied and situated in a way that it would be an attempt of overreach.

## 2 Method

We have employed an iteration between literature and empirical material. Initially we used an activity-theoretical lens to understand the services in the eGovernance systems. We realized that adversarial collaboration was important in order to understand our problem (and came up with dimension X and Y). We made a literature study on all CSCW literature on adversarial collaboration, and identified

the rest of the dimensions. Finally, we revisited our case to illustrate the framework.

### 3 The Proposed Framework

Our purpose as designers of interfaces to this kind of applications is to make the social theory help us identify some checkpoints or dimensions at a design phase or iteration. The checkpoints may be possible to generalize across a number of e-government applications with shared representations such as divorcing, legal disagreements, ombudsman conflicts, right of access to documents, parental leave, getting a new passport, etc.

Consequently, the framework, shown in Table I below, expresses dimensions for the design space of adversarial collaboration in shared representations. What is the design space? We do not conceive it as the visual aspects of the representation only. Here we adhere to a relationist stance; it is more interesting to study the relations than independent entities (see e.g. Ritzer & Gindoff 1992 for an elaboration). We delimit this work to what is only directly related to the shared representation. Things that are indirectly related are beyond the unit of study (for instance it would be interesting as a designer to know the history of the adversary in his use case, but that is delimited in [this study](#)). The dimensions are only related to adversariality, not *merely* collaboration or shared representations in general.

Table I. A framework that describes key dimensions of adversarial collaboration mediated by shared representations.

<b>Dimension</b>	<b>Source</b>
Shared Motive-diverging Motive	(deMoor & Weigand 2004)
Shared goals - Diverging goals	(deMoor & Weigand 2004, Cohen et al 2000)
One activity - cross activity	Activity Theory analysis
Explicit adversaries - tacit adversaries	Gap in literature
Harmonization or acknowledgement of adversarialness	Activity Theory analysis
Alone versus Together	Bohøj et al 2010
Contract or sandbox	Bohøj et al 2010
Record keeping or planning functionality	Bohøj et al 2010
What others have done as authoritative road or for inspiration	Bohøj et al 2010
Open or closed information space	Bohøj et al 2010

The dimensions which the designer could use to conceptualize his design space with are listed to the left in the table. To the right are the sources from where we

derived the dimensions. We will now briefly describe the dimensions, and in the following section they will be exemplified.

The first dimension is the **motive** – do the adversaries have an identical motive or are they different? The motive should not only be thought of as the concrete output, but also in the context of needs and subjectivity.

The next dimension is the **goals**. Independent of what motives actors have, their goals may diverge or converge. It cannot be presumed that collaboration with shared representations involve *one* object of work only.

The third dimension, **number of activities**, is more theoretically complicated. First, collaboration can take place as one activity, or over a number of activities. Matusov (1996) argues that within *one* work activity, it is misleading to see disagreement (adversarialness) as the disjoint elements of actors' motives. Rather, disagreement is the outcome of the activity. This is not necessarily true for cross-activity adversarial collaboration. The adversarial collaboration inside an activity is therefore qualitatively different from cross-activity adversarial collaboration. For instance, it is self-contradictory to harmonize the interests without changing the rest of the activity.

A common dilemma in conflict resolution is the dimension of **tacit-explicit adversions**. Should the designer invite that users are open with their disagreements with other stakeholder, in the hope that this will facilitate interaction more efficiently than if the stakeholders are navigating without declarations from their adversaries. Explicating functions can exist on at least two levels. The first is mere declarations. The second, and more advanced, is mechanisms that try to make the users be sincere in their declarations. This is clearly a dilemma; an example of where it is intuitive that it is unwise to make adversaries explicit is when the collaboration takes place under strong time pressure. Perhaps stakeholders lose time because they start to resolve an issue they strongly disagree on, but this is highly unlikely. Another example is when designers think that it is better to have an agreement that may break, than to have a solid foundation.

Another problem is harmonization or acknowledgement of adversarialness. Designers may have the ambition to remove adversarial collaboration, e.g. by insisting that adversaries reach consensus. They can also be more “hands-off”, i.e. agnostic about adversarial collaboration, perhaps they think it is inevitable in their design context. It may even be relevant to speak about pro-adversarial collaboration; where designers encourage the users to disagree and move in directions that enlarge the gap between users, because that will improve the outcomes of the process or summon some desired user experience.

Collaboration between citizens and municipality is often individualized, when the real question is if users should collaborate with municipality alone or together. For instance, applications that may require several citizens to apply for a service, e.g. parental leave in Denmark, is compartmentalized so that each citizen sends a form to the municipality, instead of a joint application. Communication can

therefore be represented in terms of one citizen to one municipality. It is not always self-evident that it is beneficial, and may be a result of legal issues and traditions rather than for supporting a service which is easy to understand or for providing information that can be used by citizens for decision-making. There seems to be a design spectrum that includes more fine-grained sharing mechanisms than “this is my case, and this is your case”.

Another important dimension is if the shared representation should represent binding but incompletely filled in contracts/agreements, be a sandbox for negotiation and proposals, or a combination. A similar dimension concerns the question of whether the functions available for manipulation of the shared representations should cover record keeping (the past states) or the future (plan ahead). In some cases, it is necessary with different historical functionalities such as history, versioning, rollback, etc. In other cases, it is more interesting to be able to see future states (extrapolating existing tendencies, have several alternative futures, etc). And finally, it may cause the interface to be cluttered to have all record/plan functions.

In eGovernance, a common use pattern is to do what others have done. Sharing templates or suggestions is a part of collaboration. The question is if and how authoritatively they should be presented, or if they only should be shown for inspirational purposes.

The last dimension concerns whether the space should be an open or closed information space. On the one extreme, all types of actors can enter data (compare a wiki with no access restrictions). On the other extreme, the information channels are sliced so that only two types of actors communicate with each other through the same representation (compare ordinary one-to-one telephony).

There are dimensions in this meta-design space that are impossible to occupy in the context of adversarial collaboration. If motive and goals are both shared, for instance, it is no longer adversarial collaboration. That is, however, not a conceptual problem.

A final remark; Quite many of them arose from one of the first author’s previous work. The first author’s paper “timeline collaboration” reports designing for collaboration with timelines. The timeline is thus a shared representation, is based in the institutional context of eGovernance, and it has adversarial elements (users act to some extent with secrecy, advocacy and discovery). A framework for that design will therefore always tentatively to apply for a more general domain; but not only timelines, but also other shared representations in graphical user interfaces.

## 4 Illustration of the framework

In this chapter, we illustrate that the framework is relevant for each dimension. We also demonstrate that the dimensions do not have a “one best way” solution

placed at a specific point of the dimension for any design, but where to place it (e.g. as an authoritative generalization or only for inspiration?) depends on the specific context of a given design task. This is true even within the relatively narrowly defined domain, (eGovernance, and shared representations).

It is important to know goals and motives for stakeholders in order to understand the design. As mentioned in the introduction, the caseworkers and citizens have **diverging motives**. During design work of a system for parental leave cases, it was not intuitive for caseworkers that citizens needed to enter e.g. when they wanted to have their children in day-care. Such information on the shared representation that was not relevant for the evaluation of the case itself when the caseworker evaluated the shared representation and compared it with her interests. But it was for the parents; a failure here would in the worst-case mean that both parents needed to work, but no day-care institution would be available for the kid. So, we may elaborate what we said in the beginning. Their goals are seemingly identical if one just looks at the final shared representation (a correct, approved case). However, their motives, which colour the criteria of the goals, differed.

We concur with deMoor and Weigand (2004) that sometimes the motives can be shared, but the goals may diverge as well in our context of shared representation. In our MobileDemocracy case, citizens comment on municipal planning using mobile phones and maps, which they annotate. The citizens may share the motives that a given village should have a positive economical development, but whereas one citizen may be prepared to put in voluntary work in order to reach this motive, others may have as their goal to pressure the municipality into realizing the same motive. Such situations are the easiest to resolve by communication over the representation; one side can realize that a strategy is inefficient, and e.g. that it is faster and more likely to be successful if some voluntary work is done (of course many situations will be more complicated; e.g. the belief that if one do voluntary work, the municipality will try to cut down resources in a local area even more).

It makes a difference between a design space where all users are engaged in the same activity and where users are in cross-activity collaboration. In what way? Within the same activity, disagreement is an aspect, not a result from comparison of motives (Matusov 1996). If we by analysing the users can ascertain that people have a shared activity, for instance among case workers in building permit admission and have shared representations, then they can be motivated to cooperate and co-construct their work (Bardram 1998). To such an activity, it make sense to provide functionality such as discussion about templates and best practices over a given shared representation, to provide organizational incentives for end-user programming, etc. If there is no dominant shared activity, the norms will diverge between activities, and a developmental project will be more

complex. It will require more careful management. So, norms and best practice facilitation are conditioned by this dimension.

In our ongoing project on MobileDemocracy, we are incorporating functions that encourage participants to give proposals that also express solutions to needs of the opponents. The idea is to remove some adversarial elements that lead to deadlocks in the political process. This also explicates the adversaries built into the stakeholders' configuration. This kind of function would not be as relevant for instance in an application for case processing. It is not practically possible for an individual caseworker to change her objectives and interests in the particular case, at least not in the case of parental leave we have studied. That would require a fundamental redesign of the organizational objectives.

The dimensions of 'alone or together', 'contract or andbox', 'record keeping or planning functionality', 'authoritative road or for inspiration', and 'open or closed space' have already been discussed in Bohøj et al (2010) and will be omitted here due to space constraints.

## 5 Discussion and Further Work

This is obviously a framework under development. What we have done above is only to illustrate that the framework highlights interesting design questions. The next step is to substantiate that the framework is relevant beyond mere illustration.

The framework presented in this paper is not per se restricted for shared representations. It is not a goal in itself to create frameworks that work only for collaboration in shared representations but not non-shared representations. What we have done in this preliminary work is to challenge it in one out of several possible empirical domains. One future research strategy is to start with a narrow empirical domain (collaboration in shared representations and in eGovernance) and then generalize it towards non-shared representations and other institutional settings. The narrowing down could have been done in other dimensions.

The condition that representations are shared, however, occupies a special place in adversarial collaboration. Although it is theoretically possible to meet only in F2F, the typical adversarial collaboration situations probably involve some shared representation, even if it is simple PDFs. They constitute the digital battlefield and are therefore important for designers of IT systems if they want to understand adversarial collaboration.

## 6 Acknowledgements

This research was supported by the strategic research council in Denmark.

## 7 References

- Bardram, J. (1998): Collaboration, coordination, and computer support – an activity theoretical approach to the design of computer supported cooperative work. PhD dissertation, University of Aarhus, Aarhus.
- Bohøj, M., Borchhorst, N., Bødker, S., Bouvin, N.-O. & Zander, P.-O. 2010: Timeline collaboration. Paper presented at CHI'10, Atlanta, United States.
- Clement, A. and Wagner, I. 1995: Fragmented Exchange: Disarticulation and the need for regionalized communication spaces. ECSCW'95. Kluwer, (1995), 33- 49.
- Cohen, A., Cash, D., & Muller, M. 2000: Designing to support adversarial collaboration. Paper presented at CSCW'00, Philadelphia.
- Borchhorst, N., Bødker, S., Zander, P.-O. 2009: The boundaries of participatory citizenship. Paper presented at ECSCW'09, Vienna.
- DeMoor, A., Weigand, H. 2004: Effective Communication in Virtual Adversarial Collaborative Communities. Paper presented at 54th Annual Conference of the International Communication Association, New Orleans.
- Engeström, Y. 1990: Learning, working and imagining – twelve studies in activity theory. Helsinki: Orienta-konsultit.
- KL. 2006: Kommunernes digitale strategi, <http://www.kl.dk> (downloaded 20100318)
- Borchhorst, N., Bødker, S. & Zander, P.-O. 2009. The boundaries of participatory citizenship. Paper presented at ECSCW'09, Vienna.
- Leontiev, A. N. 1978: Activity, consciousness and personality. Prentice-Hall, Englewood Cliffs, United States.
- Matusov, E. 1996: Intersubjectivity without agreement. In *Mind, Culture and Activity*, Vol 3:1, p. 25-45.
- Ritzer, G., Gindoff, P. 1992: Methodological relationalism: Lessons for and from social psychology. In *Social Psychology Quarterly*, Vol 55:2, p. 128-140.