Information Systems as Structure or Actor

A study of the implementation of a case processing system in an organisation

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Summary

This paper reports from an evaluation of the implementation and use of an integrated archiving and case processing system in a Norwegian municipality. The implementation and adaptation of this system was part of a strategy for reorganising the municipality from a traditional multilevel bureaucratic model towards a network oriented organisation based on two levels.

Our analysis clearly indicates that various groups in the organization enact different technology-in-use with the same system across various context and practices. At the same time, it is also revealed how these structures have influenced the characteristics of the system in the way it is being adopted and used in different parts of the organisation. The paper thus provides an illustration of how Orlikowskis extension to structuration theory offers a fruitful way of explaining the variations in how the same systems is being used across the organisation when introducing a new IT-system in a large organization. Thus, we believe that Orlikowskis notion of technology-in-practice provides a useful framework for evaluating IT implementations in organisations.

Key words: Evaluation of system use, eGovernment, technology-in-practise, theory of structuration, IS adoption,

1 Introduction

Norwegian municipalities are under strong pressure to become more effective and service-oriented. Therefore, many of them are being reorganised from a typical bureaucratic model to a two-level network oriented organisation, in which e.g. the case workers are given much more responsibility for carrying out their tasks, including doing the administrative work that were typically done by the secretaries and personnel responsible for archiving etc. Modern ICT systems play an ever more important role in such reorganisations. Typical systems that integrate archiving and case processing are provided to support task that previously were done manually.

This paper reports from a study[1] of the introduction of one such system, called *Ephorte*[2] in a middle-sized Norwegian municipality in 2001-2002. It is being used by archiving personnel, case processing personnel and managers. This system is frequently installed in number of organisation in both public and private sector, and it complies with the Norwegian standard for archiving routines. One experienced, however, that the system was not used as expected in

[1] This study is reported in the master thesis of Terje Nes: "Introduction and use of Ephorte in Lier Municipality" by Terje Nes, Department of informatics, University of Oslo, (Nes, 2003)
[2] *Ephorte* is standard software system developed by *Ergo Ephorma*, a Norwegian software house.

many parts of the organisation. The paper aims at explaining why system is not being used as anticipated, by applying Giddens' structuration theory (Giddens 1984), as extended by Orlikowski (Orlikowski 1992, 2000).

The paper is structured as follows. Chapter 2 and 3 gives the theoretical framework and the description of the methodological approach. In chapter 4 we present the empirical data, followed by our analysis and the final conclusions.

2 A Structurational model of Technology

Giddens (1979, 1984) has among others challenged the long-standing opposition in the social sciences between the subjective and objective dimensions of social reality, and proposes an alternative meta-theory which incorporates both dimensions. Giddens theory of structuration offers a solution to the dilemma of choosing between subjective and objective, between actors and structures, in that it recognizes that human actions are enabled and constrained by structures, yet that these structures are the result of previous actions. In his framework, structural properties consist of the rules and resources that human agents use in their everyday interaction. These rules and resources mediate human actions, while at the same time they are reaffirmed through being used by human actors (Giddens, in Orlikowski 1992, p 404). Giddens notes (1984, p 22) *"All social actors, all human being are highly learned in respect to knowledge which they possess and apply, in the production and reproduction of day-to-day social encounters"*.

Through the regular actions of knowledgeable and reflexive actions, patterns of interaction become established as standardised practices in organisations, e.g. ways of manufacturing a products etc. Over time, habitual use of such practices becomes institutionalised, forming the structural properties of organisations. These institutionalised properties (structures) are drawn on by humans in their ongoing interactions (agency), even as such use, in turn reinforces the institutionalised properties, the *duality of structure.* In this way, the individuals both shape and are being shaped by the structures.

While the structurational theory as such does not address the issue of technology, Orlikowski (1992) has developed a structurational theory of technology which is further extended in the paper "Using Technology and Constituting structure: A Practical lens for Studying Technology in Organizations" (Orlikowski 2000). She proposes a practice-oriented understanding of the recursive interaction between people, technologies and social action. Crucial in this approach is the understanding of structure, the set of rules and resources instantiated in recurrent social practice. Elements of technology, as in our case would be e.g. archiving standards, working routines, document templates etc. is not structure in itself, they become so when they *[..] are routinely mobilised in use that we can say that they "structure" human action, and in this way they become implicated as rules and resources in the constitution of a particular recurrent social practice* (Orlikowski, 2000, p 406). She continues "*the myriads of software packages [..] until such time as these are actually used in some ongoing human action- they are at best, potential structuring elements, and at worst, unexplored, forgotten, or rejected bits of program code"*

According to this view technology does not have embodied structures. As a consequence, she says : "*rather than starting with the technology and examining how actors appropriate its embodied structures, this view starts with human action and examine how it enacts emergent structures through recurrent interaction with the technology at hand*." Thus, we have to analyse how structure of technology use are constituted recursively as human regularly interact with certain properties

of a technology and thus shape the set of rules and resources that serve to shape their interaction.

Structuring of technology-in-practice

Giddens (1984) proposed the notion of structure as the set of enacted rules and resources that mediate social action through three dimensions of modality: facility, norms and interpretative schemes. When people use a technology, they draw on their tacit and explicit knowledge, the facilities available to them and the norm that inform their ongoing practices. In doing so, they recursively instantiate and thus reconstitute the rules and resources that structure their social action. Orlikowski (2002) states that *"because technology in practice is a kind of structure, the same recursive constitution applies here to*". When people uses a technology, they draw on the properties comprising the technological artefact – those provided by its constituent materiality, those inscribed by the designers, and those added on by users through previous interactions. This may be illustrated in this way:

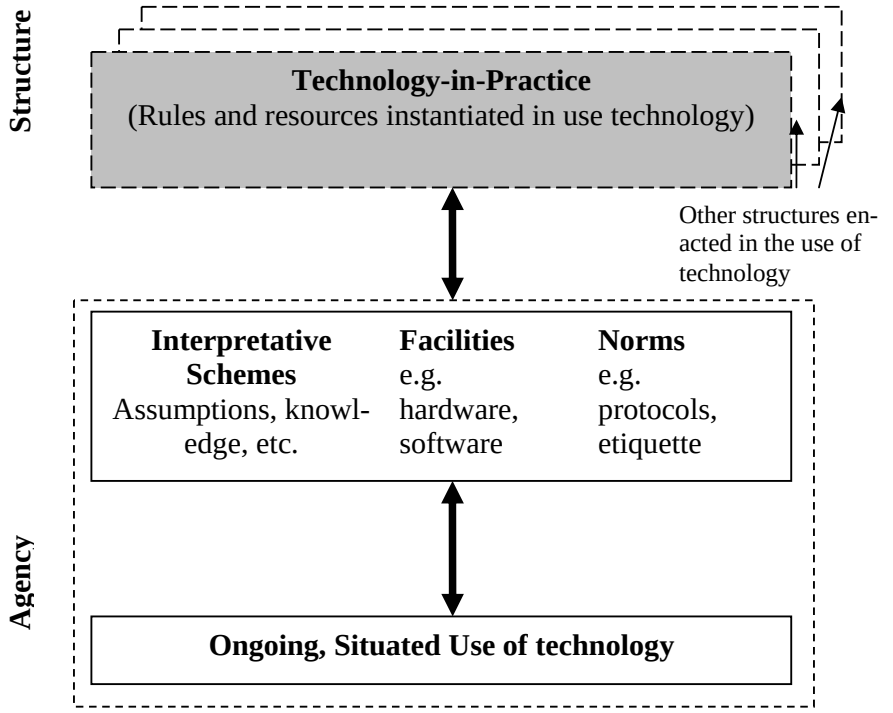

Figure 1: Enactment of Technology-in-Practice (from Orlikowski, 2000, p 410)

Figure 1 shows how our use of technology is structured based on experiences, knowledge, assumptions, behaviour, power relations, and norms along with the technology itself. A group of users that are involved in the same type of work enacts similar technology-in-practice, where through common training sessions, shared socialisation, comparable job experience etc., users come to engage with a technology in similar ways. Technologies-in-practice can be and are changed as actors experience changes in awareness, knowledge, power, motivation, circumstances, and in the technology itself. They are changed through the same process that all social structures are changed – through human action. Orlikowski emphasizes that technologies are never fully stabilised or complete, even though we may choose to treat them as fixed black boxes for a period of time. As people enact modified technologies-in-practice they also change the facilities, norms and interpretative schemes used in their use of the tech-

nology. She states that users always have the option, at any moment and within existing condition and materials, to do otherwise.

3 Research approach

The aim of this field research project was to study how Ephorte was used in an organisation, both the range of use and for what type of tasks. We would investigate what type of attitudes and understanding the different user communities had related to the system. The main research questions have been:

i) Why was not Ephorte used to the extent it was anticipated by the management
ii) Why did the various user groups use the system differently

These research questions required a combination of qualitative and quantitative data through triangulation (see e.g. Jacobsen 2000). The empirical data was collected over a period of 18 months, consisting of three phases. The first phase included of introductory, unstructured interviews and conversations with key personnel in the ICT department along with other managers. In the second phase, we conducted a survey where a questionnaire was mailed to all anticipated users of the system. Of estimated about 200 users, we got 115 responses. The aim was to get a broad picture of the use of Ephorte, as e.g. the user experiences, how the training had been, experiences, specific problems with its use etc. We did, however, learn that the questionnaire had some weaknesses in its design; e.g. that it did not take into account the substantial variety in use of the system. Accordingly, the data that was collected did not provide sufficient information on why there were these variations in usage patterns.

The third phase consisted of follow-up, unstructured interviews with 8 key users of Ephorte. In these interviews, the users were invited to express their more detailed experiences from using the system. Insight gained in the first of these interviews was used in the following interviews, in order to check whether e.g. attitudes we found among some users was shared by others. Along with these interviews, we participated in meeting and as observers on training courses.

4 The Introduction of Ephorte in the organisation

Lier municipality has 1400 employees, of those about 200 clerks and other case processors are assumed to be users of Ephorte. Some of these would use Ephorte on a daily basis while others are rather infrequent users. The introduction of Ephorte was an integral part of the reorganisation of the municipality, from a rather bureaucratic organisation consisting of 4 hierarchical levels to a more network-like structure having only two levels and 54 separate organisational units. One implication was that the number and size of central support functions was rather dramatically reduced, as e.g. the archiving office. Accordingly, the clerks and other case workers had to do a lot of administrative routines themselves, as e.g. the archiving of incoming mail. The introduction of Ephorte was thus seen as an important mean for making the clerical work simpler and more efficient.

The archiving unit became part of the ICT department, including only two employees, and none of them do have professional background within this area[3]. The municipality has to day a partly centralised archive, supporting only those units that are located in the city hall build-

[3] During the first phase of this project, the head of this unit was a professional archiving person, but she quit during this process, partly as a result of the lack of support from the management

ing. Most units are therefore responsible for taking care of the recording and archiving themselves. The way they carry out these tasks may vary substantially.

The principle of case processing in the municipality is so called *completed case processing,* which implies that the clerk that in the first place receives the case is then responsible for all phases in the processing of the case until it is completed. Furthermore, the processing should be done on the lowest possible level in the organisation. The responsible clerk has to make sure that every relevant factor is included in the decision making process. This way of working implies that the clerk have to involve persons from other departments and from various levels in the organisation. Research has shown that this way of processing a case is more flexible and often more efficient (Bukve 1997).

The archiving function is strictly regulated by Norwegian laws, in that every public institution, including municipalities are obliged to record every incoming and outgoing letter according to certain standards. A specific standard, currently Noark-4[4] provides a detailed specification of functional requirements for electronic recordkeeping systems used in public administration in Norway. A major issue in Noark-4 has been to facilitate the receipt and filing of any e-mail that makes up or contains administration documents. The Noark-4 includes several layers of standards, both basic obligatory requirements to be met by all systems, and additional, more advanced functions.

The implementation process

The acquisition and implementation of Ephorte was defined as a project within an overall ICT strategy for the whole organisation. Ephorte was chosen among other reason because it fully complies with the Noark standard, and it was even at that time used by a number of organisations[5] in private and public sector. The system has included functions for document flow and case processing, and is intended to be used by archiving personnel, clerks and case workers and even managers. Ephorte has a number of different modules that may optionally be installed. Each individual implementation of the system has to be specifically configured and parameterised. One important part of this work is to define roles that must be given to each authorised user of the system. In the implementation of Ephorte in this organisation not all modules were implemented, and they do not use the system as a complete archiving system.

The implementation project was initiated early 2001, and was headed by the leader of the archive office. The project group was recruited by user representatives from various departments, and they should actively participate in the configuring and tailoring of the system. However, most of them did not fulfil their obligations, which then were carried out by the project leader, running the danger that the parameter setting, e.g. defining roles, templates, schemes etc. did not fit the need of the individual users. Furthermore, the first consultant from the vendor did not fully understand the specific organisational structure of the municipality, resulting in that the system configuration in the first place was wrong. This consultant was later on replaced, and the system configuration was substantially improved, but it caused a lot of problems for the first users of the system.

An important part of the implementation process is user training. In our case, the training was intended to be taken care of by local *super-users*, which were users from the different units in

[4] Noark – Norwegian recording and archiving standard
[5] To day it is used by close to 100 organizations in public and private sector.

the organisation. One reason for this was that the limited budget for this project did not allow for buying rather expensive training courses from the software company. As important was the need for building-up user competence locally in the individual user communities. These super-users were supposed to know the specific routines for case processing locally, which however not always was the case. One specific problem was that some of these super-users had quite different tasks and roles in the local unit compared to the clerks they were going to train. According, they were not able to provide sufficient support for changing working routines in order to make work more efficient. Another problem was that the courses offered by the vendor were not satisfactory, having the consequence that the super-users were not as competent as they were supposed to be. Accordingly, many case workers expressed clearly that the training had been inadequate.

How is the system used?

About 200 users have access to Ephorte, including clerks and other professionals, managers, secretaries and some other. In addition some of the politicians may use the system, but they are not included in this study. Figure 2 below shows that out of the 115 respondents that turned in the questionnaire, we found that 20% answered that they did not use the system at all[6]. About the same number of users says that they use the system on a daily basis.

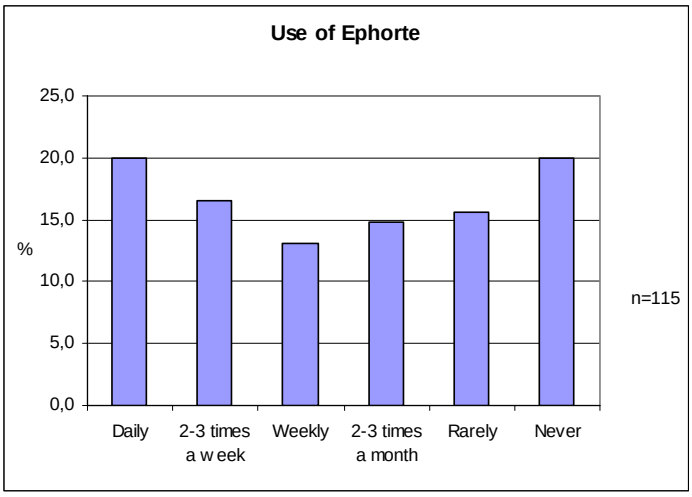

Figure 2: Use of Ephorte

Figure 3 shows what Ephorte are being used for. Of the 88 respondents that were active users, a majority (83 % of them) answered that they used it for case processing, even the managers said so. Less that 20% used it for writing letter, exchange of information, statistic purpose and others (Note: The respondents were allowed to give more than one answer).

[6] These data were collected January 2003.

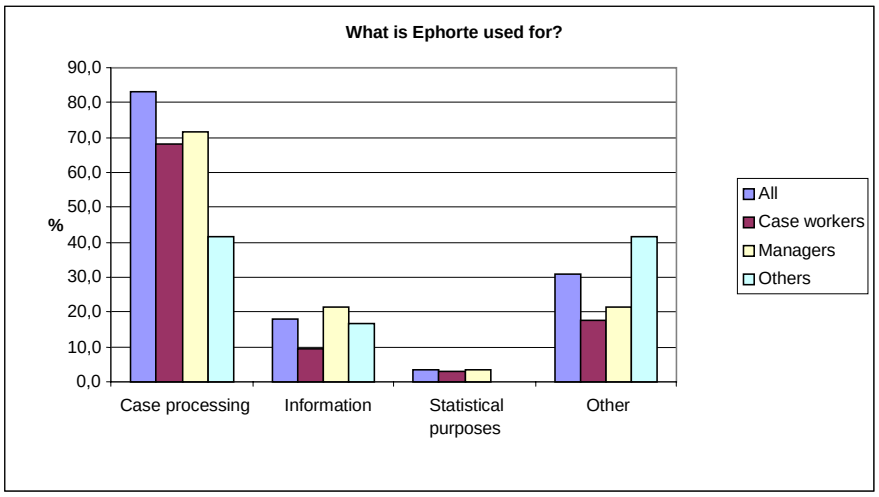

Figure 3: What is Ephorte used for

Analysis

The system is developed by people being familiar with the public sector, and one particular developer have in the past been working active with archiving work, and even participating in the specification of the Noark-4 standard. When developing the system, they used their interpretative schemes and knowledge about how such work are being conducted in public organisations. This understanding of the legal framework, work routines along with their previous work experience in this field strongly influenced the way Ephorte was developed. Thus, the first version of Ephorte was developed strictly according to the Noark-4 specifications. They even applied the data model that was outlined in the description.

However, it turned out that understanding of working routines and responsibilities did not comply with the way such work was organised in a local municipality. There are also significant variations across one organisation. The range and type of tasks among different user groups varied a lot, and they accordingly did use the systems in quite different ways. When analysing the data we found several distinct patterns which we believe can be attributed to such differences. These *technology-in-practices* discussed below should not been seen as exhaustively characterising what the users did with the system at their work place. These are however, patterns that have been identified from data on a limited number of users in the organisation. Below we will present two structures of technology-in-practice, which must be seen as simplifications.

Limited use of the system-in-practice

The structure *limited-use* of Ephorte, see figure 4 was enacted by users that experienced that the system did not make their work more efficient. They regarded Ephorte as an important mean for the organisation as a whole, but was not able to see how the system could help them, e.g. in finding correct information, make relevant documents available for others, or in collaboration with others, etc. As one user said:

> If one wishes more advanced users and users that prefer to use the system, one should have provided better and more adequate training. One issue is to master the technical aspects of system, but as important are the coding principles (principles for archiving) and how one can utilise the potentials that are inherent in the technical solutions [Case worker, February 2003].

This answer is typical for the group of users that did not use the system for the tasks they were supposed to. Moreover, many of the users found the system difficult due to its strong basis in the record-keeping and archiving tradition. The terminology, screen layout etc. which was build in due to the developers interpretative schemes and understanding of how work should be carried out, appeared to be a limiting factor for how it was conceived by the users. As a consequence, when the user's interaction with the system was based on limited and inadequate understanding, this may contribute to enact the structure *limited-use*. In there current use of the system, they established user habits (also bad habits) and facilities as e.g. templates, that influences how the system became used. E.g., when the users do not utilise the various functions that the system offers, they will not gain sufficient knowledge to start using such function in a later stage, but rather continue using the system in a limited way. In the figure below we have summarised the most important factors resulting in this structure.

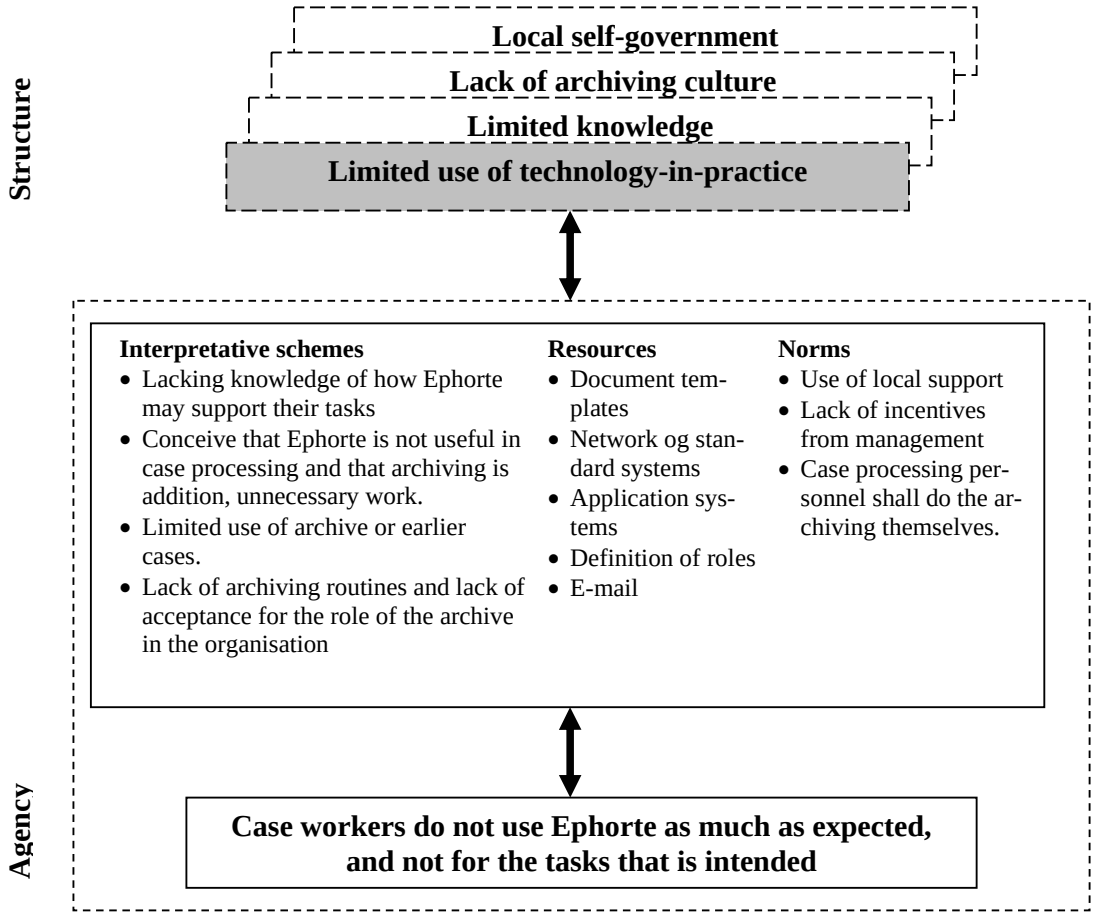

Figure 4: Limited-Use in practice of the system enacted by groups of case workers

It is, however, possible to break this pattern. One way is to participate in new, more adequate training courses. In cooperation with the chief archiving manager, it was developed new routines, document templates and better documentation that can help the case workers to benefit better from the system. Hopefully, this will weaken the limited-use structure.

Understanding of the role of case workers

The way Lier municipality practices "completed case processing" is institutionalized in case processing manuals[7], and these documents represent the structural characteristics that becomes apparent through human agency. The case workers do have their own understanding of what the role as case workers implies. A quite common view was that (and still are) that the archiving procedures is not their responsibility, but by the secretaries or the central archiving office. The tasks of case workers are to complete the cases and that should not include record incoming mail etc. As one user states:

> Archive and so forth is not my field. [..] Whether one deals with economy or planning activities, one does not think about how the archive works, no reason for that. Rather the opposite, it is too much to be asked for. The archive should be viewed as a mean for us, and that it is understandable and fairly simple to use. One needs to have an archive office that can support the work we do and that it is expected to do. [Case worker, February 2003]

The journal keeping was conceived as a task that one does if one have to, and is seen as extra work that is of no use for the case worker. However, the reorganizing process required that the case workers did a lot of office work themselves. This is a norm they have to comply to, but at the same time do many case workers experience/ feel lack of support and even pressure for this type of work. As such norms are not felt as sufficient strong, they will continue to do it their own way.

A number of case workers practice a non-standard way of processing the cases, including a lot of human judgments. The work is not following predefined routines, information and experiences from old cases are often of no help. They do not frequently collaborate with other clerks. In such cases, Ephorte is not seen as to be of any substantial help.

Lier municipality did not have any common arching plan[8]. The implication was that one has not institutionalised any practice regarding archiving work and made this available for the employees that would need it, and accordingly the way such work is done may vary considerable. One is thus running the danger that the quality of the archive is not satisfactory. Both the previous and at that time present chief of archive department felt that this work did not have any priority in the organisation. In current work practice, it is accepted that cases are not archived in a proper way. While the old organisational structure included local archiving personnel, the new model was based on small central archiving office combined with the presumption that case workers took care of such tasks in appropriate ways. As we have seen, this was in many user communities not the case. And the new system did not improve this situation.

Usefulness and quality in work

However, there were several groups of case workers that used Ephorte as intended. They found the system very useful that improved the quality and efficiency of the work. It helped them finding information, and supported complete case processing. Access to relevant information is dependent on a well functioning archive having updated information This is particular the case for those being involved in more standardised case processing, where they often have to look at previous cases. The search facilities in the system are important, proving

[7] These documents are: *Fullført saksbehandling i Lier* (Completed case processing in Lier) and the user manual *Saksbehandlingsrutiner i Lier* (Case processing routines in Lier).
[8] Archiving plan (arkiv plan in Norwegian) is requirement from the National Archives.

relevant and updated information when necessary. These case workers clearly saw the use of the system, and at the same time the necessity to keep it updated.

Furthermore, standardised case processing is characterised by that tasks are following similar routines most times, and that decision making are following well-defined procedures. In such cases, well developed document templates will simplify the work considerably, in that can apply standard references to rules and regulations. Also in work involving complicated agreements and contracts, such facilities were seen as extremely helpful.

Case workers involved in these types of work felt that Ephorte was very useful, and that it supported completed case processing in a constructive way. The way the collect information from previous cases, and exchange documents and viewpoints across departments in the organisation were well appreciated:

> It is much easier to achieve completed case processing when the case processing writes down the arguments he is responsible for, directly into the document. It works excellent! [Case worker, February 2003]

When one uses the system based on these preconditions, this understanding is likely to be reinforced by recurrent use. There was no need for pressure from the management to use it.

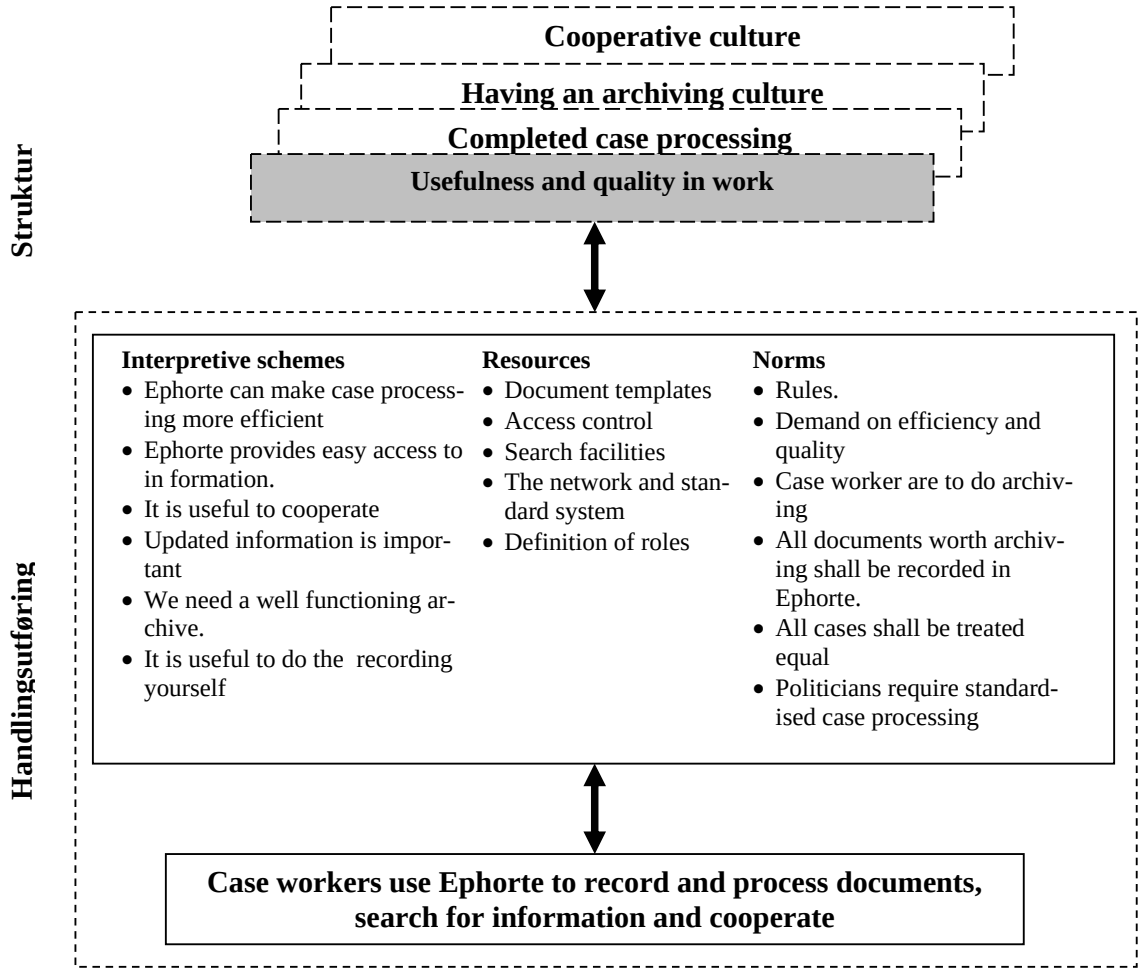

Figure 5 – Enactment of usefulness and quality technology-in-practice

5 Conclusion

In this paper, we have applied Orlikowski's extensions to Giddens structuration theory, where technology structures not are seen as embodied in a given technical artefact, in our case an application software system, but as enacted by the recurrent social practices of a group of users. We have focused on how various users groups used the system differently, and how their use is structured by the rules, that are their established working practices and the resources or facilities available. In the short version presented in this paper we have selected two sort of "idealised" patterns of use, which we believe illustrates that a number of factors influences how the system is used in daily work. These were, among other factors their own view on the type of work they are supposed do, their view on collaboration and sharing information and knowledge, how they feel that the system may support their work, the lack a archiving culture along with more "usual" factors as lack of adequate training, inadequate configuration of the system, poor user support, technical problems and so forth.

Many of these factors could rather easily have been identified by traditional evaluation of implementation and use of information systems. However, we feel that the strength of this approach is its capability of describing the complexity in a rather understandable way. We have been able to see how individual actions and institutional structures relate to each other. Furthermore, this analytical framework may also be helpful in order to change existing structures. Even though that enacted structures of system use tend to be recurrent, they are not embodied in the system. Thus, it is possible to modify the institutional, interpretive as well as technical conditions that influences usage pattern. In our case, that could e.g. be to strengthen the archiving culture and the support for such work, to provide incentives for more collaboration, offer better training programs and so forth.

We believe our study has shown the strength of combining qualitative and quantitative approach in research, however done in a proper way. Our evaluation revealed weaknesses in the data collected in early phases of the study, which had to be supplemented in the later stages. Our findings should thus be verified by another quantitative study, which so far is not done.

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