

INFORMATION SYSTEMS MEDIATION IN COMMUNICATION BETWEEN CITIZENS AND GOVERNMENT AGENCIES – EXPERIENCES FROM COMMUNICATION ANALYSIS OF FORMS

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Abstract

This paper adopts a communication perspective on (electronic and paper-based) forms in public e-services. This perspective emphasizes that the main purpose of such forms is to facilitate communication between citizens and government agencies. We use a communication analysis method consisting of a set of questions related to three communicative categories, i.e. conditions, actions, and consequences. We do this in order to analyze the communication conducted through the medical certificate used in connection with a citizen's application for a provisional driving license in Sweden. The purpose of the paper is to explore if and how the communication analysis method, originally developed for requirements engineering situations, contributes to the understanding and evaluation of electronic forms in public e-services. Our conclusion is that a communication perspective supplied us with useful insights. We discovered four communicative themes in the studied form when applying the communication analysis method. We also gained experiences from using the method in an e-government context that implied that understanding of the communicative roles of forms are important design features to focus in the development of e-services and electronic forms.

Keywords: e-government, public e-service, communication analysis, electronic forms.

1 INTRODUCTION

As citizens we interact with many government agencies, some of them during our entire life time (such as the tax declaration office) and some of them during a certain period in life (for example during a parental leave or after retirement). In some cases the citizen initiates the interaction, as when applying for permits or government allowances, and in other cases the agency initiates the interaction, as when citizens are asked to declare taxes or leave information to the national registration. Even though we can visit the agency or make a telephone call, many of our interactions with a government agency are made through filling in different forms.

Until fairly recently these forms were printed on paper, citizens ordered them from the agency, filled them in and sent them back by mail. Many early e-government projects, however, aimed at making the forms available on-line in Internet-based information systems (i.e. e-services) so that the citizen could print them out. In more ambitious e-government development attempts the forms can be filled in electronically and sent to the agency via Internet. This is a key issue in many public e-services; to provide and manage electronic forms for communication between citizens and government agencies. The level of possible digital interaction through electronic forms between the agency and the citizen is one common aspect when evaluating the level of 24/7 maturity in a government agency (see e.g. Layne & Lee, 2001; Hiller & Bélanger, 2001).

One important aspect of e-government projects is that they often fail (Undesa, 2003). Heeks (2006) refers to a Texas county that invested \$ 200 000 in an information system for online building permits that two years after its launch still lacked users. Jupp (2004) refers to the “*build it and they will come*” assumption of e-government projects and states that they often lack real benefits to citizens and are poorly marketed. Graafland-Essers and Ettetdgui (2003) have shown that a majority of citizens still wants to interact with government agencies in the traditional ways (e.g. face-to-face). For e-government to succeed the quality of communication is crucial (ibid.). Citizens who are left alone with a computer interface for permit application and a legal setting not transparent enough will not use that e-service. Government to citizen (G2C) communication that focuses on accountability and serves as an enabler of legal transparency and predictability are probably the most important among disregarded factors in realizing and implementing e-government. The National Auditing office in Sweden (Riksrevisionen) discovered in a recent evaluation of Swedish eGovernment projects that internal efficiency was the dominating motive for initiating eGovernment projects (Riksrevisionen, 2004).

A traditional way of viewing forms is that they are instruments to *transfer information* from the citizen to the agency and vice versa. This is of course relevant, but in this paper we state that this is not the only purpose of the form. By adopting a communication perspective we identify that the forms are instruments for communication and, thus, also instruments through which citizens perform different communicative actions towards the agencies. A citizen might *ask* for a permission, *request* for an allowance or a respite, *declare* income, *appeal* against a decision, etc. These are all examples of actions that the citizen performs while sending in a form to the agency. Correspondingly, the case officer at the agency performs actions on behalf of the agency, when he or she makes decisions based on the information content in the form. Common actions would in this case be to *approve* an application, *deny* a request, or *ask* for supplementary information (e.g. details).

The communication perspective that we adopt in this paper has its theoretical roots in the social action theory (e.g. Weber, 1978), the language action theory (e.g. Searle, 1969; Habermas, 1984) as well as in conversation analysis (Sacks, 1992; Linell, 1982). Electronic forms, as in public e-services, are part of an information system. A communication perspective has been adopted on information systems by several researchers (e.g. Goldkuhl & Lyytinen, 1982; Winograd & Flores, 1986; Ljungberg, 1997).

The purpose of this paper is to explore how a communication analysis method, originally developed by Cronholm and Goldkuhl (2004) for requirements engineering situations, can be used to analyse communication performed through electronic and paper-based forms in public e-services. The communication analysis method consists of a set of questions, which we use in this paper in order to analyze a medical certificate that Swedish citizens who want to apply for a provisional driving license have to fill in. In the paper we discuss how a communication perspective and the communication analysis method can be used and how this can contribute in an e-government setting.

After this introduction, communication analysis is described and discussed in the second section. This is made by stating the theoretical bases, i.e. a communication perspective on forms, as well as explaining the content of the communication analysis method. In the third section the research design and the research project, which this paper is a result from, are described. Then we use the medical certificate as an empirical illustration when conducting the communication analysis in the fourth section. In order to evaluate the form we pose a set of questions and try to answer them by giving examples from the certificate. In the fifth section we analyze and discuss our experiences from using the method. Finally, in the sixth section, we draw some conclusions from this study and propose directions for future research.

2 COMMUNICATION ANALYSIS – PERSPECTIVE AND METHOD

In this section we describe the theoretical roots of communication analysis; i.e. a communication perspective. We use the notion of an electronic form to exemplify the theories. We also explain the content of the communication analysis method, which builds upon this perspective. The section is ended with some arguments why we find this perspective and method suitable to use when evaluating electronic forms.

2.1 Communication as Perspective

A fundamental ground for communication as a perspective is Weber's (1978) theory of social actions, where social actions are viewed as intentional and depending on the behavior of other persons. Humans act with social purposes and perform acts with social grounds. Such social acts can be performed by using an information system as well as in inter-personal face-to-face situations. Citizens and case officers at the agency are no exceptions from this in their acting towards each other.

Since long time there has been a prevailing conception that communication, e.g. oral or via computer-based information systems, mainly is about information transfer. This implies that language is used in order to describe the world. This view has, however, been criticized as the "descriptive fallacy" in philosophy and science by Austin (1962) and many of his adherents. The critics emphasize that *we do a lot of other things than just describing when we communicate*. We can for example promise, request, command, declare, issue, appoint, excuse, and thank when we use language to communicate. This is a key issue in language action theory (Austin, 1962; Searle, 1969; Habermas, 1984); people who communicate perform communicative actions (speech acts). In language action theory a separation is made between the propositional content and the communicative function of an utterance (Searle, 1969). This implies that we distinguish between what we talk about and what kind of interpersonal relationship that is established between the sender and the receiver when communicating. If we use the electronic form regarding application for provisional driving license to illustrate this, the application with its personal details about the applicant is the propositional content. The communicative functions of the form are that the applicant expects the agency to approve the permit and that the agency has a commitment to make a just and fair decision according to laws and rules.

As a result of several scholars' work with a communication perspective on information systems, an alternative to the view of information systems as systems for storing, retrieving, and organizing data

has been developed. The image of information systems as “containers of data” is close to the idea that reality can be mapped into the system, i.e. that representations of reality can be caught by the system. This is often referred to as reality mapping and has been heavily criticized by language action researchers (e.g. Lyytinen, 1987). Using a communication perspective on information systems means that information systems, instead, is seen as tools that support users in their actions. The users are performing communicative actions through the information system. A communication perspective on information systems implies that “*information systems are regarded as systems for technology mediated work practice communication*” (Cronholm & Goldkuhl, 2004).

As mentioned in the introduction above, another important theoretical source for the communication analysis method is found in conversation analysis, where utterances’ relations to each other are studied. While language action theory focuses on one speech act at a time, conversation analysis tries to understand how an utterance (an initiative) is followed by another utterance (a response) (Linell, 1998). This relationship is called adjacency pairs by Sacks (1992). If we relate this to our case, the electronic form with its content can be seen as the first utterance initiated from the citizen which is followed by a response from the agency, i.e. the decision regarding approval or denial. Language action theory, as a part of a communication perspective, provides us with a deep understanding about what we do when we communicate and conversation analysis helps us to place this understanding in a wider context (a chain of speech acts). This is the reason why these two theories are suitable to merge into the communication perspective and also the reason why this perspective is usable when studying information systems use in different contexts. In order to understand the public e-service context and the use of electronic forms such a perspective, thus, provides us with important insights.

2.2 Communication Analysis Method

With the communication perspective as a fundament, Cronholm and Goldkuhl (2004) have developed a communication analysis method in order to emphasize communication issues during the requirements engineering process (issues that they claim are often disregarded in these processes). The method consists of a set of generic questions that are asked in order to analyze existing or future IT-based documents. Besides the strong influence from the communication perspective mentioned above, the method is also inspired from qualitative analysis (Strauss & Corbin, 1998). As a result of this the questions are structured according to three related communicative categories; conditions, actions, and consequences, which are critical cornerstones in the action logic of grounded theory. Cronholm and Goldkuhl (2004) illustrate this in a communication model, see figure 1.

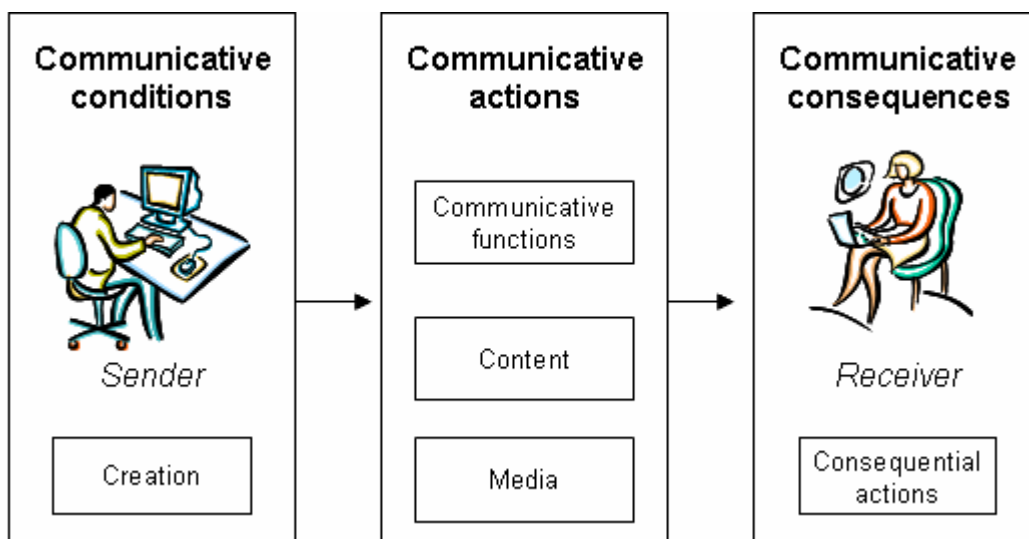


Figure 1. Communication model (Cronholm & Goldkuhl, 2004).

Each of these categories and sub-categories consist of several questions to ask when analyzing the document. These questions (ibid.) are listed in table 1 below and then used later on in our empirical example.

Table 1. Communication Analysis Questions (Cronholm & Goldkuhl, 2004).

Communicative conditions	
<i>Creation</i>	When is the information created? What are the circumstances for creating the information? Why is the information communicated? What is needed in order to create information in the document? What kinds of work practice rules govern the creation and use of the document?
<i>Sender</i>	Who is the communicator? Is there anyone mediating (transferring) the information/document?
Communicative actions	
<i>Content</i>	What is communicated? What is the content of the document? What are the meanings of different concepts? Is the terminology comprehensible and well known?
<i>Communicative functions</i>	What communicative functions does the document carry? What kind of communicative relations are created between sender and receiver? Are communicative functions expressed explicitly? Is the document a response to preceding actions (initiatives) within the work practice?
<i>Media</i>	What kind of media is used for the document? How is the document stored, accessed, retrieved, used and changed?
Communicative consequences	
<i>Consequential actions</i>	What actions are taken based on the information in the document? Is there a clear initiative-response relation between the document and its consequential actions? For what purposes is this information used? May there be any possible side effects of the document utilisation?
<i>Receiver</i>	To whom is the information in the document addressed? Are there actors updating (changing) the document? What kind of knowledge of the receiver is presupposed in the communication?

2.3 Electronic Forms as Communication Instruments

In the sections above, we have argued that information systems, according to a communication perspective, should be seen as tools that support users in their actions. If we look at web-based information systems for public e-services, the electronic form plays an important role when communicating. The electronic form serves as part of the user interface, i.e. what the user sees and interacts with on the screen. In the same time it is more than just an interface since it is the media that the user (the citizen) uses to communicate with the agency through. The content of the electronic form might be regulated by law; there can be demands for a signature to justify the citizen's identity, etc. The design of, and the content in, the electronic form strongly influence what the citizen is able to communicate, i.e. the electronic form stipulates what kind of communicative acts that are possible to perform. The electronic form (as well as the paper-based form) is thus an instrument for communication.

Cronholm and Goldkuhl (2004) claim (business) documents to be important to study when conducting requirements engineering from a communication perspective. Documents have persistence and might be a result of several communicative acts performed by several persons. In their definition of documents, Cronholm and Goldkuhl (ibid.) include computerized documents

such as forms in a user interface. This is, besides that we share the notion of a communication perspective as a fruitful way to view information systems, our main argument for choosing the communication analysis method in this study. Even though Cronholm and Goldkuhl have a wide definition of documents, the method has so far been tested on other types of business documents, e.g. internal documents regarding working tasks in a home care unit (ibid.). By adopting the method in our analysis of an agency form we aim at exploring how the method can be used in this kind of inter-organizational public context.

We can also relate the importance of analyzing forms based on a communication perspective to a bureaucracy discussion. In the ideal bureaucracy of Weber, that has influenced public administration for a long time; communication through formal documents is a fundamental part (Weber, 2000). In the weberian formal rational approach to bureaucracy in public administration receiving, sending and keeping evidence of communication in terms of formal documents is a central part. In highly rule-based case handling (as in this case focused in this paper), in opposite to case handling with a high level of administrative discretion as in Street-level Bureaucracy (Lipsky, 1980), the formal communication is more standardized. In these rule-based cases the formal communication from citizen to government and vice versa often takes place through the usage of standardized forms. In transactional e-government (Jupp, 2004) when service transactions are completely done online a higher degree of standardization in communication on both citizen and government side is important (Bovens & Zouridis, 2002). Bovens and Zouridis (ibid.) identify this transformation to a more rule-based and standardized case handling as originating from the expanding usage of information systems and the transformation of public administrations initiated through IT usage in public administrations. In the light of this transformation the formal communication will increase and the less standardized and more informal communication between citizens and street-level bureaucrats will become increasingly standardized. This transformation to more standardized and formal interaction stresses the need for analysis of and design for communication quality in information system mediation in communication between public administration officials and citizens.

3 RESEARCH DESIGN

A medical certificate that is used in connection to the application form for provisional driving license in Sweden, is used in the empirical adoption of the communication analysis method in this paper. The provisional driving license application has been studied within an on-going research project (started in 2005 and ends in 2008) concerning e-service development in public sector in Sweden. The aim of the project is to develop one-stop government e-services for driving license matters as well as a web-based portal where these e-services and information about the driving license process will be easily accessible. The e-services comprise electronic forms for provisional driving license application, which will be possible to fill in and send in electronically. The case officers will then manage the applications electronically as they receive them in their internal information system. Previous to the project these forms were only available to print out from the agency's website.

The purpose of the project is two-fold; (1) the project aims at facilitating citizens' authority contacts and communication in driving license matters and (2) the project also aims at making the internal processes in the agencies concerning these errands more efficient. An important aim is that the results from the project will have a distinct service focus of an inter-organizational nature, which will decrease the unclear responsibility division between authorities. The project will also result in a method for development of inter-organizational e-services in the public sector and contribute to the theoretical knowledge on e-service development.

Three Swedish agencies are involved in the project besides the researchers; Sweden's County Administrations (SCoA) which organizes the 21 county administrative boards of Sweden, the County Administrative Board of Stockholm (where the development project is hosted) and the

Swedish Road Administration (SRoA). The research project can be characterized as action research and has the dual purpose of both developing and evaluating e-services and the web-based portal. Action research is a qualitative research approach that is frequently used within the information systems research field (e.g. Baskerville & Wood-Harper, 1996).

As part of the action research project the researchers got the commission to evaluate the existing paper-based forms regarding driving license matters. The purpose of the evaluation was to find strengths and weaknesses in the existing forms and, thus, design the electronic forms so that the strengths were maintained and the problems solved. In order to ground our evaluation theoretically we reviewed literature about communication analysis and communication quality, and discovered a communication analysis method (Cronholm & Goldkuhl, 2004), which we found attractive due to its articulated communication perspective. The empirical data from the evaluation has been analyzed in a qualitative, interpretive way (Walsham, 1995). We have also reported and discussed our results with the practitioners in the project, in order to validate our findings and make them articulated in a comprehensive and meaningful way. The action research approach makes it possible to report findings from the project although it is still on-going. The issues focused in this paper are results from a completed phase of the project, though.

4 THE MEDICAL CERTIFICATE – AN EMPIRICAL ANALYSIS

Everyone in Sweden who wants to get a driving license, first has to apply for a provisional driving license to start taking driving lessons etc., from the county administrative board in the region where he or she lives. The provisional driving license application has to be complemented by, among other things, a medical certificate (figure 2 below), where the applicant assures that he or she has not got any medical hindrance for driving a car. The provisional driving license is approved if the applicant is judged to be able to drive a vehicle in a safe way, thus, the permit is an important aspect of traffic security. The main aim of this regulation is therefore to find those who are not suitable to receive a permit. The unsuitability can depend on medical reasons or behavior reasons, such as being punished for certain crimes.

Before the action research project started, the permit application was a paper-based form that the citizen printed from the website or ordered from the agency, filled in, signed and sent by mail to the agency. These documents are received and reviewed by a case officer at the agency, who decides whether the application is complete or not, and if there is any medical information that must be further examined. The case officer also checks so that the applicant does not have a crime record. If everything is considered as OK a provisional driving license will be granted. In 2004, Sweden's 21 county administrative boards together managed over 210.000 applications for provisional driving licenses. In as many as 80 percent of these cases, the decision was very easy to make – the permit was approved without any further examination. These are called “green cases” by the agency. Managing green cases is an uncomplicated task, but since there are so many of these cases the review process is nevertheless time-consuming.

This is the background to the present research project. By developing an e-service that will make an automated decision in all green cases, resources will be saved at the agency. These resources can instead be used for managing of more complex cases. There are other positive effects that the e-service is expected to give; such as a higher degree of complete applications since the e-service will check for missed information before it is electronically sent to the agency. The 21 county administrative boards will also be able to manage these issues in a standardized way and, thus, avoid any regional differences in judgment. Another important outcome of this e-service is that the applicant will not have to know which agency to contact in different phases of the process, as is the case today. Instead, the e-service will be an example of a one-stop government solution (Kubiceck & Hagen, 2000), where the borders between agencies are invisible for the applicants.

MEDICAL CERTIFICATE

in connection with an application for/extension of a driving licence, tractor licence or taxi driver licence

<p>A. Current driving licence</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;"> <small>Group I</small> <input type="checkbox"/> A <input type="checkbox"/> A1 <input type="checkbox"/> B <input type="checkbox"/> BE <input type="checkbox"/> Tractor </td> <td style="border: 1px solid black; padding: 2px; text-align: center;"> <small>Group II</small> <input type="checkbox"/> C <input type="checkbox"/> CE </td> <td style="border: 1px solid black; padding: 2px; text-align: center;"> <small>Group III</small> <input type="checkbox"/> D <input type="checkbox"/> DE <input type="checkbox"/> Taxi </td> </tr> </table> <p>Application for</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;"> <small>Group I</small> <input type="checkbox"/> A <input type="checkbox"/> A1 <input type="checkbox"/> B <input type="checkbox"/> BE <input type="checkbox"/> Tractor </td> <td style="border: 1px solid black; padding: 2px; text-align: center;"> <small>Group II</small> <input type="checkbox"/> C <input type="checkbox"/> CE </td> <td style="border: 1px solid black; padding: 2px; text-align: center;"> <small>Group III</small> <input type="checkbox"/> D <input type="checkbox"/> DE <input type="checkbox"/> Taxi </td> </tr> </table> <p><small>A=heavy motorcycle, A1=light motorcycle, B=private car, C=heavy lorry, D=bus, E=heavy trailer, Tractor=tractor licence, Taxi=taxi driver licence</small></p>	<small>Group I</small> <input type="checkbox"/> A <input type="checkbox"/> A1 <input type="checkbox"/> B <input type="checkbox"/> BE <input type="checkbox"/> Tractor	<small>Group II</small> <input type="checkbox"/> C <input type="checkbox"/> CE	<small>Group III</small> <input type="checkbox"/> D <input type="checkbox"/> DE <input type="checkbox"/> Taxi	<small>Group I</small> <input type="checkbox"/> A <input type="checkbox"/> A1 <input type="checkbox"/> B <input type="checkbox"/> BE <input type="checkbox"/> Tractor	<small>Group II</small> <input type="checkbox"/> C <input type="checkbox"/> CE	<small>Group III</small> <input type="checkbox"/> D <input type="checkbox"/> DE <input type="checkbox"/> Taxi	<p>B. Personal particulars</p> <p>Social security number:</p> <p>Name :</p> <p>Address:</p> <p>Telephone:</p> <p>Proof of identity:</p> <p>Known personally <input type="checkbox"/> ID card <input type="checkbox"/> Driving licence <input type="checkbox"/></p>
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C. Declaration of health - questions to be answered in connection with the physician's examination

1. Do you have any illness, injury or other medical condition that could affect your ability to drive a motor vehicle? Yes No
2. Do you have any sight defect, such as
 - a) reduced visual acuity Yes No
 - b) involuntary eye movements (nystagmus) Yes No
 - c) field of vision defects (such as limited peripheral vision) Yes No
 - d) double vision Yes No
 - e) night blindness (tangibly worse vision in the dark) Yes No
 - f) impaired eye mobility Yes No
 - g) other visual disorder Yes No
3. a) Do you have / have you ever had sudden attacks of dizziness or vertigo? Yes No
 b) Do you have any serious hearing impairment? Yes No
4. Do you have any disease of / reduced locomotor functions? Yes No
5. Do you have / have you ever had any cardiovascular disease, such as
 - a) stroke (cerebral haemorrhage, thrombus in the brain) Yes No
 - b) vascular spasm Yes No
 - c) cardiac infarction Yes No
 - d) heart rhythm disorder Yes No
 - e) reduced heart valve functioning (heart murmur) Yes No
 - f) other cardiovascular disease Yes No
6. Do you have diabetes? Yes No
7. a) Do you have / have you ever had any neurological disease? Yes No
 b) Have you ever had a brain concussion with resulting loss of consciousness? Yes No
8. a) Do you have / have you ever had epilepsy? Yes No
 b) Do you have / have you ever had convulsions, fainting-fits or other consciousness disorders? Yes No

Figure 2. The Medical Certificate.

9. Do you have / have you ever had any seriously reduced kidney functioning? Yes No
10. Have you ever been bothered by lapses of attention, thinking ability or memory? Yes No
11. a) Do you have snoring problems causing restless sleep and tiredness during the day? Yes No
 b) Are you often afflicted by involuntary attacks of falling asleep? Yes No
12. Are you or have you ever been an abuser of alcohol, drugs or medicine? Yes No
13. Do you have / have you ever had any mental disorder/disease, e.g. schizophrenia or other psychotic syndromes, manic-depression or been diagnosed with ADHD, DAMP, Aspergers syndrome, or the like? Yes No

D.

1. Have you been hospitalised or contacted a physician as a result of the above (points C 1-13)? Yes No
 When? _____

Name of hospital or clinic(s)

2. Are you currently being treated with any hypnotic or sedative drug or under any other long-term medication for any of the above diseases (points C 1-13)? Yes No

If the answer is yes, which medicine(s)?

3. Have you ever before been examined by a physician in connection with an application for a learners permit? Yes No

If the answer is yes, when? _____

4. Do you consider yourself completely healthy at the present time? Yes No

If the answer is no, state why:

I hereby certify that the information I have given is completely true.

Place and date

Signature

Figure 2. The Medical Certificate (cont.).

4.1 Communication Analysis Results

In tables 2-4 below, we answer the communication analysis questions in relation to the medical certificate.

Table 2. A Communication Analysis of the Medical Certificate – Communicative conditions.

Communicative conditions	
<i>Creation</i>	<p><i>When is the information created?</i></p> <p>Information is created in a dual creation process; a general creation (the typical level) of the form and a specific creation of filling in the form (the instance level). The general creation process is the interpretation of the laws regulating the road traffic context that are transferred first into medical demands of the required medical conditions and conditions that render an individual unfit for road traffic. These medical requirements are then transferred into questions aiming at gathering the required information from the citizen in order to decide the suitability for road traffic. The specific creation process is when the citizen interprets the questions in terms of his/her knowledge of the personal medical condition in answering the questions.</p> <p><i>What are the circumstances for creating the information?</i></p> <p>The information is created by the applicant who fills in the form (the instance level), separated in time and space from the involved agencies and the typical level as well as the management of the case.</p> <p><i>Why is the information communicated?</i></p> <p>The final motive and incentive for the applicant to fill in the form with the requested information is to get a driving license. In order to enter the handling process the application and the health declaration is needed as a compulsory part of issuing a provisional driving license.</p> <p><i>What is needed in order to create information in the document?</i></p> <p>When creating the form knowledge about the legal requirements and hazardous medical conditions are required in order to assure that the form follows the intentions of the policy formulated by the government. When the citizen is completing a form no information but knowledge about the personal medical conditions are required. If necessary a physician can be consulted.</p> <p><i>What kinds of work practice rules govern the creation and use of the document?</i></p> <p>The rules governing the information creation exist on different policy levels. Firstly, the basis for the document is laws on Road Traffic Safety. Secondly, these laws are interpreted into agency specifications on how the law should be interpreted in terms of specific medical conditions. Thirdly, these specifications are transferred into the questions in the form. All these levels together form the founding interpretation of how the government policy should be implemented. The last work practice rules are the rules regulating the behaviour of the citizen in relation to the agencies. These rules state that the information in the returned form are solemnly sworn to be true and a lying citizen is possibly facing imprisonment or fines for lying in the medical certificate.</p>
<i>Sender</i>	<p><i>Who is the communicator?</i></p> <p>The form exists in several different communication settings. Firstly, G2C communication when stating what medical conditions that render the citizen unfit for road traffic. Secondly, C2G communication when the citizen is fulfilling the requirements of the application process by answering the questions. Thirdly, G2G communication when the agency responsible for designing the form (SRoA) specifies to the receiving agencies (SCoA) what focal areas that, interpreted from law, render the citizens unfit for road traffic. Thus, the form can be analysed as G2C, C2G and G2G communication. Correspondingly the communicator can be citizen, the SRoA (responsible for road traffic policy) and SCoA. The main communicator is however the citizen (the applicant) when stating his or her medical condition.</p> <p><i>Is there anyone mediating (transferring) the information/document?</i></p> <p>The original paper form as well as the form in shape of an Adobe PDF-document on agency websites are distributed and mediated by several different actors. Driving schools, the Police, SRoA and the SCoA all provide links or paper forms to the public because of their close relation to road traffic administration in some sense. In the electronic form the main mediator is SCoA, although all design propositions and all reformulation of the questions must be approved by SRoA (the typical level).</p>

Table 3. A Communication Analysis of the Medical Certificate – Communicative actions.

Communicative actions	
<i>Content</i>	<p><i>What is communicated? What is the content of the document?</i></p> <p>The main content of the document is the medical state of the applicant the current day when he or she is signing the health declaration. There is also a section containing the applicant's personal information such as social security number, name, address, telephone etc. and information concerning current driving license and the type of application that the medical certificate refers to. The place and date when signing the form and signature is also part of the content and proof of the applicant's identity.</p> <p><i>What are the meanings of different concepts?</i></p> <p>We will not analyse all the different concepts presented in the medical certificate (figure 2) in this section. The terminology in the medical certificate is partially complex and hard for laypersons to interpret (see below).</p> <p><i>Is the terminology comprehensible and well known?</i></p> <p>The terminology when declaring the state of health is partially based on medical terms and partially adapted to a laypersons language. The applicant's interpretation of the medical terms is a source of error and causes extra work from an agency point of view when managing the application (see also communicative functions below). There are also codes used for describing different driving licenses (e.g. "A" and "BE") that is hard to interpret for a layperson – these codes are, however, effective for case officers in agencies.</p>
<i>Communicative functions</i>	<p><i>What communicative functions does the document carry?</i></p> <p>The main function of the document is to serve as a decision support for the case officer. Another implicit function is to make the applicant aware of the importance of being healthy in order to get a provisional driving license. The document shows what kind of medical issues that are of importance.</p> <p><i>What kind of communicative relations are created between sender and receiver?</i></p> <p>The sender (the applicant) applies, declares and thereby certifies his or her medical status as part of the conditions that must be fulfilled in order to get the application approved. The receiver (a case officer at the SCoA) has the role of a decision maker who has to decide upon whether the application will be approved or denied. This decision is made based on this and other information about the applicant (e.g. crime record supplied by the Police).</p> <p><i>Are communicative functions expressed explicitly?</i></p> <p>It is clear that the applicant is supposed to leave a health declaration in order to prove that he or she is healthy and thus feasible as a driver. Some of the questions can be difficult to understand for an applicant, though, which might result in misunderstandings and a more complex decision process for the case officer. The applicant might e.g. be unsure if he or she has got a certain symptom and thus give a wrong answer. It is rather usual that applicants state that they are on a medication (question D2) that has no impact on their ability to drive or that they are not completely healthy (question D4) due to a cold or some other trivial disease.</p> <p><i>Is the document a response to preceding actions (initiatives) within the work practice?</i></p> <p>The document has to be complemented with an application form. Together these documents are the initiative for application of a provisional driving license.</p>
<i>Media</i>	<p><i>What kind of media is used for the document?</i></p> <p>The medical certificate has been paper-based until 2006. In the e-service under development the medical certificate is going to be an electronic form in the web-based e-service. This medium transfer is an opportunity to make the document easier to understand, e.g. by supporting the applicant with better explanations and help texts. There will, however, exist paper forms in the future as well, since some citizens will lack Internet access.</p> <p><i>How is the document stored, accessed, retrieved, used and changed?</i></p> <p>The paper-based certificate has been stored in archive at the SCoA together with the application form. In the e-service all electronic forms will be stored in an IT-system. This will make future retrieval of documents much easier since no physical documents will be necessary to find.</p>

Table 4. A Communication Analysis of the Medical Certificate – Communicative consequences.

Communicative consequences	
<i>Consequential actions</i>	<p><i>What actions are taken based on the information in the document?</i></p> <p>The information in the form is the basis for the decision if the applicant should be granted the provisional driving license or not. The medical condition stated by the citizen in this form is solemnly sworn by the citizen. Although the medical certificate is important the decision of approving or denying a provisional license is also leaning on the crime record. If the citizen is caught lying about serious medical conditions in the form one consequential action is trial in court and the possibility of facing imprisonment or fine.</p> <p><i>Is there a clear initiative-response relation between the document and its consequential actions?</i></p> <p>In the communication setting of C2G there is no clear initiative-response relation. The citizen can be denied a provisional license on other grounds than the information stated by the citizen in the different forms. The major part of cases that do not bear this relation are cases that involve other conditions than medical in terms of drug abuse, alcohol abuse, assault or other issues more or less closely related to the road traffic context. In these cases the citizen does not always understand that the criminal or social authorities' records of the history of behaviour can lead to a denial of provisional driving license.</p> <p><i>For what purposes is this information used?</i></p> <p>We have already briefly addressed some of the purposes of this form. One purpose is of course to generate the information required from the client in order to approve or deny a provisional license. Another purpose is to teach the client the medical conditions of importance. A third purpose is for SRoA to regulate the conditions of importance that lead to at least a partial fulfillment of the goals in the government policy of the road traffic situation.</p> <p><i>May there be any possible side effects of the document utilisation?</i></p> <p>No side effects that we have discovered so far in the project.</p>
<i>Receiver</i>	<p><i>To whom is the information in the document addressed?</i></p> <p>The addressee as well as the communicator can be viewed upon from different angles. The obvious addressee in the C2G communicative relation is the SCoA that receives the forms from the applicants. Another important addressee is the citizen in the communication setting of G2C where the client is taught important medical conditions and obstacles for getting and keeping a driving license.</p> <p><i>Are there actors updating (changing) the document?</i></p> <p>In the paper form updating the form is not a frequent act. Hundreds of thousand of copies are printed and distributed at once and updates (on the typical level) come rarely. In the electronic form the medical certificate can be a more dynamic document than the paper-based version and the maintenance personnel will be able to continuously update the questions (but such changes will of course be surrounded by regulations).</p> <p><i>What kind of knowledge of the receiver is presupposed in the communication?</i></p> <p>In C2G communication the knowledge of the receiver is not of any critical nature. We have already discussed the issue of garbage data in terms of irrelevant medical conditions. Besides this lack of knowledge at the citizen side or lack of precise communication skills at government side about what medical conditions that are relevant, the main issue of knowledge is the citizen's knowledge about him-/herself and the medical condition of the individual.</p>

5 EXPERIENCES FROM METHOD USE

The communication analysis of the medical certificate was performed by answering the questions posed by the method. After having answered these questions, we discuss our experiences from the analysis and what contributions and shortcomings the method implied.

5.1 Communication Themes

The communication setting in this empirical case is somewhat more complicated than is indicated in the original method description by Cronholm and Goldkuhl (2004). We have identified four communication themes in this case that deal with this complexity. The first theme is communication as it is perceived by the citizen; i.e. a theme of government-to-citizen (G2C) communication of health related requirements for provisional driving license. This is probably perceived by the citizen as communication from the SCoA to the citizen, but is in reality communication from the SRoA.

SRoA is responsible for designing the form and, thus, the actor who regulates and restricts the communication between agency and citizen. This is an example of an inter-organizational complexity that is not unusual in public e-services.

This leads us to the second communication theme which is the governing theme. The authorities involved in provisional driving license matters are not on the same hierarchical level. SRoA is the agency with sector responsibilities for the road traffic sector. This implies that SRoA interprets the laws issued by the government and transfers these into more detailed regulations specifying how provisional driving licenses should be handled. This also involves designing and maintaining the practice of how to interpret the applicable laws. This means that the SRoA governs the input to the SCoA as well as the output from the SCoA on the typical level through its explicit right to interpret the laws and reformulate these into detailed regulations specifying outline contents of formal G2C as well as C2G communication. This is on the level of detail as in specifying the relevant medical conditions and the tolerance level in terms of seriousness for approving or denying the provisional license.

The third communication theme is a regulative control mechanism theme in the hierarchy of policy implementation. Through the content of the medical certificate as well as other regulative documents the SRoA specifies what should be focused in order to reach the goals of road traffic safety issued by the legislature of government in policies of road traffic. An example of how these multiple communicative functions come into conflict is the issue of how inclusive the medical certificate questions should be articulated. The more inclusive formulation of questions to the citizen ordered by the SRoA the more irrelevant and possibly relevant information is communicated from citizen to the SCoA. This example shows how the value of efficiency in terms of productivity and the value of legal efficiency, in terms of finding more citizens diverging from the norm specified in law and other specifications, clash. This clash of values is one of the important design features of multi-functional and multiple communication settings in the development of electronic forms in public e-services. More gathered data through questions in forms mean further complexity in handling the cases and this also implicitly makes up large obstacles in granting the licenses automatically. On the other hand with deeper investigations of the clients there is a larger possibility of finding unsuitable drivers. This means that in this case the clash between productivity and quality in policy implementation also means a clash between quality and transactional eGovernment. This clash of interests and values is also inter-organizational as the question of implementing and designing procedures for electronic communication (“How to”) is in the hands of the SCoA but the contents to be communicated (“What to”) is in the hands of the SRoA. These clashes need to be balanced in order to design forms and e-forms with a suitable level of detail, but the inter-organizational character in this case adds complexity to this task of balancing values.

The fourth theme is the communication taking place between citizen and the SCoA. This is a typical citizen-to-government (C2G) communication of fulfilling the requirements of the application process as specified by legal requirements. An interesting fact in this case is that very few in common application age (approx. 16 years old) have any of these health related problems and no further medical certificate is required later in life. This leaves at least one interpretation of this form as a teaching document that in formal requirements informs the citizens of the most hazardous medical conditions in a road traffic setting.

5.2 Method Use in an E-government Context

The communication analysis method follows the logic of conditions, actions and consequences. We apprehend this as being a very suitable structure when analysing communication between citizens and agencies in public sector since this logic is obvious in exercise of public authority. This should make the method easy to comprehend in such a context.

Cronholm and Goldkuhl (2004) define the work practice as the setting where the communication analysis should take place. We apprehend the work practice as being placed within an organization

in their study. When the method is transferred from the requirements engineering field and an intra-organisational setting to a public e-service setting, the work practice must be replaced by, or at least interpreted as, an inter-organizational or government vs. citizen setting instead. The communicative actions take place between citizens and agencies instead of within an organization. This implies some important differences compared to the situation in which Cronholm and Goldkuhl have originally developed and tested their method. The inter-organizational context entails that the communicative interaction is more complex than in an intra-organizational ditto. There are several interacting actors, possibly unknown with no previous relations and no obvious hierarchal bonds, with differing purposes and inconsistent understanding of the governing aspects of the interaction, just to mention a few characteristics that increase the complexity. In our public e-service case the communicative actions conducted through the electronic form have to be stored on parallel media; both in the IT-system and on paper in an archive. This is an obligation that is important in a life cycle perspective of the document, but it also adds complexity to the situation.

In this case we as researchers have conducted a communication analysis. If the analysis method should be useful in public e-service development and evaluation, practitioners should be able to accomplish the analysis without any help from researchers or consultants. Cronholm and Goldkuhl (ibid.) do not explicitly state who the analyst would be in their case, but there seems to be implied that the IT-designer is a main actor. This can be criticised as an inappropriate solution in the public sector, where the development of an e-service to a large extent involves development of working processes and routines within an agency and between agencies. Thus, the practitioners are the ones that need to analyse the communication in order to understand the interaction between citizens and agency. The need and arguments for practitioners or users to participate when designing information systems is for example elaborated in the work describing cooperative and participatory design (cf. e.g. Bjerknes et al. 1987; Greenbaum & Kyng, 1991).

5.3 Potential Risks

The communication analysis method guides us through the analysis by posing questions. We found this to be helpful and rewarding during the analysis, but in the same time this can be criticised as drawing the attention from important characteristics. Walsham (1993) talks about theories as a way of both seeing and not seeing things. The communication perspective helps us focus on certain issues but in the same time it hides other issues from us. This means that the analyst has to be careful about what he or she sees when accomplishing the analysis. Thus, the purpose of the analysis must be clear and should guide the analysis together with the set of proposed questions.

Another possible risk with this kind of document analysis could be that the existing form will be too much in focus. This might result in a development of an electronic form that is almost identical with the old paper-based form and, thus, not innovative enough. The electronic form in the public e-service inherits content and design from the paper-based form that is not necessary optimal and the electronic medium is, thus, not fully exploited. When the potential of an electronic medium is not fully exploited in order to gain benefits for an organization we identify similarities with at least one of the perspectives introduced by Markus and Robey (1988). Markus and Robey state that an organizational imperative when developing information systems and processes only is one possible way of looking at the phenomenon. We also have the technological imperative (information systems as a driving force that has effects on an organization) and the emergent perspective (the use and effects of an information system emerge from social interaction). We are not in sympathy with technological determinism, but we identify a potential in using and interpreting an information system as a tool with potentials. This is related to the emergent perspective presented above where we identify the need for actors within the agencies to proactively use information systems in order to realise their intentions. If only the organizational imperative is used when developing information systems, for e.g. e-services, there is a risk that only the internal and existing information needs (and for example in existing forms) are realised – not the more innovative e-services.

In our case the law also regulates what must be communicated in the form. This is also an example of the interpretative schemes deeply implicated in linking social action, structure and interaction embodied in an information system (Walsham, 1993). Problems discovered in the communication analysis might in such cases be able to solve by proposing changes in laws and regulations, which is an example of the importance of not taking the existing form for granted. As we see it, the communication analysis method helps us discover weaknesses in existing forms as the method questions issues that are sometimes taken for granted.

6 CONCLUSIONS AND FURTHER RESEARCH

The communication analysis method focuses on the dyadic communication between a sender and a receiver. Our review of the method shows that in order to understand the communicative functions of the public form we needed to alter the roles of sender and receiver. We did this in order to understand the different relations apparent as communication themes in the studied form in public administration. We discovered four communicative themes in the studied form, other forms could possibly contain fewer or more themes. The identified themes were the G2C communication theme, the governing theme, the regulative control mechanism theme, and the C2G communication theme. The electronic or traditional paper-based form in public administration is, thus, multi-functional and features multiple communicative themes. We also showed how the different themes of communication possess different core values that could be seen as competing. This multiple values problem along with the multi-functional and multiple communication settings are very important key issues in the understanding of the communicative role of forms as well as key design features in the development of e-services and electronic forms.

This paper has showed that a communication perspective is useful in order to understand the role of the form as a communication instrument that supports citizens in their interactions with public agencies. The method has helped us to avoid a one-eyed analysis only focusing on either the agency's or the citizens' perspective. Instead, the communication perspective has pointed out the importance of focusing on both interacting parties – being symmetrical in that sense.

The communication analysis method can be used for several purposes in the public e-service context. The result of the analysis can be used for developing an electronic form; i.e. transferring a paper-based form into an electronic form in an e-service as in our case. The method can also be used for evaluation of electronic forms in existing e-services as well as before redesign of electronic forms on a typical level. According to these findings we claim that communication analysis of electronic forms seems to be an important part of a future method for development of inter-organizational e-services in public sector.

By applying the communication analysis method on the medical certificate form we have been able to discover key issues in the development of e-services and electronic forms. Further research is obviously needed in order to understand how these issues should be managed in order to develop successful public e-services. An interesting question for future research would be to explore in what way our conducted analysis influenced the developed e-service with its electronic forms in the studied case. Another issue to study would be how the method can be used and understood by practitioners without help from researchers or consultants. The latter issue can also highlight a possible need for refining the categories of questions used in the communication analysis presented by Cronholm and Goldkuhl (2004). Our impression from the analysis presented above indicates that some of the categories and questions tend to overlap each other.

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References

- Austin, J. L. (1962). *How to Do Things with Words*. Oxford University Press.
- Baskerville, R. and Wood-Harper, A.T. (1996). A critical perspective on action research as a method for information systems research, *Journal of Information Technology*, 11(3), pp. 235-46.
- Bjerknes, G., Ehn, P and Kyng, M. (1987, Eds.) *Computers and Democracy - A Scandinavian Challenge*, Avebury, Aldershot, England.
- Bovens, M. and Zouridis, S. (2002). From street-level bureaucracy to system-level bureaucracy: How ICT is transforming administrative discretion and constitutional control. *Public Administration Review*, 62(2), pp. 174-183.
- Cronholm, S. and Goldkuhl, G. (2004). Communication analysis as perspective and method for requirements engineering. In Maté, J.S. and Silva, A. (Eds. 2004). *Requirements Engineering for Sociotechnical Systems*. Idea Group, Hershey.
- Graafland-Essers, I. and Etedgui, E. (2003). *Benchmarking e-Government in Europe and the US*. RAND, Santa Monica.
- Goldkuhl, G, and Lyytinen, K. (1982). A language action view of information systems. In Ginzberg and Ross (Eds. 1982). *Proceedings of third International Conference on Information Systems*. Ann Arbor.
- Greenbaum, J. and Kyng, M (1991). *Design at Work: Cooperative Design of Computer Systems*, Lawrence Erlbaum Associates, Hillsdale, New Jersey
- Habermas, J. (1984). *The theory of communicative action 1. Reason and the rationalization of society*. Polity Press, Cambridge.
- Heeks, R. (2006). *Implementing and managing eGovernment*. SAGE, London.
- Hiller, J. and Bélanger, F. (2001). *Privacy strategies for electronic government, E-government series*. Endowment for the business of Government, Pricewaterhouse Coopers, Arlington, VA.
- Jupp, V. (2004). *Realizing the vision of e-government*. In Curtin, G., Sommer, M., Vis-Sommer, V. (Eds.) *The World of E-Government*, Haworth Press, New York.
- Kubicek, H. and Hagen, M. (2000). *One Stop Government in Europe: An Overview*. In Hagen, M., Kubicek, H. (Eds. 2000). *One Stop Government in Europe. Results from 11 National Surveys*. University of Bremen, Bremen 2000, pp. 1- 36.
- Layne, K. and Lee, J. (2001). *Developing Fully Functional E-government: A four-stage model*. *Government Information Quarterly*, 18(2), pp. 122-136.
- Linell, P. (1998). *Approaching dialogue. Talk, interaction and contexts in dialogical perspectives*. John Benjamins Publications, Amsterdam.
- Lipsky, M. (1980). *Street-level bureaucracy*. Russel Sage Foundation, New York.
- Ljungberg, J. (1997). *From Workflow to Conversation*. PhD dissertation, Department of Informatics, Göteborg university.
- Lyytinen, K. (1987). *Two Views of Information Modelling*. *Information & Management*, vol. 12, pp. 9-19.
- Markus, M.L. and Robey, D. (1988). *Information Technology and Organizational Change: Casual Structure in Theory and Research*, *Management Science*, 34(5), pp. 583-598.
- Riksrevisionen (2004). *Vem styr den elektroniska förvaltningen?*, RIR 2004:19, Riksrevisionen, Stockholm. [in Swedish]
- Sacks, H. (1992). *Lectures on conversation*. Blackwell.
- Searle, J. R. (1969). *Speech Acts: An Essay in the Philosophy of Language*. Cambridge University Press, London.
- Strauss, A. and Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage Publications, Thousand Oaks.
- Undesa (2003). *E-government as a "free lunch"?* *Development administration* 106:6-8, UN Department for Economic and Social Affairs, New York.
- Walsham, G. (1993). *Interpreting Information Systems in Organizations*, John Wiley, Chichester.
- Walsham, G. (1995). *Interpretive case studies in IS research: nature and method*. *European Journal of Information Systems*, 4, pp. 74-81.
- Weber, M. (1978). *Economy and society*. University of California Press, Berkeley.
- Weber, M. (2000). *Makt og byråkrati*, Gyldendal, Oslo. [in Norwegian]
- Winograd, T. and Flores, F. (1986). *Understanding computers and cognition: A new foundation for design*. Ablex, Norwood.