COMMUNICATION ANALYSIS OF PUBLIC FORMS
- DISCOVERING MULTI-FUNCTIONAL PURPOSES IN CITIZEN AND GOVERNMENT COMMUNICATION

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Abstract

This paper adopts a communication perspective on forms in public e-services. This perspective emphasizes that the main purpose of such forms is to facilitate communication between citizens and government agencies. The form is perceived as a tool for performing communicative actions. A communication analysis (CA) method, originally developed for systems requirements engineering, is applied on a public form; i.e. the medical certificate used in connection with a citizen's application for a provisional driving license in Sweden. The CA method consists of a set of questions related to three communicative categories; conditions, actions, and consequences. The CA method is used in order to explore the communicative roles of forms in public e-services. As a result of the communication analysis four multi-functional purposes of citizen and government agency communication are discovered. These purposes contribute to the understanding and evaluation of forms in public e-services. The communicative roles, and their multi-functional purposes, are important design features to focus in the development of e-services and electronic forms. Besides these findings, another outcome is that the CA method has been tested in an e-government context. The communication perspective, as well as the CA method, contribute with useful insights in this context.

Keywords: communication perspective, 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 taxation authority) and some of them during a certain

period in life (for example the social insurance office during a parental leave or after retirement). In some cases the citizen initiates the communication, as when applying for permits or government allowances, and in other cases the agency initiates the communication, 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 communicative situations when interacting with a government agency are made through filling in forms.

Until fairly recently (approximately around early 2000) 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 (e-forms) for communication between citizens and government agencies. By e-forms we mean forms that are mediated by information technology and provided by a government agency in order to serve citizens' communication needs. Thus, we interpret the e-form as an instrument for communication. An e-form can have a paper-based, more or less "original" equivalent, that serves as an alternative communication channel. The level of possible digital mediated communication through e-forms between the agency and the citizen is one common aspect when evaluating e-government maturity in agencies, cf. e.g. [Layne and Lee, 2001; Hiller and Bélanger, 2001; Andersen and Henriksen, 2006].

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 stress that 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 acts in his or her position as a public servant (with specific rights and duties), 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 considering the applicants circumstances).

In order to distinguish the relationship between the citizen and the agency, we introduce three roles in citizen and government communication supported by forms. A form is issued by one actor and usually filled in by another. The filled-in form is then received by a third actor (or, in some cases, the first actor). We name these actors the issuer, the user, and the recipient, see Figure 1 below. The issuer is a government agency and the recipient could be the same agency or another agency. The user is in this context a citizen. The issuer is restricted in the design actions by laws and regulations, which implies that a fourth important role is the legislator. The user and the recipient are also influenced by the legislator when performing their actions.

Issuer
Creates and distributes
the form according to
restrictions from the legislator

User
Fills in the form
and submits it

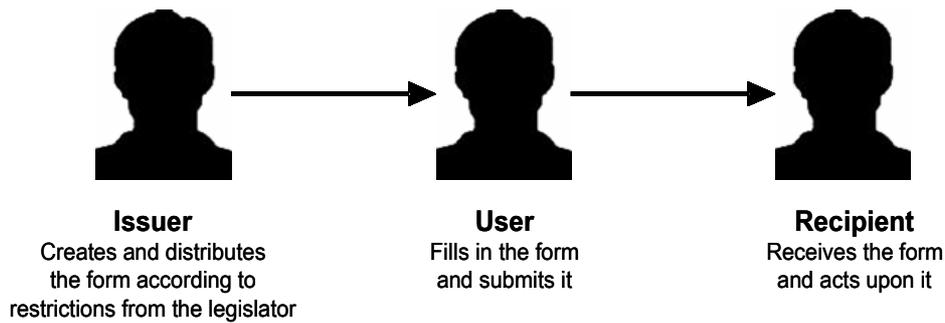**Recipient**
Receives the form
and acts upon it

Figure 1. The issuer – user – recipient model. Source: [Axelsson and Ventura, 2007, p. 344]

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]. E-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 and Lyytinen, 1982; Winograd and Flores, 1986; Ljungberg, 1997; Ågerfalk and Eriksson, 2004]. In e-government research the two-way communication character of public e-services, cf. [Ancarini, 2005; Goldkuhl, 2006; Wimmer, 2002] is emphasised by the communication perspective.

The purpose of this paper is to explore the communicative roles of forms in public e-services. A communication analysis (CA) method, originally developed for systems requirements engineering [Cronholm and Goldkuhl, 2004], is applied on a public form; i.e. the medical certificate used in connection with a citizen's application for a provisional driving license in Sweden. A medical certificate is a form where the applicant assures to the government 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 medical certificate is further described and illustrated in Figure 3 and in section 4 below.

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 CA 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 answer them by giving examples from the medical certificate. In the fifth section we analyze and discuss our findings. 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 e-form to exemplify the theories. We also explain the content of the CA method, which builds upon the communication

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perspective. The section ends with some arguments about why we find this perspective and method suitable to use when designing and evaluating public e-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 e-form regarding application for provisional driving license to illustrate this, the application with 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 regulations.

As a result of several scholars' work on 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]. We agree upon this criticism and believe that a communication perspective is a more feasible way of understanding information systems. Using a communication perspective on an information system means that an information system, instead, is seen as a tool 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 and Goldkuhl, 2004].

As mentioned in the introduction above, another important theoretical source for the communication perspective 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 issued e-form can be seen as a first utterance from the agency. The e-form is then used by the citizen and its filled-in content can be seen as both a response to this and as an

utterance initiated from the citizen. This is then followed by a response from the agency, i.e. the decision regarding approval or denial (compare to Figure 1 above). Language action theory, as a part of a communication perspective, provides us with a deep understanding about what we do when we communicate while 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 e-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 CA method in order to emphasize communication issues during the requirements engineering process (issues that Cronholm and Goldkuhl claim often are disregarded in requirements engineering). 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 by qualitative analysis and in particular grounded theory [Strauss and 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 2 below.
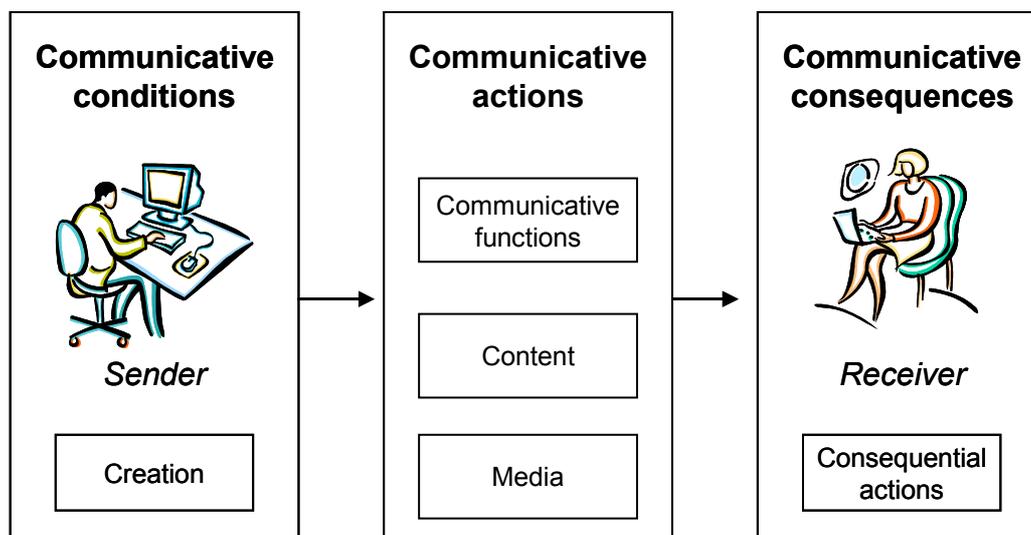

Figure 2. Communication model. Source: [Cronholm and Goldkuhl, 2004]

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.

Communicative conditions	
Creation	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?
Sender	Who is the communicator?
	Is there anyone mediating (transferring) the information/document?
Communicative actions	
Content	What is communicated? What is the content of the document?
	What are the meanings of different concepts?
	Is the terminology comprehensible and well known?
Communicative functions	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?
Media	What kind of media is used for the document?
	How is the document stored, accessed, retrieved, used and changed?
Communicative consequences	
Consequential actions	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?
Receiver	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?

Table 1. Communication Analysis Questions. Source: [Cronholm and Goldkuhl, 2004].

2.3. E-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 e-form plays an important role when communicating. The e-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 information system interface since it is the information technology based media that the user (the citizen) uses to communicate with the agency. The content of the paper-based form as well as the e-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 e-form strongly influence what the citizen is able to communicate, i.e. the e-form stipulates what kind of communicative acts that are possible to perform. The e-form (as well as the paper-based form) is thus an instrument for communication – both restricting and enabling 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 CA 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 also 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 are central components. In highly rule-based case handling (as in the 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; Reddick, 2005], where service transactions are completely done online, a higher degree of standardization in communication on both citizen and government side is important [Bovens and 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 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. The transformation to more standardized and formal communication stresses the need for analyzing and designing public e-forms that serve as high quality tools for citizen and government communication.

3. Research Design

The medical certificate that is filled-in in connection to the application form for provisional driving license in Sweden, is used as the empirical case in this paper. The provisional driving license application has been studied in 2006 within a research project concerning e-service development in public sector in Sweden. 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 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. A one-stop government solution consists of integrated services that are made available from one single website, even if they are provided by different government agencies or private businesses [Wimmer and Tambouris, 2002]. The e-services comprise e-forms for provisional driving license application, which will be possible to fill in and submit 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. This paper is related to this latter project goal, since communication analysis is a potential component in a method for inter-organizational e-service development.

The research project can be characterized as action research, which has the dual purpose of developing and evaluating e-services and the web-based portal as well as developing knowledge based on reflections from these activities. Action research is a qualitative research approach that is frequently used within the information systems research field, cf. e.g. [Baskerville and Myers, 2004; Baskerville and Wood-Harper, 1996]. A typical characteristic of the present research project compared to action research is the "problem solving part". We as researchers do intervene in social systems (the client organization), cf. [Susman, 1983]. Another core characteristic in action research that is present in the case is the intention to develop a comprehensive view of the social systems that are studied. A social system is usually in transition or change when studied and intervened [Baskerville, 1999]. This is the case here as described above. The intervention means that we as researchers observed and participated in the studied phenomena [ibid] and used research methods such as a longitudinal case study, participation and observation. Pragmatism is therefore an appropriate underlying philosophy. The present project as an action research project is discussed as a phenomenon in Melin and Axelsson [2007] – different roles, researcher identified problems and issues vs. practice identified problems and issues are discussed, etc.

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 e-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 found the CA method [Cronholm and Goldkuhl, 2004], which we found attractive due to its articulated communication perspective. In the present action research case we, the researchers, have conducted a communication analysis. This is more due to practitioners' lack of time during the development project, than a result of a strategic choice. Some kind of participation of practitioners when actually performing the communication analysis would probably have been fruitful. In the present case the practitioners' have given us, as researchers, the input to the CA analysis and received the output from the analysis. The empirical data from the evaluation has been analyzed in a qualitative, interpretive way [Walsham, 1995] also with guidance from the communication perspective operationalized in the CA method (above). 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.

4. The Medical Certificate – An Empirical Analysis

Everyone in Sweden who wants to start taking driving lessons in order to get a driving license, first has to apply for a provisional driving license at the county administrative

board in the region where he or she lives. The provisional driving license application has to be complemented by, among other documents, a medical certificate (Figure 3 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 may depend on medical reasons or behavior reasons, such as being punished for certain crimes.

Until recently, the permit application has been a paper-based form that the citizen has printed from the website or ordered from the agency, filled in, signed and sent by mail to the agency. The application is 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 to be satisfactory a provisional driving license is 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 labeled as "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 reported action research project. By developing an e-service that will support automated case handling in all green cases, resources will be saved at the agency. These resources can instead be used for managing more complex cases. There are other positive effects that the e-service should 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, which has been the case earlier. Instead, the e-service will be an example of a one-stop government solution [Kubiceck and Hagen, 2000; Wimmer and Tambouris, 2002], 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

<table>
<tr>
<td>

A.
Current driving licence

Group I
☐ ☐ ☐ ☐ ☐
A   A1   B   BE   Tractor

Group II
☐ ☐
C   CE

Group III
☐ ☐ ☐
D   DE   Taxi

Application for

Group I
☐ ☐ ☐ ☐ ☐
A   A 1   B   BE   Tractor

Group II
☐ ☐
C   CE

Group III
☐ ☐ ☐
D   DE   Taxi

A=heavy motorcycle, A1=light motorcycle, B=private car,
C=heavy lorry, D=bus, E=heavy trailer, Tractor=tractor licence,
Taxi=taxi driver licence

</td>
<td>

B. Personal particulars

Social security number:

Name :

Address:

Telephone:

Proof of identity:

Known personally ☐   ID card ☐   Driving licence ☐

</td>
</tr>
</table>

C.   Declaration of health - questions to be answered in connection with the physicianís 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   ☐ Yes ☐ No

    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 3. 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)? ÖÖ ☐ 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 3 (cont'd). The Medical Certificate.

4.1. Communication Analysis Results

In tables 2-4 below, we as researchers answer the communication analysis questions in relation to the medical certificate provided by the government agency. In all questions where it is meaningful, we distinguish between communication from issuer to user and communication from user to recipient, in accordance with the issuer-user-recipient model in Figure 1 above.

Communicative conditions	
Creation	*When is the information created?*
	Issuer-to-user: The issuer interprets the laws regulating the road traffic context and transfers them into demands of the required medical conditions and circumstances that render an individual unfit for road traffic. These medical requirements are then transferred into questions in the form, aiming at gathering the required information from the citizen in order to decide the individual's suitability for road traffic.
	User-to-recipient: The citizen interprets the questions in terms of his/her knowledge of the personal medical condition when answering the questions.
	What are the circumstances for creating the information?
	Issuer-to-user: The form is designed and issued once and for all. The form is not changed or updated on a regular basis.
	User-to-recipient: The information is created by the applicant who fills in the form, separated in time and space from the involved agencies.
	Why is the information communicated?
	Issuer-to-user: The main reason to issue the form is to find unsuitable future drivers and prevent them from getting a driving license.
	User-to-recipient: 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 are needed as a compulsory part of issuing a provisional driving license.
	What is needed in order to create information in the document?
	Issuer-to-user: When designing 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.
	User-to-recipient: When the citizen is completing a form no other information but knowledge about the personal medical conditions is required. If necessary a physician can be consulted.
	What kinds of work practice rules govern the creation and use of the document?
	Issuer-to-user: 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 in terms of specific medical conditions. Thirdly, these specifications are transferred into questions in the form. All these levels together form the founding interpretation of how the government policy should be implemented.
	User-to-recipient: There are also work practice rules regulating the behaviour of the citizen in relation to the agencies. These rules state that the information in the submitted form is solemnly sworn to be true since a lying citizen is possibly facing imprisonment or fines for lying in the medical certificate.

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

Communicative conditions	
Sender	*Who is the communicator?*
	Issuer-to-user: Government-to-citizen (G2C) communication occurs when stating what medical conditions that render the citizen unfit for road traffic. Government-to-government (G2G) communication occurs 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. *User-to-recipient:* Citizen-to-government (C2G) communication occurs when the citizen is fulfilling the requirements of the application process by answering the questions.
	Is there anyone mediating (transferring) the information/document?
	The original paper form as well as the e-form (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 e-form the main mediator is SCoA, although all design propositions and all reformulation of the questions must be approved by SRoA (in its role as issuer).

Table 2 (cont'd). Communication Analysis of the Medical Certificate – Communicative conditions.

Communicative actions	
Content	*What is communicated? What is the content of the document?*
	User-to-recipient: 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.
	What are the meanings of different concepts?
	We will not analyse all the different concepts presented in the medical certificate (Figure 3) in this section. The terminology in the medical certificate is partially complex and hard for laypersons to interpret (see below).
	Is the terminology comprehensible and well known?
	Issuer-to-user: The terminology when declaring the state of health is partially based on medical terms and partially adapted to a layperson's 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 handling the application (see communicative functions below). There are also codes used for describing different driving licenses (e.g. "A" and "BE") that are hard to interpret for a layperson – whereas these codes are effective for case officers in the agencies.
Communicative functions	*What communicative functions does the document carry?*
	Issuer-to-user: An 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. *User-to-recipient:* The main function of the document is to serve as a decision support for the case officer.
	What kind of communicative relations are created between sender and receiver?
	User-to-recipient: 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 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).

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

Communicative actions	
Communicative functions	*Are communicative functions expressed explicitly?*
	User-to-recipient: 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 an incorrect 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.
	Is the document a response to preceding actions (initiatives) within the work practice?
	The document has to be complemented with an application form. Together these documents are the citizen's initiative for application of a provisional driving license.
Media	*What kind of media is used for the document?*
	The medical certificate has been paper-based until 2006. From now on the medical certificate will also be an e-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 not all citizens will have Internet access.
	How is the document stored, accessed, retrieved, used and changed?
	Issuer-to-user: The paper-based certificate has been stored in archive at the SCoA together with the application form. In the e-service all e-forms will be stored in a database. This will make future retrieval of documents much easier since no physical documents will be necessary to find. Paper-based forms will be scanned in the future, in order to be stored and handled in the same way as the e-forms.

Table 3 (cont'd). Communication Analysis of the Medical Certificate – Communicative actions.

Communicative consequences	
Consequential actions	*What actions are taken based on the information in the document?*
	User-to-recipient: 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.
	Is there a clear initiative-response relation between the document and its consequential actions?
	User-to-recipient: 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 forms. The major part of such cases 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 past behaviour can lead to a denial of provisional driving license.

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

Communicative consequences	
Consequential actions	*For what purposes is this information used?*
	Issuer-to-user: One purpose is to teach the citizen about medical conditions of importance.

	Another purpose is for the 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. User-to-recipient: A third purpose is of course to generate the information required from the applicant in order to approve or deny a provisional license. *May there be any possible side effects of the document utilisation?* We have not discovered any side effects in this case.
Receiver	*To whom is the information in the document addressed?* *Issuer-to-user:* An important addressee is the citizen in the communication setting of G2C, where the citizen is taught important medical conditions and obstacles for getting and keeping a driving license. *User-to-recipient:* The obvious addressee in the C2G communicative relation is the SCoA that receives the forms from the applicants. *Are there actors updating (changing) the document?* *Issuer-to-user:* In the paper-based form updating the form is not a frequent act. Hundreds of thousand of copies are printed and distributed at once and updates come rarely. In the e-form the medical certificate can be a more dynamic document than the paper-based version since the issuer is able to continuously update the questions (but such changes will of course be surrounded by regulations). *What kind of knowledge of the receiver is presupposed in the communication?* *User-to-recipient:* 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 the government side about what medical conditions that are relevant, the main issue of presupposed knowledge is the citizen's knowledge about his or her own medical conditions.

Table 4 (cont'd). Communication Analysis of the Medical
Certificate – Communicative consequences.

5. Discussion

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

5.1. Multi-Functional Purposes of Citizen and Government Communication

The communication setting in this empirical case is somewhat more complicated than is indicated in the original method description and context by Cronholm and Goldkuhl [2004]. Grounded in empirical data (following an inductive analysis approach) from our case we have outlined *four communication themes* that deal with this complexity. The issuer-user-recipient model (Figure 1) supported us to discover these examples of multi-functional purposes in communication between citizen and government.

The first theme is *communication as it is perceived by the citizen*; i.e. a theme of communication from the issuer to the citizen concerning health related requirements for provisional driving license. This is often denoted as government-to-citizen (G2C) communication. In our case, this communication 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 issuing 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.

The second communication theme is the *governing theme*. The authorities involved in provisional driving license matters are on different hierarchical levels in

Sweden's public administration. SRoA is the agency with sector responsibility for the road traffic sector. Sector responsibility involves designing and maintaining the practice of how to interpret the applicable laws. Thus, the SRoA governs the input to the SCoA as well as the output from the SCoA. This is accomplished through SRoA's explicit right to interpret the laws and reformulate these into detailed regulations specifying outline contents of formal G2C as well as C2G communication (e.g. by issuing public forms). This entails both specifying the relevant medical conditions and the tolerance level in terms of approving or denying the provisional license.

The third communication theme is a *regulative control mechanism theme*. 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 multi-functional communicative purposes come into conflict is the case of how inclusive the medical certificate questions should be articulated. The more inclusive formulation of questions to the citizens, requested by the SRoA, the more irrelevant (as well as possibly relevant) information will be communicated from citizens 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 an example of the multi-functional purposes in citizen and government communication that must be handled when designing e-forms in public e-services. More gathered data through questions in forms means further complexity added in handling the cases. This also implicitly implies large obstacles for handling the licenses automatically by an e-service. On the other hand, with deeper investigations of the clients, the possibility of finding unsuitable drivers increases. Thus, 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 content to be communicated ("What to") is in the hands of the SRoA. Such a clash needs to be balanced in order to design e-forms with a suitable level of detail, not at least since the inter-organizational character in our case adds further complexity to this challenge of balancing values.

The fourth theme is the *communication taking place between citizen and the government* (SCoA) in the role of the recipient. 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 (approximately 16 years old) have any of the focused health related problems and no further medical certificate is required later in life. This implies that one purpose of the form is to serve as a teaching document that by its formal requirements informs the citizens of the most hazardous medical conditions in a road traffic setting.

5.2. CA Method Use in an E-government Context

The CA method follows the logic of conditions, actions, and consequences (illustrated in Figure 2). We apprehend this as being an adequate structure when analysing communication between citizens and agencies in public sector since this logic is obvious in exercise of public authority. This makes 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 organizations' boundary in their paper. When the method is transferred from the requirements engineering field in 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. The communicative actions take place between citizens and agencies instead of between employees within an organization. This implies some important differences compared to the context in which Cronholm and Goldkuhl have originally developed and tested the CA method. The present inter-organizational context entails that the communication 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 communication, just to mention a few characteristics that increase the complexity. In the studied public e-service case the communicative actions conducted through the e-form have to be stored on parallel media; both in the IT-system (a database) 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 the present action research case we, in the role as researchers, have conducted the communication analysis. If the CA method should be useful in public e-service development and evaluation, practitioners need to be able to accomplish the analysis without any support from researchers or consultants. Cronholm and Goldkuhl [ibid.] do not explicitly state who the analyst would be in the presentation of the CA method, 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 and between agencies. Thus, the practitioners are the ones that need to analyse the communication in order to understand the overall 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 and Kyng, 1991].

5.3.   Potential Risks Using a CA Method

The CA 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 an existing form will be too much in focus. This might result in development of an e-form that is almost identical with the old paper-based form and, thus, not innovative enough. In that case the e-form 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. Besides this imperative, they also describe 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, e.g. e-services, there is a risk that only the internal and existing information needs (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 be solved 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 CA 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 CA 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. The issuer-user-recipient model [Axelsson and Ventura, 2007] was used in order to focus the agency as sender and the citizen as receiver, as well as the citizen as sender and the agency as receiver. We did this in order to understand the different relations apparent as communication themes in the studied form. This is an example of an adaptation of the application of the CA method to a specific context – the public administration. We discovered four communicative themes in this study. It is possible that other forms contain fewer or more themes. The identified themes were (1) the G2C communication theme, (2) the governing theme, (3) the regulative control mechanism theme, and (4) the C2G communication theme. The electronic (as well as the traditional paper-based) forms in public administration have, thus, multi-functional purposes (as we have discussed in section 5.1) and features multiple communicative themes. We also showed how these different purposes possess different core values that could be seen as competing. This multiple values dilemma, along with the multi-functional communication settings, are 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 e-forms.

The main contribution in this paper is the notion that a communication perspective is useful in order to understand the roles of the form as a communication tool that supports citizens in their interactions with public agencies and vice versa. The CA method helps us to avoid a one-eyed analysis only focusing on either the agency's or the citizens' perspective. Instead, the communication perspective points out the importance of focusing on both interacting parties – being symmetrical in that sense.

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

By applying the CA method on the medical certificate form we have been able to discover multi-functional purposes of this form. We argue that this is a key issue when designing and evaluating e-services in order to obtain a thorough understanding of the communicative dimensions of interaction between citizens and government agencies. An effect of applying the CA method can be a better base for decisions regarding the design and re-design of public forms – leading to forms that better support communication between citizens and government agencies.

Further research is needed in order to understand how these purposes should be handled in order to develop appropriate 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 e-forms in the studied case. Another issue to study would be how the CA 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 CA method 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, conceptually and in use.

Acknowledgement

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