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Reaching Communication Quality in Public E-Forms – A Communicative Perspective on E-Form Design

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Abstract. This paper adopts a communication perspective on public electronic forms (e-forms). By doing so we define forms as instruments for communication and, thus, also instruments through which citizens perform different communicative actions towards government agencies. As such instruments, the forms might be more or less useful. The purpose of this paper is to explore what features of an e-form that increase the communication quality. We conduct a theoretical synthesis of three existing approaches for designing information systems. The result is a combined theory on key features of an e-form that make the establishment of communication quality more likely. The result consists of four key concepts, each of which give rise to one set of design principles for communication from the issuer of the e-form to the user (citizen), and one set of design principles for communication from the user (citizen) to the recipient of the e-form.

Keywords: Communication quality, usability, actability, electronic form, public e-service.

1 Introduction

Citizens interact with government agencies in many different matters. This interaction might be performed face-to-face or through a communication medium. In most cases forms are filled in as part of the interaction. 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. In more ambitious e-government development efforts 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. The level of possible digital interaction through e-forms between the agency and the citizen is a frequent aspect when evaluating the level of 24/7 maturity [6].

A traditional way of viewing forms is that they are containers which transfer information from the citizen to the agency and vice versa. In this paper we suggest a communication perspective as a complementary view. 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 government agencies. A citizen might ask for a permission, request an allowance or a respite, declare income, appeal against a decision, etc. These are all examples of actions that the citizen performs when submitting a form to the agency.

Correspondingly, the government agency performs actions both as issuer of the form and as recipient of the form. The issuer decides what communicative actions that will be possible to perform through the form, what information content that is possible to give, in what way this is supposed to be documented, etc. The issuer is often restricted by laws and regulations when designing the form. The case officer performs actions as recipient of the form on behalf of the agency, when he or she makes decisions based on the information content in the form. Common actions are for example to approve an application, deny a request, or ask for supplementary information (e.g. further details). A communication perspective on public e-services also emphasize the two-way communication character of e-services that has been discussed by several e-government researchers [c.f. 1, 11].

In this paper we define the e-form concept as an electronic equivalent of a paper form. The e-form serves as part of the user interface in a web-based public e-service, 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 citizen uses to communicate with the agency. The content of the e-form is obviously often 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 communication perspective, thus, highlights the fact that there are several communicating actors related to the e-form. Three roles are always present in e-form communication: An e-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 original actor). The actors filling these roles are in this paper called the issuer, the user and the recipient of the e-form (fig. 1). These roles may in reality be played by several individuals or a whole organization, but the roles are always present. The issuer generally issues several mostly identical copies of the e-form, each one filled in by a different user. An e-form may also have several recipients, especially if the e-form is complex and the primary recipient is a large organization. The e-form might also be partly or entirely processed by a computer upon submission. Besides these roles, there is a fourth actor that influences e-form design and communication; the legislator. As stated above, laws and regulations are often restricting the issuer when designing the e-forms for citizen and agency communication.

By naming one of these roles “user” we do not imply that the user is the only one who makes use out of the e-form. In fact, since e-forms are parts of an organizational context there may be numerous of people who directly or indirectly benefit from the e-form’s existence and use. However, the user is normally the only one who directly interacts with the original e-form. In the context of public e-forms, the user is a citizen and the issuer as well as the recipient belong to a government agency. The concept “user” is therefore in this paper used as a synonym to “citizen”.

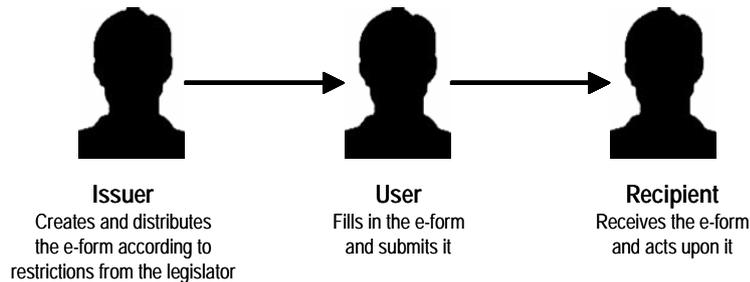


Fig. 1. The issuer – user – recipient model.

The communication perspective that we adopt in this paper has its theoretical roots in the language action theory [e.g. 2, 8, 5]. The key issue in language action theory is that people who communicate perform communicative actions (speech acts). Searle [8] defines speech acts as consisting of three parts; the propositional content, the illocutionary context and the illocutionary force. The propositional content describes what the speech act is about. The illocutionary context characterizes the significant background information of the speech act and the illocutionary force specifies the intended effect of the communication. (ibid.)

When viewing e-forms as instruments for communication it is obvious that the design of the e-form can result in an e-form that is more or less useful in order to perform a certain communicative action. We use the concept of communication quality to characterize what we mean by an e-form that is fulfilling its communication purposes as satisfactory as possible. Eriksson [4 p. 405] defines communication quality as “communication with qualities which contribute to actor relationships based on mutual understanding”. The purpose of the paper is to explore features of an e-form that increase the communication quality. By conducting a theoretical synthesis of three approaches for designing information systems, we arrive at a combined theory on key features of an e-form that make the establishment of communication quality more likely. The fact that we focus on the e-form and, thus, on the formal communication that takes place between the citizen and the agency, does not imply that we are neglecting the fact that a certain amount of informal communication is performed through other media. In this paper, the communication quality concept is applied on the formal part of the communication, but it would also be relevant to assess communication quality in informal citizen and agency communication.

2 Research Method

This paper reports on a theoretical, conceptual work, even though the outcome of the study will apparently have practical influence. Three approaches for information systems design were analyzed with the aim to combine design features from the approaches and adjust these features to the context of e-forms. The three approaches were all characterized by design guidelines; i.e. a set of principles that covers critical standpoints of each approach. The first set of principles selected as data was a set of usability principles [7]. Keinonen’s compilation of several previous usability models seemed to be a good starting point, since usability is the most frequently used and most well-known perspective on end-user issues. We argue that Keinonen’s study represents this perspective well. While usability is critical it does not cover communicative issues deeply enough to allow a thorough appreciation of them. Therefore, two sets of principles derived from a communication perspective on information systems were included in the analysis. The actability principles, put forth by Cronholm and Goldkuhl [3], and the communication quality principles, put forth by Ericsson (2000), were chosen to represent this perspective.

These guidelines were analyzed by using a grounded theory approach [9]. The set of principles were used as data and the procedures of sampling, coding, comparing and conceptualizing were performed iteratively. By the third iteration the categories were beginning to feel saturated. Potential additional sets did not seem to enrich the developed concepts in any significant way. Thus, the analysis iteration was completed.

3 Information Systems Design Principles from Usability, Actability and Communication Quality

Usability is one of the most common perspectives used in analysing design features of information systems and has been focused in research since the 1980s. Much of the research is grounded in cognitive psychology, and centres on how the mental faculties of humans influence how we perceive and use different artefacts. Since there is no consensus on an exact meaning there are many different views on what usability is. Keinonen [7] condenses sets of principles from eight of the most commonly cited guidelines into a chart. This chart does not claim to be the definite word on what usability is, but gives a good summary of what the most generally agreed upon principles are. The principles in the chart are all recognised by several guidelines. In table 1, these eight generic principles for usability are presented.

Table 1. Eight generic principles for usability [7].

| | |
|----|---|
| U1 | <i>Consistency</i> – Do things the same way every time so that new things have to be learned only once |
| U2 | <i>User control</i> – Put the user in direct control of the actions performed |
| U3 | <i>Appropriate presentation</i> – Present all information in an appropriate fashion |
| U4 | <i>Error handling and recovery</i> – Give advance warning and allow easy detection of and recovery from errors made |
| U5 | <i>Memory-load reduction</i> – Help the user remember important information |
| U6 | <i>Task match</i> – Provide exactly the information that the user needs, in the right order |
| U7 | <i>Flexibility</i> – Allow adaptation to tasks and environments beyond those first specified |
| U8 | <i>Guidance, help</i> – Give the user relevant guidance in understanding and using the system |

Information System Actability Theory (ISAT) is a way of looking at information systems that highlights the actions that are performed through information system usage [12]. This view is based on a communication perspective on business processes. Information systems are seen as part of an organisational context in which actors perform communicative actions. Actability is defined as the ability of an information system to “perform actions and to permit, promote and facilitate users to perform their actions both through the system and based on messages from the system, in a work practice context” [3 p. 3]. In table 2, ten generic principles for actability are presented.

Table 2. Ten generic principles for actability [3].

| | |
|----|--|
| A1 | <i>Clear action repertoire</i> – Help users to easily understand what they can do in the system |
| A2 | <i>Satisfied communication needs</i> – Allow users to “say” what they want to say through the system |
| A3 | <i>Easy to navigate</i> – Help users to easily move to another document |
| A4 | <i>Action transparency</i> – Help users to understand consequences of proposed and performed actions |

- A5 *Clear feed back* – Help users to immediately see if the intended action is executed
- A6 *Easy access to action memory* – Allow users to easily access information of what has been done previously
- A7 *Personalized information* – Help users to know who has said what
- A8 *Familiar and understandable vocabulary* – Help users to understand used concepts
- A9 *Clear intentions* – Help users to understand the communicative intention of different messages
- A10 *Support for actions* – Offer users a good support for business actions

Eriksson [4] presents a view of communication as the performance and interpretation of communicative acts. Part of this view is that communication is used to establish a relationship between communicating actors. Communication of high quality is defined as “communication with qualities which contribute to actor relationships based on mutual understanding” [4 p. 405]. Eriksson also presents a set of generic principles for establishing communication quality in an information system. In table 3, these twelve generic principles for communication quality are presented.

Table 3. Twelve generic principles for communication quality [4].

| | |
|-----|--|
| C1 | <i>Communication acts with a relevant and comprehensible information content</i> – Propositional components of communicated messages are relevant and understandable |
| C2 | <i>Communication acts with a relevant and understandable action aspect</i> – Illocutional components of communicated messages are relevant and understandable |
| C3 | <i>Comprehensible communication</i> – Communicating actors are able to understand each other |
| C4 | <i>Trustworthy communication</i> – Communicating actors are able to trust the communicated messages |
| C5 | <i>Communication acts which can be controlled and criticized by the interpreter and defended by the sender</i> – Messages are to be clear enough that the user can evaluate their validity |
| C6 | <i>Trustworthiness/Security</i> – Communicating actors are trustworthy and have a good reputation |
| C7 | <i>Empathy</i> – Communicating actors are considerate, respectful and cooperative towards each other |
| C8 | <i>Reliability</i> – Communicating actors honour their commitments |
| C9 | <i>Messages with a good presentation</i> – Presentation of messages is visually clear and aesthetical, supporting human cognition |
| C10 | <i>Suitable media for the communication</i> – Medium is a viable way of conducting the communication |
| C11 | <i>Good recollection of the communication and commitments made</i> – Actors are able to recall previous communication |
| C12 | <i>Good access to information and communication</i> – Actors have access to the information they need |

4 Features that Effect Communication Quality in E-Forms

In this section the categories developed by analyzing the coded data will be presented. For each category the underlying concepts found during the analysis will also be described. Data in this study was the design principles from the three approaches summarized in table 1-3. After analysing data, six categories were developed, see table 4 below.

Table 4. Developed categories and related design principles.

| | |
|----------------------------------|--------------------------------------|
| Relationship quality | A7, C6, C7 |
| Action space | U6, U7, A2, C2, C10, C12 |
| Action comprehension | U1, A4, A8, A9, C1, C2, C3, C4, C5 |
| Assistance in performing actions | U2, U4, U5, U8, A1, A5, A6, A10, C11 |
| System interface | U3, A3, C9 |
| Perlocutionary effect | C8 |

The principles in the first category deal with the way the relationship between the communicating actors is established and maintained. The concept of *relationship quality* was identified as an important aspect of communication in e-forms. The second category contains principles that cover the range of actions available to the user. This is known as the *action space*. The third category contains principles that deal with the users' understanding of what the actions performed within the e-form mean. This evolved into the concept of *action comprehension*. The fourth category contains principles covering how to make it possible for the user to select and perform the right actions. The core property of all these principles is that they deal with *assistance in performing actions*. The fifth category contains principles that are in fact not about communication but about interaction between the user and the system. Without a well-designed system interface it is often hard to do anything valuable with an information system. The design of the system interface (relevant to interaction quality) is, however, not within the scope of this paper and this concept will, thus, not be further analysed. The last category contains one single principle. This principle is not about the design of the e-form at all, but about the organisational process supported through the e-form. This is of course important but it is an external consequence and not in the scope of this paper (as it refers to process quality rather than communication quality). Thus, the first four concepts seem to be of importance to e-form communication. In the following sections we will therefore analyze these concepts to discover what they might imply for the communication quality of e-forms.

4.1 Communication from Issuer to User

The purpose of an e-form is to allow the user to perform certain communicative actions. The communication from the issuer to the user mainly functions as a guide for the user to the correct way of performing these actions. The most important part of the issuer's communication is the series of "cues" that encourage the user to perform certain communicative actions – to supply information, to confirm some state of affairs, to assert their identity, etc. Apart from these cues, an e-form regularly contains

additional information aimed at helping the user perform the right communicative actions.

The first principle in this category deals with personalizing information (A7). There should never be any doubt as to who is behind a certain message. For e-forms this means that it should always be evident who the issuer is. Even though the issuer may actually be a group of people in a government agency, somebody should always be responsible for issuing the e-form. There should always be an actual person that the user can contact about the e-form. Another prerequisite for establishing good relationships is the trustworthiness of the issuer (C6). This will in part be a reflection of the general reputation and demeanour of the issuer. But it will also matter whether the e-form is successful in assuring the user that the communication from the issuer is appropriate and enough, and that using the e-form will be secure and meaningful. Lastly the issuer's empathy for the user's situation is a key (C7) to sending the appropriate message. The issuer should have a respectful and cooperative attitude towards the user. Showing that the individual social relationship with the user is valued is crucial for high quality in organisational processes [4 p. 54].

The action space is the space bounded by the possibilities and restrictions for actions that an information system has. The action space in this particular case is the range of communicative actions by the issuer that are or can be presented to the user. The first thing that the principles in this category tell us is to be relevant (U6, C1, C2, C10). This may be seen as an upper boundary for the communication from issuer to user. Communication that is not relevant should not be performed, presumably because this is confusing, disturbing and perhaps even irritating to the user. While it is important not to be irrelevant it also seems important to be comprehensive (A2, C12). This can be construed as the lower boundary for the communication from issuer to user. Providing too little information might render the e-form unusable. Keinonen [7 p. 27] expresses both these sentiments by stating that "According to the principle of task match, designers should provide exactly the information that the user needs, no more – no less." Though this may seem obvious, it is of course very hard to anticipate exactly what the needs of the users are. What seems relevant to one user might be irrelevant to another. The last principle in this category seems to provide a way of handling this question. Applying the principle of flexibility (U7) would mean that the e-form should be flexible enough to handle the communication needs of different users. Preferably the user should be able to control how extensive the communication with the issuer should be.

The principles in the third category all deal with understanding the actions performed through the information system (i.e. e-forms in the e-service). This seems to be an essential prerequisite of communication quality within e-forms. Several principles refer to the vocabulary used in the e-form (U1, A8, C1, and C3). The language and other symbols used must be familiar to the user. Concepts and expressions should be used in a manner that is consistent, not only through-out the e-form, but consistent with the way it is used in other information systems, since most users will spend more time using other information systems than the particular e-form in question. Recognizing the language used is of course just the first step to understanding the underlying meaning and significance of the messages in the e-form (A4, C2). The e-form cues in particular, can be viewed as a request to perform a specific communicative action. The user must therefore be able to understand exactly

which response that is being requested. Beyond understanding the actions of the issuer, the user should also be able to evaluate and criticize them (C5). The actions should be clear enough so that the user can evaluate the validity of the messages sent from the issuer to the user. The user should also be able to understand why the issuer performs a particular communicative action (A9, C4). Knowing the intentions behind the action makes it easier to select an appropriate response, and allows the user to determine whether the issuer has valid reasons for requesting a certain response.

Supporting the performance of actions for the issuer-user communication is mainly about making it as easy as possible for the user to receive and understand the appropriate communication from the issuer. The system (i.e. the e-service) is designed to support a certain action space. This is not the most important action space though, as it is the perceived action space of the user that determines what action the user might try to take. At any point it should be obvious to the user what messages are available from the issuer (A1), but the user should always be in charge of what messages the user will receive (U2). Several principles also deal with memory-load reduction (C11, A6, and U5). The less information that the user is forced to remember, the more the user can focus on the task at hand and on analysing further actions. The system should therefore offer a good recollection of previous communication and commitments made.

4.2 Communication from User to Recipient

For the user, using an e-form means performing certain communicative actions. The actions are performed through a series of cue-response pairs. Each cue is accompanied by a means of responding – an option to check, a field to write in, a value to select, etc. To respond to these cues is to fill in the e-form. After the user has performed all communicative actions the e-form is said to be submitted. E-forms are often, but not always, constructed in such a way that no individual responses are submitted to the recipient until all required responses are filled in and the user has expressively submitted the whole e-form. Different kinds of quality controls of the information are possible to conduct before submission. Apart from responding to the cues, a user might want to provide certain information not asked for or ask the recipient a question.

Key to high quality relationships is to personalize the communication (A7). Since the recipient of a public e-form may often be someone in a large government agency it may be impossible for the user to know exactly who will interpret his or her communicative actions (and this might actually not be decided until after the form has been submitted). It is still important that the user is able to picture who the recipient will be, since the user's view of the recipient will influence the communication. If the user can identify with the recipient's situation there is a better chance that the appropriate action will be taken (C7). There should always be a clear way of contacting either the recipient or the issuer. The user must also be assured of the competence of the recipient to handle the submitted e-form in a proper way, i.e. comprehend the user's communication and act on the commitments made through receiving the e-form. The user should also be able to trust that his or her integrity is respected and that the submitted information is not misused in any way (C6). As

computers are getting more advanced and more ubiquitous, more and more functions in our society are getting automated. It is possible to create e-forms that are both filled in and interpreted automatically, by computers. Interacting with a computer and with another human being is very different however, and for this reason it is always important to indicate whether the user's actions will be interpreted by a human being or by a computer (A7). Designers of e-forms must be aware that having an automated recipient may in many cases negatively influence the communication quality. For one, the user might find it harder to trust in the competence of a computer to interpret the user's actions in the right way, which may limit the messages the user feels comfortable sending (C6). The interaction with the computer may also not be accompanied by the same feeling of mutual commitments as human communication which might lessen the user's empathy for the situation (C7).

The action space in user-recipient communication is the range of communicative actions that the user can perform. Just as for issuer-user communication it would seem important to find a balance between action relevance (U6, C2 and C10) and comprehensiveness (A2, C12). For many e-forms identifying the actions that are relevant for the user would be hard, if not impossible. E-forms are designed with the purpose of facilitating one or more types of actions. E-forms vary greatly, however, in how unrestricted communication can be. Sometimes the possible actions are very strictly defined (e.g. answering a yes/no question), other times they are more free (e.g. an open field where the user can send a question or message to the recipient). The task of finding a balance between relevance and comprehensiveness highlights the importance of defining one's view of the user. This paper views users as being cooperative communicators. When designing e-forms one should, thus, trust the user in determining what to communicate. As long as there is sufficient assistance in performing actions there is no reason to mistrust the communicative intentions of the user. There might often be a good reason when citizens want to give some extra information or ask a clarifying question. Therefore the user should generally be as free as possible in choosing what to communicate through the interface (U7). Of course this principle must be used in a conscious way when designing public e-forms, since authority decisions are to be made from the information in the e-forms. Citizens' justice must not be violated and laws and regulations must be followed.

In order to be able to select appropriate responses the user needs to understand the possible actions that are available. First of all, the user must understand the language used in the e-form. The available actions should be described in a familiar and consistent way (U1, A8, C1, and C3). von Wright [10] describes three parts of an action: doing (performance), result and consequences. The user must fully understand each of these three parts to comprehend the actions available (A4). Doing is the act of performing an action. The user should be able to fully understand how the action is performed before doing it. The result of an action is the thing that gets done by performing the action. Before undertaking an action the user should be able to understand what the result will be. The consequences of an action are all the things brought about by the action. These can happen as an effect of the action, but are not controlled by the actor. For an e-form, these are for example what happens after the e-form has been submitted. The user should be able to understand what the consequences of an action are supposed to be before carrying it out. There should also

be a clear timeline for when different consequences take place, for example when an application will be approved if the user submits the e-form today.

Understanding the actions available is not enough to be in control of the situation. The user might also need support in choosing and performing the appropriate action. The principles in this category all deal with giving the user control of the situation. It should always be obvious to the user what the possible actions are at any single point (A1). In addition to having a clear perception of the current action space the user should always have a clear overview of the entire use situation for the e-form (U8, A10). After the user has selected the action, the information system (i.e. the e-service) should offer the appropriate support for performing it. The ideal situation is when the user is in direct control of the actions performed (U2). This requires clear feedback (A5) on all actions. The information system should warn before doing any potentially hazardous actions, especially ones that cannot be cancelled. After performing an action the user should be able to undo erroneous actions or edit the communicated message without having to redo the whole thing again (U4). This means that how to withdraw a submitted e-form should be clear.

5 Conclusions

By conducting a grounded theory analysis, the design principles of three existing approaches have been categorized and some key concepts have been identified. These have thereafter been analyzed for two types of communication: communication from the issuer to the citizen and communication from the citizen to the recipient. By doing this we have arrived at a combined theory of how communication quality in e-forms can be established, consisting of four key concepts. The combined theory is formulated in an idealistic way, which implies that the design principles are presented without consideration of external conditions that of course also might influence the e-form design. The ideal types are inherited from the three analyzed approaches.

Relationship quality – The identity of the issuer should be plainly visible in the e-form and there should be an easy way of contacting either the issuer or the recipient. The issued message should be empathic to the citizen's situation and instill trust in the governmental process at hand. It should be clear who the recipient of the e-form is. The citizen should be able to trust that the recipient will understand the submitted message and honour commitments made. The citizen should be assured that submitted information is handled with integrity. *Action space* – The communication from issuer to citizen should be comprehensive but relevant. The e-form should be flexible enough to handle citizens with varying needs. The citizen should be able to communicate everything that he or she determines to be relevant. The e-form should preferably not disallow messages not following the desired syntax. *Action comprehension* – The issuer should use a familiar and consistent language. The citizen should be able to understand which response that is requested and the reason why. The messages should be clear enough so that the citizen can evaluate their validity. Before undertaking an action the citizen should be able to understand the performance, result and consequences of it. *Assistance in performing actions* – The citizen should be able to recognize what messages there are from the issuer, and

choose among them. The e-form (and the e-service) should strive to reduce the memory-load of the citizen and offer a good recollection of previous actions. To be able to select the appropriate actions, the citizen should have a clear overview of the entire governmental process, and what actions are possible at every single point. When needed, the citizen should get guidance on how to perform the selected action. The citizen should be able to control the selected actions directly, with immediate feedback and the ability to undo or edit previous actions.

These four key concepts and their underlying design features are derived from a conceptual, theoretical analysis. This approach has resulted in design principles for communication quality in e-forms that are well grounded in theory. The next research phase is, thus, to apply these features in practical e-form design and evaluation settings. When testing the theory empirically, the issuer-user-recipient model will be applied.

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