

## “How can I help you?” - The role of a virtual servant in a municipal context

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### Abstract

**Purpose** - The purpose of this paper is to analyse service encounters between citizens and a virtual servant called Elin on a municipality's website in Sweden and contribute to an understanding of this kind of encounters.

**Design/methodology/approach** - The empirical material consists of registered interactions (back-log) between citizens and the virtual servant, observations of citizens in their interactions with the virtual servant and their reflections as well as interviews with representatives from the municipality.

**Findings** - In the study it was found that the dialogue capability of the virtual servant lacks due to that it 1) rather often fails in matching an answer with the question, 2) provide general instead of specific answers, and 3) does not enable enough turns in the dialogue.

**Research limitations/implications** - Using records of what citizens ask as a driver for capturing the viewpoint of citizens/clients is a powerful driver for business development. Research and development of dialogue capability among virtual servants should therefore be encouraged to a high extent and put in relation to other electronic means for service encounters.

**Practical implications** - The results derived in this paper have been developed in collaboration between researchers and personnel at the municipality. This has meant that the results highly have influenced the development of electronic interfaces towards the citizens.

**Original/value** - We recognize this study as unique in the sense that there have been very few reports on recorded dialogues (questions – answers) between a virtual servant acting on behalf of an organization.

**Keywords** E-services, Technology in services, Service encounter, Virtual servant, Avatar, Municipality

**Paper type** Case study

### 1. Introduction

If you are used to talk to frontline personnel or send an e-mail to the company in order to get things done - and perhaps not satisfied with long waiting times – you nowadays have an alternative. When browsing on companies' Web sites you may encounter a person-like “being”, a humanoid, which encourages you to engage in a dialogue. Mostly it is in the shape of a woman and often one that seems to work in a customer service department. Her outfit with a headset, a corporate logo on her blouse, and friendly smile is probably something that you associate with frontline personnel in a hotel lobby, a check-in desk at the airport or picture the person on other side of the telephone to look like. These so called virtual servants or avatars are becoming more and more common and large corporations like IKEA and SAS (Scandinavian Airlines) have introduced this technology on their Web sites. The introduction of this kind of technology in a business environment is often related to cost-cutting agendas and strives to improve the communication with customers. As Gustavsson and Czarniawska (2004) mean the replacement of humans by virtual, interactive, agents seems to be a logical

continuation of the trend towards system-oriented services such as ATMs, Internet bank services and voice navigated telephone services. These agents can be seen as an on-line extension of the marketing and sales function and lead customers through the sales process. They perform customer services and can to some extent replace/complement companies' customer self-help systems such as call centres (Gustavsson, 2005).

In Sweden several municipalities have also chosen this as one of several ways to interact with citizens. Since the virtual servants reside on the companies' and municipalities' Web sites and act on behalf of them (c.f. Ahrne, 1994) they could be regarded as virtual personnel, ready 24/7 to interact with whoever wants it. Are they then to be seen as a complement to Web sites or even to frontline personnel? They could be seen as a way to establish a more human-like interaction, but do they succeed? The virtual servants also seem to play a role in guiding a customer or citizen on the Web sites. Customers' interactions with computerized interfaces provided by companies or municipalities can also be described as a specific kind of service encounter. The virtual servants represent a relatively new form of self-service technology (SST) and it is therefore of interest to develop knowledge of their role in service encounters. In general little research is done about the effects of this form of SST on governments' and municipalities' Web sites.

In this paper we explore a virtual servant that resides on a Swedish municipality's Web site. This paper is part of a larger research endeavor where the overall research question is *which role do virtual servants have in public/private service encounters*. The purpose is to analyse the role of this virtual servant and interactions between the servant and citizens and thereby contribute to an understanding of this kind of service encounters. What does she actually perform and what type of dialogue is possible? We delimit ourselves to study dialogue capability in the sense of what is said / communicated by the use of words and recommended actions. This means that we are not focusing other aspects such as gestures, eye, head and body movements in the dialogue. The notion of dialogue is in this paper conceived as inter-related questions – answers.

Following this introduction we discuss how virtual servants are conceived by other scholars and thereby reveal knowledge gaps in contemporary research. Then, applied research methodology is presented in which different data sources used for deriving the contribution put forward in this paper. Before presenting the analysis of interactions between the virtual servant and citizens performed the idea about the virtual servant in the municipality of Mark will be introduced. The analysis is then used for arriving at conclusions about the virtual servant, its dialogue capability followed by the identification of further research issues.

## **2. Virtual servants defined**

The phenomenon described as virtual servants (c.f. Gustavsson, 2005) in this paper has been given several different terms in previous research, such as virtual agents, animated interface agents (e.g. Dehn and van Mulken, 2000) or virtual assistants (Gustavsson, 2005). They have been described as computerized agents that “[...] appear on the screen as embodied characters and exhibit various types of life-like behaviours, such as speech, emotions, gestures and eye, head and body movements” (Dehn and van Mulken, 2000, p. 1-2). A wide spread term that has become even more popularized by on-line virtual world “Second Life” is “avatar”. It has its derivation in Sanskrit language and refers to the embodiment of a supernatural being on earth; an incarnation or God's appearance on earth (e.g. Gerhard, More and Hobbs, 2004). Consistent with this original definition, present day definitions of an avatar refer to a representation of an entity. Avatars are defined as general graphic representations that are personified by means of computer technology (Holzwarth, Janiszewski and Neumann 2006). An avatar can thus be seen as the embodiment of a user in a virtual world (e.g. Taylor, 2002).

There are some studies that take on a social aspect of interaction between humans and avatars. The findings suggest, among other things, that there is a competitive advantage for online retailers to use social cues that provide consumers with enhanced perceptions of human connection and the formation of emotional bonds (e.g. Wang *et al.*, 2007). The confidence can be increased and the sales conversion rate can be improved by using human like interaction on retail Web sites. Wang *et al.* (2007) used social response theory that posits that consumers may respond to a Web site that exhibits humanlike characteristics in much the same way they respond during human-to-human interactions. Computer technology that exhibits humanlike behaviours, such as turn taking in conversations and reciprocal responding, triggers users to a higher degree personify the technology (Moon, 2000; Nass *et al.*, 1995).

Other studies have investigated the benefits of using avatars as company representatives on commercial retail Web sites. Holzwarth *et al.* (2006) show that avatars positively affect the online shopping experience. They state that an avatar communicator creates a more positive perception of the entertainment value and informativeness of a Web site which lead to shoppers being more satisfied with the retailer, more positive about the product, and more likely to purchase the product. The advantages persist even when information content is held constant between an avatar and a non-avatar format. Another finding was that attractive avatars are persuasive because of their likeability, whereas expert avatars are persuasive because of their credibility. Other researchers (e.g. Barlow *et al.* 2004; Redmond 2002) also claim that avatars can increase customers' entertainment value, information value, and satisfaction of Web-based shopping experiences.

Much of the research seems to be geared towards commercial Web sites such as retail sales on the Internet. It shows several positive aspects of using avatars like getting a more human-like interaction on otherwise impersonal Web sites. From an information provision point of view, there could also be potential cost savings by having a virtual servant answering questions compared to using personnel. However these studies do not provide an analysis of actual dialogues between users and avatars. Another area of less research is avatars on Web sites provided by governments and municipalities. This paper combines that by studying dialogues between citizens and a municipality's avatar called "Elin". Since the notion of avatar is conceived as a social proxy of oneself, such as consumer/citizen as in e.g. the concept of e-Me (c.f. Albinsson *et al.*, 2006), we instead choose to use the term virtual servant. In this study the virtual servant can thus be seen as a virtual representative of the municipality.

### **3. Methodology**

During 2007 a research project were conducted in corporation between University College of Borås and the Municipality of Mark in Sweden. The purpose was twofold: to (1) analyse and evaluate the electronic contacts between citizens and the municipality; and (2) to develop a methodology that the municipality could use in their own evaluation and development of both electronic and interpersonal contacts with citizens. A special focus was on their virtual servant called Elin that was introduced on the municipality's Web site in the autumn of 2006. The data collection has been performed in the spirit of method triangulation. The empirical material for this paper consists of registered interactions (back-log) between citizens and the virtual servant, observations of citizens in their interactions with the virtual servant and their reflections as well as interviews with representatives from the municipality.

The main source of data consists of registered interactions in the form of dialogues between citizens and Elin during two separate weeks in the spring and the autumn of 2007. The registered dialogues were extracted out of a backend system provided by the software company that sold the technology to Mark. The municipality uses this system in their own analysis of citizens' use of Elin. They can extract data in five different categories:

- Answer Frequency – the most frequently given answers in different categories
- Dialogue Reading – dialogues between user and assistant.
- Category Browsing – graphics over categories and percentage
- Quantity Hours/Month - the number of dialogues/answers registered a specific hour during a specific month.
- Quantity Days/Year - the number of dialogues/answers registered every day during a specific year.

The number of dialogues per day was about 25 in average, i.e. a total of 258 dialogues during the two weeks. These were extracted from “Dialogue Reading” and analyzed by the aid of two core categories; (1) question/-s from user; (2) answer/-s from Elin. The dialogues were then categorized based on “success” or “failure”. The category “success” is based on a reading of the dialogue that interprets that Elin’s answer seems to fulfill the intention that the user had with his/her question. The category “failure” is in the same way based on a reading of the dialogue, but this time interprets that Elin’s answer *not* seems to fulfill the intention that the user had with his/her question. Based on data from the backend system (period 01 Jan 2007 to 31 August 2007) we have also generated quantitative information (section 5.2) about how many answers that seems to be relevant from Elin. The backend system did unfortunately not provide any quantitative information about questions asked from citizens. We can thus not match questions to answers through the system. We have therefore decided that a relevant answer from Elin is one where Elin seems to provide some kind of information to the citizen. We have however not been able to confirm if this information was helpful to the citizen.

The second complementary source is three workshops with three different groups of citizens (retirees, parents and youth) in the autumn of 2007. Each workshop lasted for three hours and about 4-5 people from the specific group of citizens participated. These workshops were arranged in such a way that each group of citizens developed a view of their life situation, identified desires related to municipal services, and resolved these desires by actively using the self-service technology (web site and the virtual servant Elin) offered by the municipality. Results, reflections and observations were digitally recorded on tape and video.

A third data complementary source is interviews with managers and personnel in Mark municipality carried out in May and June 2007. The seven respondents (municipality chairman, operations controller, chief of environment and construction department, information manager, IT developer, information assistant and web editor) were selected together with the Mark Municipality. All interviews were digitally recorded and then transcribed. The correctness of the transcripts were then confirmed by each one of the respondents. The questions to the respondents about the virtual servant Elin were related to what they work with in the municipality; how they work with / come into contact with Elin; what they know about the Elin project and how/if that affects them; how well Elin function in their opinion; and if they have any suggestions for improvements.

#### **4. Elin - a virtual servant in the municipality of Mark**

Mark Municipality, founded 1971, is in the southwest of Sweden just 60 kilometers east of Gothenburg. It has 33 000 citizens and consists of a number of small cities and villages; the largest one is Kinna with 7 000 inhabitants. The main purpose for the municipality is to provide traditional services like infrastructure, kindergartens, schools and care for the elderly. Like other municipalities they also provide other services such as libraries, housing, financial support, water and sanitation. Their main “clients” are the citizens that can be divided into two main groups, inhabitants and companies. The inhabitants include children, youth and adults that make out the work force and retirees. The services are financed by direct taxes and support from central government, but also service fees and rental yields.

Both personnel and elected leaders in Mark Municipality see great benefit in using various electronic tools to interface with the citizens, both directly and indirectly. The municipality's Web site, [www.mark.se](http://www.mark.se), is the main electronic interface to the citizen. The purpose of the Web site is both to provide quality services 24/7 to citizens and to make possible cost savings related to interpersonal interaction with the citizens. The Web site should also provide most of the basic information to the citizens so that the personnel can focus on more qualified work such as answering questions from citizens that requires interpersonal interaction. The municipality plan to invest more in electronic communication, as powerful tools, for the purpose of improving the service level to their citizens in the future.

As part of their ambition to increase citizens' use of their electronic services they saw the virtual servant Elin as a "softer", simpler and more inviting way for citizens to find information on the municipality's Web site. Elin was also regarded as a complementary tool to improve the municipality's Web site since the questions Elin is unable to answer often are areas that the Web site is lacking or has insufficient information about.

Managers in Mark were also well aware that some other municipalities in Sweden, both large and small, already were using such a tool on their Web sites. Mark did not want to lag too far behind in technology use. The software provider calls the technology "interactive chat assistants". The provider has for example developed "Anna" for IKEA (c.f. e.g. Lind and Salomonson, 2006) and was early to provide virtual servants to municipalities in Sweden. Botkyrka municipality, close to Stockholm, was one of the first and Mark municipality, along with others, took the opportunity to piggy back on this. The software provider describes the technology in the following way: *"An Interactive Chat Assistant is a virtual service agent that answers questions, assists in finding information on the Website. This is done through a dialogue based chat. Whenever a client is seeking information that can be found on the Web, the Interactive Chat Assistant can help, therefore taking away unnecessary usage of the telephone. The assistant is typically placed on a Website and graphically represented by an animation, a user input field and an area where the responses are displayed. The assistant can either be fully integrated in the normal Website or can be placed in a special pop up window. The user types a question in everyday language and receives a direct answer. If the question requires more information to be answered, the assistant will ask a follow up question and even initiate a more complex dialogue."*

Elin is located on the right side of Mark's home page and presents herself to citizens in the following way: *"Good Day! My Name is Elin. My job is to help you to find information here on this web page and to answer questions about Mark's Municipality. Please don't hesitate to ask me. Kindly write short but complete sentences. How can I help You?"* If one clicks on "About Elin" the following information is displayed:



*"Hi!, My Name is Elin. I am a digital Web assistant. I can help you to answer questions about Mark Municipality. Write your question in the question text box and click on the "Answer Button". Ask one question at a time, kindly write short and full sentences, then it will be easier for me to understand your question. I will write my answers on top of the question text box. Often I try to provide a reference to further information. If I am unable to answer or if I'm not sure, I will let you know. Please note that the answers I provide are advisory and not legally binding! If you have any comments about my work or have found that the information I provide is incorrect, please click on the link below."*

When analysing the volume and frequency of dialogues in the backend system the result show that most dialogues take place during office hours with a peak during the lunch hours (11 am to 2.30 pm). Further, when viewing the number of dialogues between January and August 2007 it appears that the number of dialogues on a monthly basis are somewhat

decreasing (over 900 dialogues per month in January and dipping down to around 700 per month in August). The dip may be an indication that Elin was seen as a novelty when introduced and then suffered a decrease when users did not find Elin’s answers sufficient. The municipality expresses a need for further development of Elin and also that they, within the municipality, should provide more local information to Elin’s database in order to improve Elin’s capability. They state that they need to put more effort in maintaining and developing Elin’s “level of knowledge”.

## 5. An analysis of interactions between Elin and citizens

In the sub-sections of this section different examples of Elin’s dialogue capability are shown. The first sub-section show some dialogues that are classified as successful and failures. In the following sub-section we extract some quantitative data about what kind of answers Elin has provided during the period of investigation.

### 5.1 Interactions between Elin and citizens

Below a number of examples of actual dialogues between the virtual servant and citizens are displayed. These dialogues are structured in successful dialogues and dialogues that have failed. They were chosen since they are representative for other dialogues in the material. We have also included our comment after each dialogue that is based on our interpretation of the specific dialogue. Both questions and answers were originally in Swedish and have been translated into English.

#### *Successful dialogues*

##### *Example 1*

	Period 070528-070601
<b>Question from citizen</b>	<b>Answer from Elin</b>
	Good Day! My name is Elin. My job is to help you to find information on this Web Page and to answer questions about Mark Municipality. Please don’t hesitate to ask me. Kindly write short and full sentences. How can I help you?
How do I find an apartment	Mark Bostads AB is the municipality’s real estate company. We own 3 500 apartments. Our phone number is 0320 21 73 00. Also, please go to <a href="http://www.marksbostadsab.se" target="_blank">Marks Bostads AB’s homepage</a> of you would like to know more about the company.

##### *Comment:*

The citizen asked a question in a short but complete sentence and Elin answered in a short and correct manner. Elin provided a phone number to the Real Estate Company and a link to its Web site. It is likely that Elin trigger on the word “apartment” in order to manage to state an accurate answer. Elin thus succeeded in delivering an apparently relevant answer to the citizen.

##### *Example 2*

	Period 070528-070601
<b>Question from citizen</b>	<b>Answer from Elin</b>
	Good Day! My name is Elin. My job is to ...
Consumers protection agent	The Consumers Protection Agency is independently safeguarding the interest of the consumers versus companies in court. The Consumers Protection Agency is the authority to monitor a number of laws. The Agency’s Director, [her name], is also the “Consumers Protection Agent”. <a href="#">Consumers Protection Agent</a> .

*Comment:*

In this case the citizen has just used one single word (in Swedish this is just one word) as one would have in a traditional search engine. Elin answers and point to the relevant Web page. This shows that it possesses a certain search engine capability.

*Example 3*

	Period 070819-070825
<b>Question from citizen</b>	<b>Answer from Elin</b>
	Good Day! My name is Elin. My job is to ...
I am 16 and would like to start playing handball. I wonder if you know of any team?	I am just a robot, that's why I only can deal with one question each time. Kindly ask questions without dots and commas, and I may be able to give you a better answer
I am 16 and would like to start playing handball.	Please see the municipality's database over clubs and associations, where I am sure you can find the right association. Please follow the link here on the side.

*Comment:*

First the citizen states that he/she would like to play handboll and wonders if Elin knows any teams. After the response that informs the citizen of limited functionality (I am just a robot), the citizen skips his/her second question. Elin then points to the municipality's database over clubs and associations. Apparently Elin have problems in interpreting too compound statements, which is one limitation in her dialogue capability. It does however seem that she has managed to provide relevant information after the question was rephrased.

*Example 4*

	Period 070819-070825
<b>Question from citizen</b>	<b>Answer from Elin</b>
	Good Day! My name is Elin. My job is to ...
When do we start school ?	I understand you would like to read more about the yearly school schedule. The yearly school schedule states when the semester starts and ends and when holidays and leave occurs. On the side you can read more about this.

*Comment:*

Also in this example it seems that Elin has managed to provide relevant information. It is however a rather simple question that is stated and the answer is a combination of a response from Elin together with additional information provided on the Web site. It is also an example of how Elin opens up a new Web page and instructs the citizen to read more about it there. Elin thus provides general directions and let the citizen take it from there.

*Example 5*

	Period 070819-070825
<b>Question from citizen</b>	<b>Answer from Elin</b>
	Good Day! My name is Elin. My job is to ...
Borrow life vest	I don't know everything about life vests yet, but I am happy to tell you what I do know. The tourist association has life vests for rent. They are 5 Kronor per day.

*Comment:*

The citizen wants to borrow a life west and Elin succeeds in delivering relevant information on where these can be rented and the cost. Elin thus delivers additional information about the cost to rent a life west that possibly could have been the citizen's next question to Elin.

## Dialogues that has failed

### Example 6

	Period 070528-070601
<b>Question from citizen</b>	<b>Answer from Elin</b>
	Good Day! My name is Elin. My task is to ...
	I think you forgot to write anything at all.
Where can a pupil log on to his or her school user account?	I believe that you wonder about the meaning of something, but I didn't understand exactly what. Please rephrase the question and I may be able to help you.
Where can I logon to the schools homepage?	One must only do what is ethically and morally right.

#### Comment:

In the dialogue above it seems that user first pushed the “enter” button on the keyboard without writing anything. The rest of the dialogue above is a bit comical. Elin obviously doesn't understand the question and on top of this she seems to believe that the person is asking about something unsuitable or even criminal, when it's actually only a question on how to logon to the schools homepage. Elin thus fails to provide a relevant answer to the citizen.

### Example 7

	Period 070528-070601
<b>Question from citizen</b>	<b>Answer from Elin</b>
	Good Day! My name is Elin. My task is to ...
yearly financial statement	I didn't really understand your question. Please try to reformulate the question in order for me to better understand it. Kindly use complete sentences.
activities and operational goals	I didn't really understand your question. Please try to reformulate the question in order for me to better understand it. Kindly use complete sentences

#### Comment:

The citizen states “yearly financial statement” and then “activities and operational goals”. Elin fails in delivering a relevant answer. The information is available on the home page, but for some reason Elin does not understand what the citizen is referring to.

### Example 8

<b>D17</b>	070528-070601
<b>Question from citizen</b>	<b>Answer from Elin</b>
	Good Day! My name is Elin. My task is to ...
Is there currently a ban to make a fire	You are asking a question about making a fire / barbeque, but I don't understand what you need to know in specific. Maybe you will find what you are looking for here on the side.
Can I make a fire	Burning of garden waste can only be done under certain circumstances. On the side here you can read more about the rules for this
Can I make a fire now	Burning of garden waste can only be done under certain circumstances. On the side here you can read more about the rules for this
Rules for making a fire	If you're not happy with my answer the staff at the municipality can contact you. Do you want us to contact you?
Rules for making fires	What do you want to know about bans and rules to make fires? Try to reformulate the question and I will try to answer.
Fireworks	What do you want to know about fireworks? Try to reformulate the question and I will try to answer.
Am I allowed to have fireworks	In some cases you need a permit from the police. The permits are issued by the police authorities. On: <a href="http://www.polisen.se/" target="_blank">http://www.polisen.se/</a> police homepage you can obtain an application form.

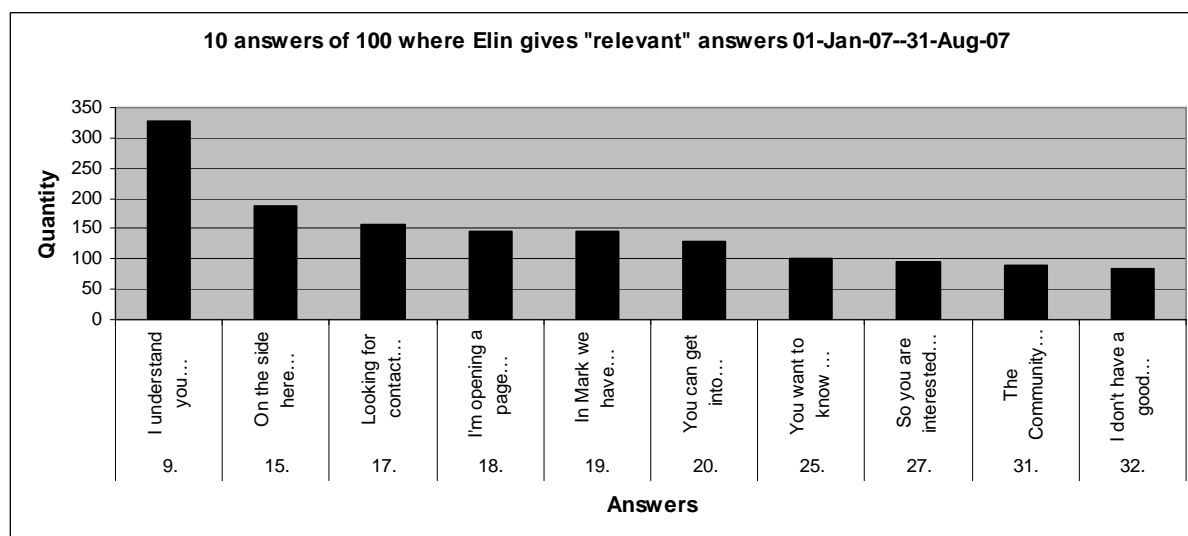
Rules for making a fire	What do you want to know about bans and rules to make fires? Try to reformulate the question and I will try to answer.
Can I make a fire	Burning of garden waste can only be done under certain circumstances. On the side here you can read more about the rules for this

*Comment:*

The citizen wants to know if there currently is a ban to make a fire. Elin fails to understand the question and directs the citizen to a Web page. The citizen is apparently not satisfied and asks another question; now a bit reformulated. Elin answers and directs the citizen to another page. After another two questions from the citizen Elin asks “If you’re not happy with my answer the staff at the municipality can contact you. Do you want us to contact you?” The citizen seems not to want that and continues with further questions. The citizen shows a great amount of ambition and stamina as he/she asks in different ways about rules, permits and regulations for making fires. Apparently Elin seems to fail to provide an answer to this seemingly simple question.

*5.2 Quantitative analysis of answers from Elin*

Figure 1 below indicates the position (between 1-100) of the 10 first answers (out of the 100 most common answers) where Elin seems to provide a relevant answer. The most common answers 1-8 where about greeting the citizen and answers like “I didn’t really understand your question. Try to reformulate...”. Elin’s full answers are found below figure 1.



*Figure 1: 10 answers of 100 where Elin gives "relevant" answers 01-Jan-07--31-Aug-07*

**No. Elin’s answer**

- 9. I understand you have a question about some place in the municipality. I'm opening a page where you can find more info about different places in Mark Municipality.
- 15. On the side here you will find available positions to work within the municipality.
- 17. Looking for contact info? Here on the side I've opened a page with contact info for the municipality.
- 18. I'm opening a page where you will find information and facts about the Mark Municipality.
- 19. In Mark we have the swim centre "Kaskad", more info you will find on the page displayed here on the side.
- 20. You can get into contact with Mark personnel by calling 0320 21 70 00 or through markskommun@mark.se
- 25. You want to know more about water and sanitation. There are many rules and regulations in this area. You can read more here on the side or by contacting 0320 21 70 55 or <http://www.mark.se/.....>
- 27. So you are interested in sport activities? Then I will open a page for sports centers in the municipality.

31. The Community Building Departments unit for Water and Sanitation are responsible for recycling in the municipality. If you have questions please call 0320 21 70 55 or email [link]
32. I don't have a good answer to that. Please ask me something else.

Here we can see that on position 15 Elin replies on what positions are available at the municipality by opening a page about that. On position 19 she opens a page about Kaskad swim centre in the municipality. Based on these answers one can conclude that Elin in a number of cases opens a web page by saying ("here on the side you will find..."). Elin is thus guiding the user to a specific page. It is also possible to get the most common questions in various sub categories. One such category is municipality specific questions. The ten most common answers in this category are shown in figure 2. Elin's full answers are found below figure 2.

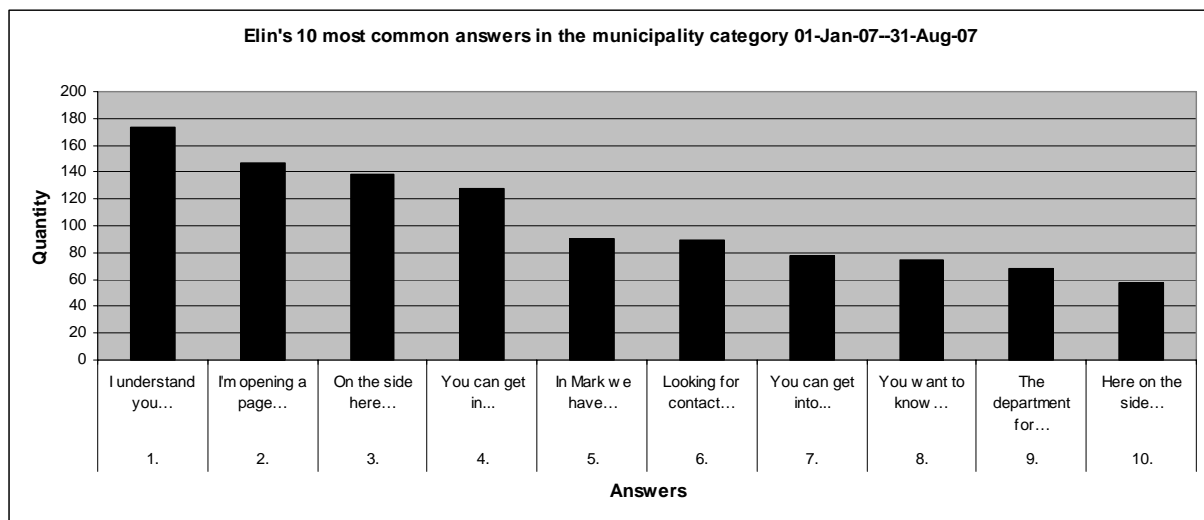


Figure 2: Elin's 10 most common answers in the municipality category

**No. Elin's answer**

1. I understand you have a question about some place in the municipality. I'm opening a page where you can find more info about different places in Mark Municipality.
2. I'm opening a page where you will find information and facts about the Mark Municipality.
3. On the side here you will find available positions to work within the municipality.
4. You can get in contact with personnel in the municipality by calling the main number, 0320 21 70 00.
5. In Mark we have the swim center "Kaskad", more info you will find on the page displayed here on the side.
6. Looking for contact info? Here on the side I've opened a page with contact info for the municipality.
7. You can get into contact with Mark personnel by calling 0320 21 70 00 or through markskommun@mark.se
8. You want to know more about water and sanitation. There are many rules and regulations in this area. You can read more here on the side or by contacting 0320 21 70 55 or <http://www.mark.se...> or visit us at Mor Kerstins väg 13 in Kinna.
9. The department for Water and sanitation. For questions contact 0320 21 70 55 or by email [link]
10. Here on the side you can read more about the municipality recycling central. Is there anything else I can do to help?

Among the most common answers in this category are general municipality info, available positions as well as a reference to the main switchboard phone number. The latter is also apparent as answer number 7 with the addition of the municipality email address. Figure 2 also reveals that people going into dialogue with Elin seem to be very interested in applying for job, opening hours for the Swim centre, water and sanitation, and recycling. It should

however be noted that the identification of most common answers could have its basis both in the actual interest by citizens and the placement of desired information on the Web site structure.

### 5.3 Workshops with the citizens

The *retirees* in the first workshop were an active group that was involved in numerous different activities. They were keen on having a good surrounding environment and to keep themselves informed on what's going on in the municipality. In our group, all the retirees were active computer users. The *youths* in the second workshop were all spending lots of time on the Internet chatting and socialising with friends. They don't send many emails, but use other forms of e-based media to keep in touch with others. School and after school activities take a lot of time. They thought there was not enough activities in the municipality and that the people in charge did not really listen very much to them. The *parents* in the third workshop considered themselves extremely busy and almost all their time was used in family activities. They were relatively inexperienced computer users. Further, they were not really keen on using the computer as a tool for regular daily tasks. As a family with kids you are mainly interested in activities that are of interest for the family.

In the workshops all three categories were assigned small tasks to try to solve with the help of the Web site and virtual servant Elin. The tasks were created during the workshops together with the participants and were based on things they saw as important in their lives and in their contacts with the municipality of Mark. It was for example to

- rent a meeting place for some activity (like dancing) in the municipality (retirees and parents)
- reserve a certain book on the library in the municipality (retirees)
- make a complaint about something, for example a hole in the road (retirees)
- get information about leisure activities (youth, parents)
- get information about choices of schools and directions of what to study (youth)
- find a email address to a teacher (parents)
- get information about recycling of garbage (parents)
- register a child for music lessons (parents)

In the workshops few of the participants spontaneously chose to use Elin to solve the issue at hand. Those less experienced with computers often expressed that Elin did not understand them. One of the retirees expressed that Elin was "stupid". Several of the participants in all workshops mix up the search function on the Web site and Elin. This caused some misunderstandings. Another problem was that Elin sometimes directed them to a Web page that did not exist. They also experienced that Elin did not provide the information they wanted. Elin was not regarded as a natural starting point when seeking information. They also had problems in formulating questions that Elin understood. Some used single words and other wrote whole sentences. Some turned to the search engine when they got tired of Elin. One positive aspect was that they saw Elin as a novelty; something interesting that they probably were going to try out more in the future. Elin was perceived as exciting and a potentially valuable tool. The youth seemed more interested in using Elin. They experienced that Elin actually delivered some relevant answers and guided them on the Web site.

## 6. Discussion and managerial implications

According to Gerhard *et al.* (2004) life-like behaviour is one characteristic of a computerized agent. In this paper we have delimited ourselves to conceive life-like behaviour as the capability to become engaged as a conversationalist in dialogues. In order for Elin to succeed the questions need to be quite "simple", that is questions that are short, correctly

formulated and contain keywords found in Elin's "knowledge base". Elin often provides more general than specific answers. Elin can also be regarded as a different form of search engine. By different we refer to the graphical interface and that Elin sometimes opens a separate page on the municipality's Web site for the citizen. It is also clear that many citizens, based on their questions, seem to regard Elin rather as a search engine than a conversationalist since they often use single words or a combination of words instead of questions. It seems more difficult for Elin to answer combination of words than single words. If Elin is to be any more than just a different form of search engine she needs to be able to ask "follow up" questions in order to narrow down what the citizen needs to know. The results thus show that the virtual servant to some degree manages to answer questions but there are still major improvements to be made in order to reach a more dialogue-like interaction. An important starting point is what kind of dialogues that can occur between Elin and the citizen. The examples of dialogues shown above (c.f. sec. 5.1) reveal that much of the dialogues are about stating questions – giving answers. Elin thus exhibits the ability to be a conversationalist in single interaction pairs. An interaction pair is conceived as two related communicative acts, such as a question and an answer. In communication theory (c.f. e.g. Searle, 1969) utterances constituting congruent dialogues are often of different kinds. Examples of such types are questions, answers, commitments, appreciations, confirmations etc. In order to arrive at congruent dialogues constituted by several utterances these are arranged in patterns of initiatives and responses (c.f. e.g. Linell, 1998). As shown in the analysis there are also problems for Elin to interpret too compound utterances made by citizens. Elin needs rather simple utterances in order to give accurate answers. As identified by Moon (2000) and Nass *et al.* (1995) requirements of being a human-like conversationalist are however higher, such as being able to become engaged in multiple related interaction pairs. Dialogues involving Elin should allow a number of turns in the dialogue.

Holzwarth *et al.* (2006) show that avatars positively affect the online shopping experience. Whether Elin delivers such experience for the clients/citizens is hard to say anything about. The fact that Elin rather often fails in delivering a correct answer can of course have negative effect on how Elin is perceived by the citizens. There is thus a potential risk that the citizen will not try again in the future when Elin has become "smarter"; when new versions have been launched. The results from the workshops did to a high extent confirm our findings from the analysis of the dialogues. The participants in the workshops did not find Elin very useful even though some of them, especially the youth, saw Elin as a novelty – something interesting that could trigger her to be used in the future.

Wang *et al.* (2007) claim that the use of avatars as a complementary channel is a competitive advantage in business settings. A municipal context is driven by another logic so one could not raise the same quality norms for virtual servants in such a context, but we could still see that it increases the value in the service encounter. We claim this due to the fact that many recorded answers given by Elin are relevant, qualitative analysis of some question-answer sequences arriving at success, and positive reflections by citizens during the workshops. We do however conclude that there are some major improvements to be made before Elin can be regarded as a valuable tool for the citizens. It is however also important to state that a virtual servant's ability to perform its task is highly dependent on that the customer, in this case the municipality, continuously updates the database that contains information used by the servant to answer questions. We have in our study found that this can be improved in the municipality and thus also be a way to improve the virtual servant's capability.

## **7. Limitations and directions for future research**

One powerful insight gotten from this study is the richness of the records covering citizen interactions performed with virtual servants, such as Elin. Given that one identifies the necessity of capturing the viewpoint of the ones that an organisation/several organisations exist for, it seems reasonable to continue develop dialogue capabilities of virtual servants such as Elin. In this way even richer knowledge about behaviour, desires, and judgements of citizens could be derived and thereby become a driving force for business development.

As identified in the study there are strong relationships between different forms of electronic communication. As discussed Elin support the user to navigate to different web sites in a complementary way. One question for further research however is where different information in the Web site structure should be placed. Should highly desired information be placed on the opening page of the Web site? How dynamic should the Web sites be constructed? Another issue of further research would be potential integration with other electronic interfaces, such as email and chat. This would also include how organisations need to act in order to utilize the potential in different channels, where the virtual servant is one of many.

This study has also revealed insights of how different the behavior and attitude against different electronic interfaces could be between diverse user groups. It therefore seems relevant, from an organizational point of view, to wonder how enough flexibility can be ensured in the construction of different electronic interfaces. As indicated above, earlier studies about virtual servants, has been performed in commercial settings. In this paper we have analysed Elin as a virtual servant in a municipal context governed by other values and norms than in a commercial setting. One important such value norm is the goal of realising the needs of a 24/7-government. Further research could stress questions whether virtual servants, such as Elin, enhance a cost-efficient way of fulfilling the requirement of a 24/7 government.

## **Acknowledgment**

The authors would like to thank Municipality of Mark, Jan Wallander's and Tom Hedelius' Foundation, University College of Borås and Vision House Limited (Bangkok) for funding this research.

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