



BACHELOR THESIS

Creating a usable and customer-oriented e-government website: A case study

Identifying the wishes and needs of customers through usability tests

Remi Tromer
S1806963

Faculty of Behavioural, Management and Social sciences (BMS)
University supervisor: Dr. Joyce Karreman
GBTwente supervisor: Irma Nadorp

28-06-2019

UNIVERSITY OF TWENTE.

Abstract

Public organizations have digitized their public service delivery to fulfill the needs of citizens wanting fast and efficient service. Besides, digital services save time and money for the organizations. These online services are called e-government. However, the optimization of the public websites is not as well explored as the websites in the private sector. That is why this research aims to investigate how to adapt a website of a public organization to the wishes and needs of customers, in order to be able to provide a usable and customer-oriented website. The website of Gemeentelijk Belastingkantoor Twente (GBTwente) has been used as case study, to be able to offer supporting evidence. The wishes and needs of the customers of GBTwente regarding the website, were discovered with the help of usability tests. The factors that influence usability and thus customer-oriented service are ease-of-navigation, content, and design. Results reveal that it is difficult to satisfy all the needs and wishes of the customers of public organizations, since the customers consist of multiple different groups. Nevertheless, it is found to be valuable to focus on creating a well-structured website, preferably linear, improving the search engine, and making sure the information is clear and without jargon. At last the design of a public website appeared to be perceived as less important regarding the usability. This paper will provide further insight into usability studies and how to measure the usability of a public website. Moreover, the outcomes of this study can be fundamental for further research concerning optimization of e-government. However, it is crucial to conduct more case studies comparable to this study in order to be fully able to determine the wishes and needs of customers concerning websites of public organizations.

Table of contents

1. Introduction	4
1.1 Problem description	4
1.2 Goal of this study.....	5
1.3 Research question	5
1.4 Case study	5
2. Theoretical framework.....	8
2.1 E-government.....	8
2.2 User-Centered Design	10
2.3 Usability	12
2.4 Main conclusions theoretical framework.....	14
2.5 Sub questions	15
3. Method.....	16
3.1 Research design.....	16
3.2 Selection of participants	16
3.3 Research participants	17
3.4 Pre-test.....	18
3.5 Data collection procedure	18
3.6 Data analysis.....	19
3.7 Analysing research quality.....	20
4. Results	21
4.1 Ease-of-navigation.....	21
4.2 Content.....	24
4.3 Design	28
5. Discussion	30
5.1 Interpretation results.....	30
5.2 Practical implication.....	34

5.3 Reflection and suggestions for future research	34
6. Conclusion.....	36
References	37
Appendix A: Literature study log	42
Appendix B: Participant message	44
Appendix C: Introduction usability test	45
Appendix D: Demographics	46
Appendix E: Tasks usability test.....	47
Appendix F: Interview questions	48
Appendix G: Codebook	49
Appendix H: Screenshots website.....	51

1. Introduction

Nowadays private companies are facing high competition in the market. That is why it is crucial to be customer-oriented as a company. According to research findings, the service quality is strongly related to the customer loyalty (Javadin, Shafie & Adbollahi, 2012) and customer satisfaction (Wallin Andreassen, 1994). In general, service quality as a whole has an effect on gaining sustainable competitive advantage.

In former times these customer oriented strategies were only seen as necessary in the private sector. However, in the early 1990s, quality improvement has been applied in the public sector as well as private enterprises (Carr & Littman, as cited in Pyon, Lee & Park, 2009). Public sector organizations include municipalities, various state offices, and other organizations which provide services to citizens. Besides the enhancement of efficiency, governments and municipalities are implementing projects aimed at increasing the accessibility and quality of public services. These projects are necessary in the public sector, since the development of information technology makes citizens to want faster, more convenient and efficient service at lower cost.

The public sector extensively uses information and communication technology (ICT), in order to fulfill the needs of citizens of wanting fast and efficient service. The services provided via ICT are called e-services. E-services are defined as an interactive, content-centered service which can be accessed through the internet. Hassan, Shehab and Peppard (2011) state, due to the rapid expansion of the information economies and electronic networks, the era of e-service has risen in the twenty-first century. However, the use of online environment in the local public sector is not as well explored as in the private sector. Ancarani (2005) mentions in his paper the importance of the sector to understand how e-service is provided and how it can be evaluated.

1.1 Problem description

Nowadays, customers of private sectors do want fast and efficient service via websites. Users want to look up information without getting annoyed by the structure or design of the website. That is why it is important to create customer-oriented websites in the public sector, as the customers will feel like the website provides fast and efficient service. Despite the intention to be customer-centric, many e-government services remain far less useful and easy to use than intended (Kotamraju & Van der Geest, 2012). The website of the Dutch municipal tax office GBTwente, is a good example of a non-customer-oriented website. The website has been reviewed by design professionals, but not by the customers itself. A website is considered as efficient if the website is usable according to the users. A great amount of quantitative research is available on how to create usable public websites, however most studies use heuristic evaluation. Heuristic evaluation involves professionals reviewing websites based on usability guidelines. Just a few studies use a qualitative method and include the opinion of the real-user of the

website. When in fact it is essential to include the opinion of the user, to be able to create a true customer-oriented website.

1.2 Goal of this study

The aim of this study is to gain more knowledge about the opinion of customers regarding websites of public organizations, to create customer-oriented websites. In order to answer this question, the website of GBTwente is used as example. First, existing literature is summarized to create a basis for the rest of the study. Afterwards, usability tests are performed with the website of GBTwente, as the only way to get knowledge about the needs of the customer is to talk to customers and seek their advice (Donald, 1995). Usability was used as concept to measure the quality of the website. The results of this research offer more understanding on how to adapt a public website, to make sure that the website is more usable and customer-oriented. Moreover, this paper will give further insight into usability studies and how to measure the usability of a public website.

1.3 Research question

How to adapt e-government websites in order to provide a usable and customer-oriented website?

1.4 Case study

In this research a case study was used to be able to propose an effective solution for the research question mentioned above, using supportive evidence. Within this case study the municipal tax office GBTwente situated in the Netherlands, was used as an example. Gemeentelijk Belastingbureau Twente (GBTwente) is a public organization that handles the levying and collection of local taxes and the implementation of the WOZ Act for 10 municipalities. GBTwente started off as a Back Office organization. At that time the main goal was to make the tax process efficient and cost saving. This was realized through expanding and collaborating with the municipalities of Almelo, Berkelland, Borne, Bronckhorst, Enschede, Haaksbergen, Hengelo, Losser, Oldenzaal, and Twenterand. GBTwente started off with three municipalities, through time more and more municipalities joined. This enhanced the quality of the taxes but the knowledge of the helpdesk employees decreased, since the front office-contacts were handled by public counters of the municipalities self. The employees of the front office did not know what was going on in the back offices of GBTwente. This caused that customers were not helped well and were left with questions.

Nowadays, GBTwente wants to increase the accessibility and quality of public service and create citizen-oriented services. They are realizing this among other things by moving to a solitary office building and rebranding. In former times, GBTwente was considered as a back office of the 10 municipalities. By moving to a solitary office, GBTwente becomes the front office and handles the contacts with the

customers. In this way the customers will be helped properly, since the employees of GBTwente have more knowledge about taxation. Rebranding is implemented in the process, in order to embed the new way of thinking regarding citizen-oriented services. Daly and Moloney (2005) define rebranding as the practice of developing a new image in the head of stakeholders, and a distinctive identity from competitors. Moreover, the customer service and communication channels need to be adjusted with the aim to support the new ideals of the new identity. In order to match the research question, the focus lies on the website of GBTwente in this paper.

GBTwente has a vision of becoming citizen-oriented. In order to achieve this the most important communication channels have to meet the standards of this ideal. One of the most important channels is, according to the communication professional of GBTwente, the website. Customers use the website to gain information about the yearly tax assessment or about other questions they have concerning municipality taxes. However, the website has been reviewed by design professional but not by the customers themselves. It can be stated that the website is not seen as customer-oriented. To conclude, the website of GBTwente needs to be adjusted based on the desires and wishes of the customers, to match the new identity of GBTwente.

Figures 1.1 and 1.2 are provided with the aim to provide an overview of the GBTwente website. This will give the reader a better picture of the case study while reading the rest of the report.

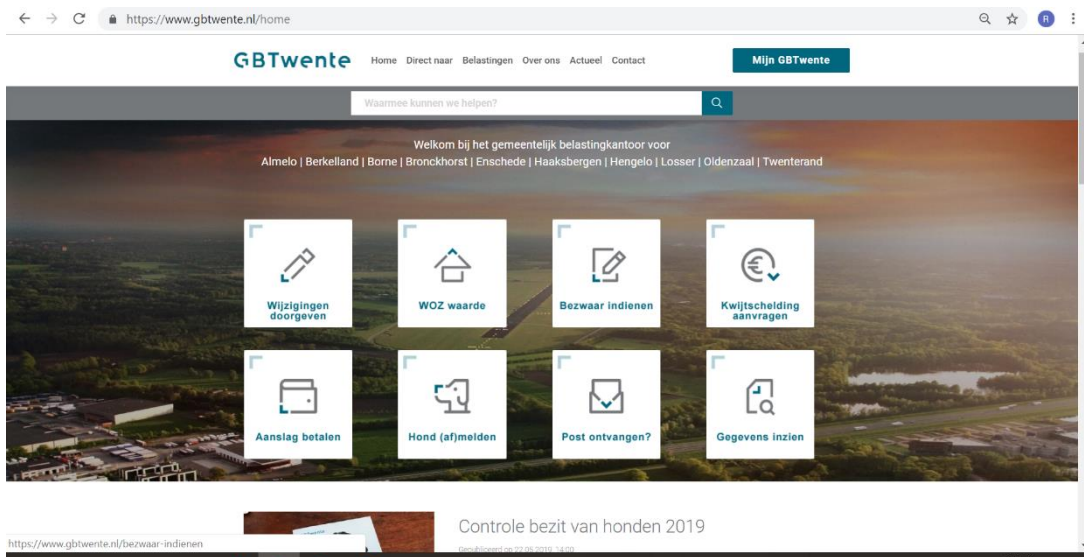


Figure 1.1. Home page GBTwente

When clicking on the button “bezwaar indienen” (submit objection), the user will open the page of figure 1.2.

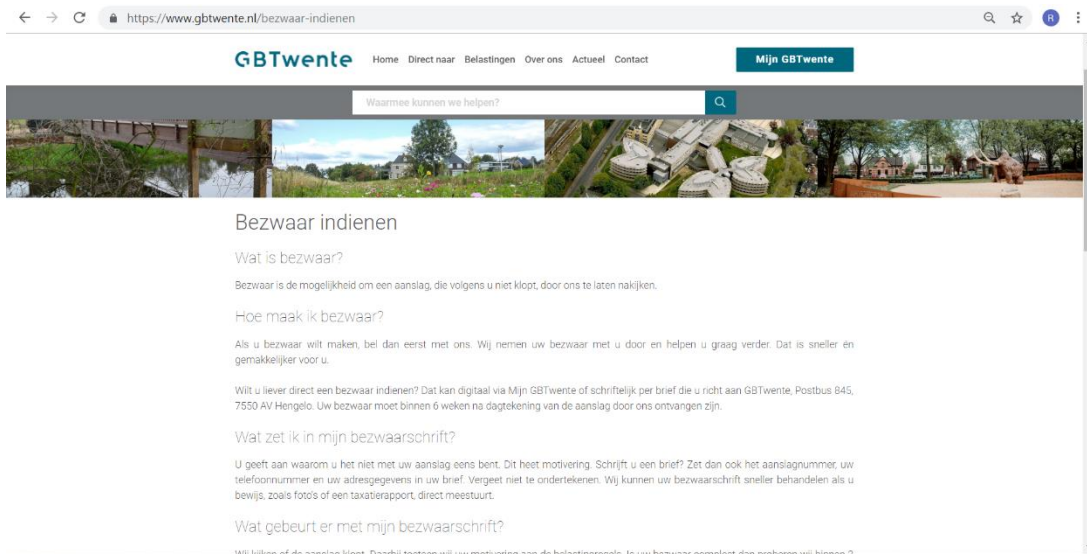


Figure 1.2. “Bezwaar indienen” (submit objection) GBTwente

2. Theoretical framework

In this chapter the existing literature regarding the subject will be discussed, with the aim to create a basis for this research. This includes theories about e-governments, user-centered design, and usability. In the end sub questions are formulated based on the literature, to enhance the ability to answer the research question.

2.1 E-government

This paper focuses on the e-services within governments. Governments like GBTwente extensively use e-services, in order to deliver online government services. The trends toward electronic function of government and delivery of government services is called, e-government (Gouscos, Kalikakis, Legal & Papadopoulou, 2007). Muir and Oppenheim (as cited in Huang & Benyoucef, 2014) and Moon (2002) define e-government as the use of the internet, especially web technology as a tool to deliver government information and services to users. Lee (as cited in Huang & Benyoucef, 2014) add to this that e-government is a web-based application to provide faster, easier and more efficient access to and delivery of information, and services.

Nowadays, governments extensively use ICT in order to provide online service. According to Reddick (2009) is this growth of ICT use due to the fact that citizens expect a faster response, increased access, and improved service from public sector organizations. ICT enables governments to organize their service delivery in a customer-friendlier, integrated and responsive way (Wimmer, Traunmüller, Grönlund & Andersen, 2005a). Moreover, the use of ICT minimizes costs and time for the citizens and the government. To get an answer regarding government-related questions citizens do not have to go to the help-desk of the government and the organization is able to provide more help with less employees. Even though it is not within the scope of this research, it has to be noted that ICT has negative sides besides the positive results. For example, technical innovation evokes privacy and security concerns, since the technology is also used to collect and store data of customers. The automation of gaining information makes it easier for businesses, governments and other individuals to obtain information about an individual without their knowledge (Agarkhani, 2005).

Nevertheless, technology on its own is not enough to drive the development of effective e-service. According to Atkinson and Leigh (2003), there is a need to approach the web with a philosophy of helping users, and not to deliver the same old services through a new medium. The old architectures of e-government fail to fully support a client-centered approach. The old architectures of e-government includes the integration of both traditional and online channels, the support for concurrent access points, versatility, and security (Dias & Rafael, 2007). That is why governments are coming up with new strategies for online service provision and are redesign their existing websites. A useful tool to serve as a guide to improve the qualities of a website, are the maturity models

2.1.1 E-government maturity models

Several studies have proposed models in order to visualize the evolutionary path of online services, between public agencies and users (Alhomod et al. , 2012; Hiller & Belanger, 2001; Reddick, 2004). These models are called e-government maturity models. E-government maturity is defined as the extent to which a government in a country has established an online presence (Krishnan, Teo & Lymm, 2017). The main benefit of maturity models is that these models can serve as a guide to help public sectors enhance the qualities of their website.

The study of Layne and Lee (2001) provide a model which has been cited frequently by other researchers. The model describes four stages of how to develop functional e-government and is based on e-government initiatives in the US. The maturity model is defined as followed: (1) cataloguing, (2) transaction, (3) vertical integration, and (4) horizontal integration. The first stage focuses on developing online presence for the government. In this stage the website is mostly limited to showing government information. The second stage is about connecting the internal government systems to online interfaces and allowing citizens to transact with e-government. The third stage involves integration with higher level systems within similar functionalities or jurisdictions. The last stage, horizontal integration, is defined as integration across different functions and services. Layne and Lee (2001): *"The last stage of e-government – vertically and horizontally integrated – represents an ideal situation for citizens, in which citizens have on-line access to ubiquitous government services with levels of government and the functional walls inside government transparent to them."*(p.126).

Andersen and Hendriksen (2006) proposed the Public Sector Process Rebuilding (PPR) model, which is an extension of the Layne and Lee model. Andersen and Hendriksen (2006) believe that the governments should lay more focus on trying to reach the citizen in a more efficient way, while the Layne and Lee model only highlight how to integrate data with the help of technology. For this purpose, the authors decide to include horizontal and vertical integration in the first stage, instead of the last. This first stage with horizontal and vertical integration is called 'cultivation'. The second stage is 'extension', at this stage, there is an extensive use of intranet and customized Web interfaces. The third stage is 'maturity', at this stage, the organization is mature and the processes are transparent. The fourth stage is 'revolution', at this stage, data can be shared between organizations and applications can be shared across vendors.

However, most of the maturity models were considered obsolete (Khan & Krishnan, 2019). According to Krishnan et al. (2017), is the UN's four-stage model of online service development (United Nations, 2012) a universally accepted and widely acknowledged model. This model describes four stages as (1) emerging information, in this stage websites provide static information. (2) Enhanced information services, the presence is enhanced with one way or simple two-way communication. (3) Transactional services, a two way interaction with citizens is possible, and (4) Connected services, web sites are proactive in requesting citizens' feedback via Web 2.0 tools. The overall model can be found in figure 2.1.

It can be stated that GBTwente is at the third stage, looking at the stages of the UN's four stage model. At this moment, a two-way interaction between the citizens and the organization is possible. The clients are able to contact GBTwente via multiple media if they have questions, and GBTwente can contact the clients with questions or information. However, the website is not yet proactive in requesting citizens' feedback. It is hoped to create this in the future with the help of this research, in order to create an even more citizen-centered website.

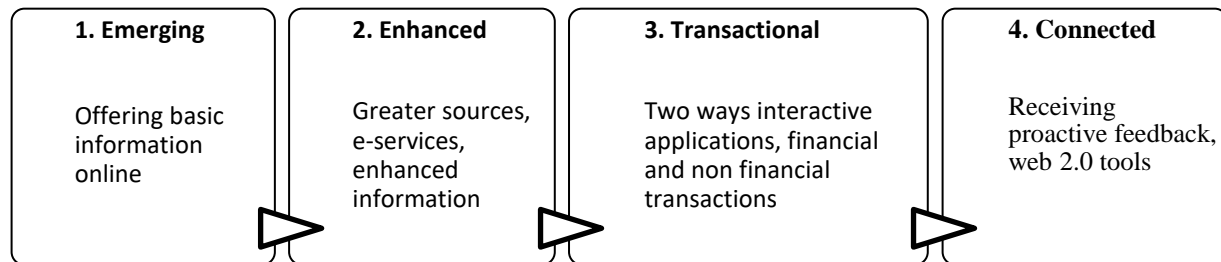


Figure 2.1 The UN's four-stage model of online service development

2.2 User-Centered Design

A stronger user-centered e-government is considered as an important rationale. Kotamraju and Van der Geest (2012) emphasizes that services, in order to be satisfactory, must address the needs of end-user through a user-centred design of the service. Moreover, a clear understanding of users' needs could guide the design, development, and implementation of e-government, which could increase its usage and acceptance. Norman (as cited in Twizeyimana,2017) defined User-Centered Design (UCD) as a philosophy based on the needs and interests of the user, with an emphasis on making products usable and understandable. Wallach and Scholz (2012) add to this that UCD is based on involving the users at different stages in this procedure of designing.

Gould and Lewis laid the foundations of user-centered design by providing key concepts for developing usable interactive systems (Wallach & Scholz, 2012). Gould and Lewis (1985) state that if systems were designed using three principles, they would receive much higher usability marks. In 1988 Gould added a fourth principle. The first principle is early focus on users and tasks. The second principle is empirical measurement. This suggests that intended users should try out simulations and prototypes, in order to observe and analyze their performance. According to the third principle, there must be an iterative design. An iterative design is a cycle of design, test and measure, and redesign, repeated as often as necessary. The last principle is integrated design, which indicates that all aspects of usability should evolve in parallel and should be under one management.

Wallach and Scholz (2012) highlight five central categories of design activities performed in realizing a UCD. It is a structured iterative design. The activities performed in a typical user-centered

design project can be assigned to the following five categories: Scope, Analyse, Design, Validate and Deliver (Wallach and Scholz, 2012). An overview of the model can be found in figure 2.2. During the Scope phase, an agenda with goals and constraints is set for the analysis stage. The goal of the Analyse phase is to uncover attributes of the user, the tasks and the contextual circumstances of using a future or current application. In the Design phase the insights from the Scope and Analyse phases are combined in order to design a tangible product. Afterwards, the design needs to be validated against goals to appreciate its appropriateness and maturity. This is done in the Validate phase and can be done with heuristic analysis to inspect its usability status, or through usability testing. After meeting the usability goals, the Deliver phase focuses on delivering the result of a user-centered design.

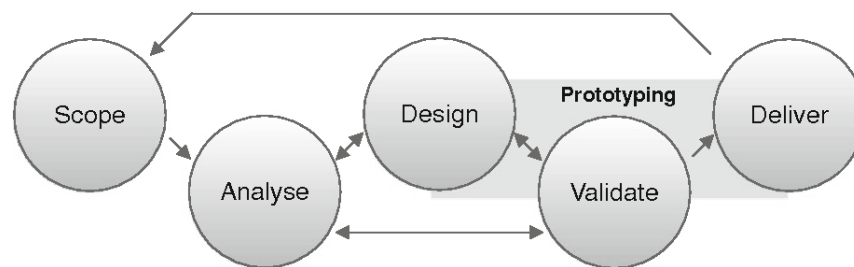


Figure 2.2. User-centered design model of Wallach and Scholz

Looking at the phases of Wallach and Scholz, it can be assumed that the website of GBTwente is still in the validation phase within the model. However, it has to be taken into account that GBTwente never had the intention to apply the UCD process to the website. Thus, the website has never go through the first stages of the process, besides the website has already been delivered. However, the UCD model is used for the purpose of illustrating the iterative process of validating the design of the GBTwente website to achieve an user-centered design. Wallach and Scholz (2012) mention that methods of usability evaluation are included in the validation phase. An example of a usability evaluation method is usability testing. A great number of researchers, including Chen, Yu, Yang, and Chang (2004), Wimmer et al. (2005b), and Huang and Brooks (2012), state that usability perfectly expresses the concept of User-Centered Design and thus the quality of e-government.

2.3 Usability

The concept of usability is a frequently used theme in the Human-Computer Interaction (HCI) literature, since it is considered to be one of the most important quality factors for Web applications. Higher usability ensures better performance, increases users' satisfaction, and promotes users' interaction with e-government (Huang & Brooks, 2012). In the field of HCI, the most widely accepted definition of usability is proposed in the International Organization for Standardization (ISO) 9241-11. The ISO defines usability as the effectiveness, efficiency and satisfaction with which the specified users achieve specific goals in the specified context of use (ISO, 1998). Fernandez, Insfran and Abrahão (2011) agreed with this definition by defining usability as the capability of the software product to be understood, learned, operated, and attractive to the users. These definitions illustrate that it is important to put users central when trying to create a usable application. Barnard, Hammond, Morton, Long, and Clark (1981) suggested that a *"truly usable system must be compatible not only with the characteristics of human perception and action, but, most critically, with users' cognitive skills in communication, understanding, memory, and problem solving."* (p.88).

2.3.1 Usability Evaluation Methods

Usability needs to be carefully considered and evaluated, as it appears to be a vital factor in the quality of e-government. There are several methods to evaluate the usability of a product. In this section an overview of literature regarding Usability Evaluation Methods (UEMS) will be presented, with the aim to choose the best approach to evaluate the usability of a public website. Tan, Liu and Bishu (2009) say that the evaluation of usability of websites can generally be classified into two different types of Usability Evaluation Methods (UEMs): inspection methods and empirical methods. Inspection methods are performed by expert evaluators and excludes the participation of end-users. These methods are based on reviewing the usability aspects of Web applications, in order to set guidelines. These guidelines can range from checking the level of achievement of specific usability attributes to heuristic evaluations concerning predictions of problems related to user interfaces. A widely used inspection method is heuristic evaluation. Heuristic analysis relies mainly on the expertise and knowledge of human factors engineers that would evaluate the web site based on a set of heuristics. Nielsen (1994) introduced a set of heuristics, which are frequently used and its applicability and usefulness have been demonstrated in a number of studies (Jimenez, Rusu, Roncagliolo, Inostroza & Rusu, 2012). The second UEM type, empirical methods, is based on evaluating usability of an application with the help of real end-users. Data from users completing a set of tasks on a software product or a prototype is observed and analyzed. Analysis of these outcomes can provide useful information to detect usability problems during the user's task completion (Fernandez et al., 2011). With the observations of empirical methods it is possible to reduce the problems of users and thus enhance the usability of a product. An example of a frequently used empirical method is

usability testing. During usability testing a participant needs to perform tasks with the product, with the aim to collect information about the specific ways in which the product is easy or difficult to use.

Choosing the suitable UEM is an important part of the usability evaluation process of Web applications. Due to the variety of these methods, non-specialists and even specialists can encounter difficulties in selecting the most appropriate method to evaluate the usability (Dhouib, Trabelsi, Kolski & Neji, 2016). Deciding which method to use depends on different factors, such as number of stakeholders, available time, available money, and so on. Gould and Lewis (1985) recommended to bring the design team into direct contact with potential users, in order to create a usable product. Thus an empirical method would be the best option within usability evaluation. Moreover, the way of evaluating depends on which User-Centered Design phase a product is in. Websites within earlier stages in the UCD model of Wallach and Scholz call for quick and easy methods that offer immediate feedback, to be able to incorporate the opinion of the customer in the design phase. Websites within later stages, which are already delivered to the customers and have a detailed design, may need scenario-based user testing (Preece, Rogers & Sharp, as cited in Tan et al., 2009). Lyzara, Purwandari, Zulfikar, Santoso, and Solichah (2019) performed a systematic literature review in order to identify the suitable usability evaluation methods in the context of e-governments. In the study, 519 literatures have been selected in the initial stage. Lyzara et al. (2019) mention performance measurement as method of usability testing as the best empirical method to get more in-depth information. This method focuses on understanding users by observing their behavior on a given tasks.

Taking all of this into account, it can be affirmed that the best approach to evaluate the usability of public websites is the scenario-based usability testing with a real end-user. However, it is important to keep in mind in which design phase the website is in. If the website is in the first phases a fast way to receive feedback is convenient, while websites in the last phases of the design need detailed feedback. Looking at the fact that the website of GBTwente is in one of the last phases of the design process, the best method to use in this research is usability tests with customers, in order to receive in-depth results. It is chosen to use the performance measurement as method.

2.3.2 Usability goals

In order to be able to regulate the usability evaluation, usability goals are defined. Usability goals are necessary to decide when an artefact is found to be able to serve for its purpose. Many studies have focused on defining usability goals. In general, looking at the definitions of usability mentioned earlier in this paper, the general goals include efficiency, effectiveness and satisfaction to realize usability of a website. However, these concepts are still too broad and do not help with defining how to adapt a website to the wishes and needs of customers. Looking at e-government websites, users have to deal with the

navigation, the content and the design of the website. It is expected that if one of these three concepts are lacking quality, the website will be perceived as unusable by customers.

Navigation can be defined as the process of finding, planning or following a way from one place to another. Easily navigated websites helps users to acquire relevant information and makes it easier to find the needed content. Nielsen (1999) argues that it is necessary to “have a strong sense of structure and navigation support in the site so that users know where they are, where they have been, and where they can go.” (p.66). Wang and Senecal (2007) agree that it is a key challenge in building a usable website is to develop a clear navigational structure.

The content of a websites includes all the present written text and information. It can be stated that generally the site-visitors go to a website of public organizations to obtain information. People do not come to those website for fun or to admire the design. Thus, people expect information that answers their question, is easy to understand, accurate, up to date, and credible (Redish, 2012).

The design of a website includes the appearance of the size, colour, layout, and images. This aspect will provide insight into if clients find the website appealing. Not much is known about the importance of the design within e-government. However, according to literature is the design of an e-commerce critical for the success for any company (Ranganathan & Ganapathy, 2002; Tan & Wei, 2006; Zhou, Lu & Wang, 2009). Taking this into account, it is expected that design is perceived by customers as important within e-government.

2.4 Main conclusions theoretical framework

It is increasingly important to create public customer-oriented service. E-government makes it easier for municipalities to deliver customer-friendly and integrated service. Besides, the use of ICT minimizes costs and time for the citizens and the government. Several studies have proposed e-government maturity models, which can serve as a guide to help public sectors enhance the qualities of their website. The acknowledged UN's four-stage model of online service development, consist of four stages in which the last stage includes websites requesting proactive feedback from customers. Moreover, User-Centered Design is seen as an important rationale when striving for customer-oriented service. The UCD model of Wallach and Scholz includes the five categories of design activities performed in realizing UCD. Even though the website of GBTwente did not follow this process, the model is used to illustrate the phase GBTwente is in now, and this validates the use of usability evaluation. It appeared that usability is an important factor when ensuring the quality of a website. Several methods can be used when evaluation usability, however, empirical methods are seen as important but are rarely used. That is why the empirical method usability testing is chosen to be used within this research. The factors influencing the quality of websites of public organizations are ease-of-navigation, content and design.

2.5 Sub questions

It is decided to define sub questions, with the intention to make it easier to answer the broad research question:

How to adapt e-government websites in order to provide a usable and customer-oriented website?

The sub questions are formulated based on the usability goals suggested above. The aim is to find out which changes have to be made to ensure a usable and customer-oriented website in the field of navigation, content, and design.

1. Do navigation paths of the website meet users' expectations?
2. Is the content on the website useful and clear to users?
3. Do the users like the design of the site?

3. Method

In this chapter the overall process of the data gathering and analysing is described. This includes among other things the research design, description of the participants, and data analysis.

3.1 Research design

For this research, usability tests were held. The study was conducted among the inhabitants of the 10 municipalities of the catchment area of GBTwente. The goal of this study was to find out what the customer wishes and needs are regarding the website of GBTwente. The results of the study served as input for changes in the website in order to provide a customer oriented and usable site. The method of usability testing was chosen as qualitative methods produce rich and descriptive data and can reflect the participant's perspective. In this way, the findings of the research can be easily transformed into interventions for practitioners (Boeije, 2009). For example, adjusting the website on behalf of the results from this research. Usability fulfils the criteria and helps to identify potential problems faced by the users (Lyzara, et al. 2019; Tan, Liue & Bishu, 2009). During the usability test the participants were asked to think aloud. The think-aloud method was chosen since this method enhances the ability to analyse the data (Kokil & Scott, 2017). After the usability tests an interviews were held in order to be able to verify some quotations said by participants during the usability test, to reduce the possibility of a misinterpretation.

3.2 Selection of participants

The population of this research was the inhabitants who pay taxes and live in the catchment area of GBTwente, since these people in fact use the website. The municipalities in the catchment area includes Almelo, Berkelland, Borne, Bronckhorst, Enschede, Haaksbergen, Hengelo, Losser, Oldenzaal, and Twenterand. Another requirement was that the participants had to be able to work with a computer, for the simple reason that otherwise the participant would not be able to perform the usability test properly. The target group of this research was recruited via multiple channels. One channel was the website itself where an announcement was placed on the newsfeed. Within this announcement, the clients of GBTwente were invited to take part in the research, in order to improve the website. This announcement can be found in Appendix B. This announcement included a registration form where clients could register to participate. After the registration the participant would receive an email with suggestions of dates to visit GBTwente and perform the usability test. The message was visible during the whole period of data gathering. The call team, who are responsible for the questions clients ask over the phone, asked after every conversation if the client wanted to participate in this particular research. If the client indicated that they wanted to participate, an email was sent to them with more information and a link to the registration form on the website. The link was also shared via LinkedIn by GBTwente. Furthermore, participants were

recruited via the customer panel. This panel consisted of four clients who had indicated to be willing to engage in research when necessary. One out of the four was able to participate.

3.3 Research participants

Out of the 12 participants, the result of one participant were deleted, since this particular participant had trouble with thinking aloud. This caused that the data of the participant was not possible to analyse and thus not useful. In total, the data of 11 participants remained and were included in the data analysis. The average age of the participants was 42, with 23 as youngest participant and 71 as oldest participant. Further in this research there will be talked about the younger participants and the older participants. The six participants between the ages of 18 and 30 years were considered as the younger participants. The five participants of the age 50 and older were considered as the elderly. There are no participants in this research between the ages of 30 and 50. Of all participants, 54.5% were woman (N= 6) and 45.5% were man (N=5). 58% of the participants (N=7) stated that they have visited the website of GBTwente before. Within this 58%, the participants visited the website approximately 2 or 3 times in total. Other demographics that were asked during the research can be found in table 3.1.

Table 3.1
Demographics of research participants

	N (N=11)	Percentage (100%)
<i>Age</i>		
18-30	6	54.5%
51-60	2	18.2%
Older than 60 year	3	27.3%
<i>Gender</i>		
Male	5	45.4%
Female	6	54.5%
<i>Municipality</i>		
Enschede	8	72.7%
Hengelo	1	9.1%
Almelo	2	18.2%
<i>Education*</i>		
University Bsc/ Msc	9	81.8%
HBO	1	9.1%
HAVO/ vwo	1	9.1%
<i>Visited website</i>		
Yes	7	63.7%
No	4	36.4%

*Highest level of education according to the Dutch schoolsystem

It is striking that the majority of the participants are highly educated. 81.8% (N=9) of the participants stated to have a Bachelor or Master diploma from the university. The other two participants had a HBO certificate, which is comparable to university of applied sciences, and HAVO/vwo certificate, which is comparable to high school as highest level of education. The research participant were to the utmost extent representative for the customers of GBTwente. However, the sample would be more representative if more low educated customers participated.

3.4 Pre-test

Before the usability test was performed, it was screened by a test-person. For this pre-test, one participant performed the whole research and gave feedback afterwards. The pre-test resulted in some small changes. Some questions were reformulated, because they could be misinterpreted due to unclear formulation. Furthermore, some spelling errors were fixed after the pre-test.

3.5 Data collection procedure

Before the data collection started, this research procedure had been approved by the Ethics Committee of the Faculty of Behavioural, Management and Social sciences of the University of Twente. The usability tests were conducted in a private setting, mostly in a conference room of GBTwente or personal home. The interviews were preferably conducted at the respondents' house, because of the familiarity of the environment. This increased the feeling of comfort. In general, the duration of the research per participants was 30 minutes. The usability tests took place from the 29th of April until the 13th of May, 2019. Precursory the test, the interviewer gave an overview of the goal of the study, told how the research would be conducted and asked the participant to think aloud during the research. The text of this overview can be found in Appendix C. Besides, the participant was asked permission to record the session, it was told that all data would be handled in an anonymous way, and that the participant could end their participation at any time without reason. The respondent filled in the informed consent and a questionnaire concerning the demographics of the participant (Appendix D).

The research consisted of two parts. In the first part the participant performed an usability test and had to fulfil 11 scenario-based tasks on the website. These tasks were designed to make sure that the participants would view a great part of the website. The first section of the tasks had to be performed via the general website, and the second section of the tasks via the login portal. These tasks can be found in Appendix E. The participants had to find the answer of the task on the website, but were allowed to proceed if they were not able to provide an answer. In this way the participants did not feel like they were tested, but the website was. The second part consisted of an interview where the interviewer asked the participants questions related to the tasks of the usability test. The interviewer asked questions concerning the navigation, content, and design of the website. These interviews were semi-structured

interviews and the questions can be found in Appendix F. During the first and second part of the data collection, the researcher made notes.

Afterwards, the participants were thanked for the coöperation and received a gift card.

3.6 Data analysis

In order to analyse the data of this research, the audio-tape of every participant is transcribed. Pseudonyms were used during the transcription, in order to protect anonymity. Afterwards the transcriptions were coded with the help of a codebook. Codes were assigned to quotations making use of the software Atlas.ti. The codes were based on the three aspects of usability; Ease-of-navigation, content, and design. The codebook was developed partly inductively and partly deductively. The deductively developed codes were the codes based on the codebook of Van den Haak (2008). Van den Haak (2008) came up with these codes in order to detect usability problems that had arisen while the participants were using the municipal website of Haarlem, Netherlands. The inductively developed codes came about while coding, looking at their relevance regarding the research. The goal of coding the transcripts was to be able to get an overview of which parts of the website were discussed positively and which parts negatively. That is the reason why every sub code was positive and negative. The codebook used to analyse the transcriptions can be found in table 3.2. The expanded version of can be found in Appendix G.

Table 3.2

Codebook

Main code	Nr.	Sub code	Description	Developed *
Navigation	1.1	Navigation (negative)	The participant finds the order of the information illogical or the structure not clearly signalled.	Inductive
	1.2	Navigation (positive)	The participant finds the order of information logical or the structure clearly signalled.	Inductive
Content	2.1	Comprehension (negative)	The participant finds the information on the site unclear or not applicable.	Deductive
	2.2	Comprehension (positive)	The participant finds the information clear and applicable.	Inductive
	2.3	Relevance (negative)	The participant feels that certain information should not be included or should be cut down.	Deductive
	2.4	Relevance (positive)	The participant finds certain information relevant and a useful addition.	Inductive
	2.5	Completeness (negative)	The participant feels that information is missing or more elaboration is needed	Deductive
	2.6	Completeness (positive)	The participant finds the information complete.	Inductive
	2.7	Formulation (negative)	The participant does not appreciate particular formulation.	Deductive
Design	2.8	Formulation (positive)	The participant appreciates particular formulation.	Inductive
	3.1	Graphic design (negative)	The participant does not appreciate layout or illustrations.	Deductive
	3.2	Graphic design (positive)	The participant does appreciate layout or illustrations.	Inductive

*Inductive = code created during this research, Deductive = code created by Van den Haak,(2008)

3.7 Analysing research quality

In order to ensure research quality, the validity and the reliability of this research was analysed. Quality of the research is connected with reliability and validity, both in quantitative and in qualitative research (Kirk & Miller, as cited in Boeije, 2009). The reliability of the results of research was ensured by standardizing the data collection methods. Within this research the usability test was standardized by giving all the participants the same tasks. The interview was semi-structured dealing with the same themes per participant. Moreover, it was made sure to have a reliable codebook, which is used to analyse the transcriptions. In this way the outcomes of this study would be reliable. In order to analyse the reliability of the codebook, the Cohens Kappa of the 3 codes were measured over >10% of the transcripts (transcriptions of 2 participants). To calculate the Cohen's Kappa, a second encoder had coded the transcriptions. Afterwards the codes of the first and second encoder were compared, and it appeared that the second encoder used the codes in a whole different way than the first coder. This caused that the Kappa of all codes were lower than 0.61. The description of the codes were adjusted in order to make the codes more understandable and thus more reliable. After the adjustments another second encoder coded the transcription with the help of the codebook. After that the Cohen's Kappa was higher than 0.61. An overview of the final Cohen's Kappa per code can be found in table 3.3. The codebook with the enhanced descriptions can be found in table 3.2.

Table 3.3
Cohen's Kappa codes

Nr.	Main code	Cohen's Kappa
1	Ease-of-Navigation	0.81*
2	Content	0.71*
3	Design	0.75*

*Significant on 0.01 niveau

Measurement validity refers to whether the measure that is formulated for a particular concept, really does reflect the concept that it is supposed to measure (Bryman, as cited in Boeije, 2009). Within qualitative research, the presence of a researcher can cause change in behaviour of the participant. This phenomenon, called 'reactivity', has a negative influence on the validity of the results. To reduce the effects of reactivity within this research, several measures have been taken. The usability tests were conducted preferable at the participant's house, to make sure the participants were feeling comfortable. If this was not possible, the research was done in a private setting with only the observer present. Before starting with the research the observer and the participant had an introductory conversation. Subsequently, the goal of the research was clearly explained to the participant. This all to make sure that the participant was feeling comfortable enough with the observer to behave natural, and thus to enhance the validity of the results.

4. Results

In this chapter the results of the analysis of the usability tests will be presented. As described in the method section, there are several codes derived from the transcriptions. These codes are subdivided in three main codes: Ease-of-navigation, content, and design. To find out which parts of the website need to be improved in order to realize a customer-oriented website, the quotations connected to these codes were analysed. There is a total of 246 quotations. An overview of the division of the quotations over the different codes, can be found in table 4.1.

Table 4.1
Overview of division of quotations

Name of code	Number of quotations
Ease-of-navigation	119
Content	76
Design	50

4.1 Ease-of-navigation

The main code ease-of-navigation consist of two sub codes, navigation (negative) and navigation (positive). These codes will help to analyse whether the participants talk negatively or positively about the navigation of the website. Ease-of-navigation is coded 120 times (0.49%). Thus, almost half of the total codes consist of navigation, it is assumed that navigation plays an important role with regard to the usability of a website. 0.63% (N=76) of the navigation codes were negative, and 0.36% (N=43) of the navigation codes were positive. It can be concluded that participants were generally more negative about the navigation of the website than positive. Furthermore, the opinions of the younger participants and the elderly clearly differ with regard to the navigation of the website of GBTwente, whereas this is not the case with the content or the design.

4.1.1 Navigation (negative usability feedback)

In order to make it easier to analyse the large number of codes, the 76 negative codes are divided in different subjects. These subjects relate to parts of the website and are based on the most common and important obstacles the participants experienced while performing the tasks.

Search bar The search bar on the homepage was the reason for the majority of the negative codes within navigation. In general, 9 of the 11 participants experienced one or multiple problems with the search engine. The three participants who had no difficulties with the search bar were all elder participants and did not use the search bar at all. The search engine has the function to help customers navigate through the website, however, according to the participants it was not useful. The search bar gave often irrelevant results or even no results. Participant 12 (woman, 25) said *"I find the search function a little inconvenient. For example, when I searched 'waste container' I would get results like*

'Enschede', or 'Losser'. That is when I think; Please help me directly with where I have to go.". Participant 3 (woman, 23) said *"The search engine did not give that much help, as it only shows head titles as results. That is not really useful."* It was noteworthy that most of the difficulties with the search bar occurred when participants tried to search for information about an extra waste container (task 7) or a parking fine (task 6). These specific tasks can be found in Appendix E. Most of the participants did not find any results when searching for "afvalcontainer" (waste container). Participant 3 (woman, 23) *"I will just search for it I think (searching in the search bar). 'Waste container'... 0 results. Oh dear..."*. This caused that several participants would stop looking for the information about the container. Participant 6 (man, 71,) *"Well, I will type here 'waste container' (searching in the search bar). 0 results. Ummm, let me see.. Via this side I cannot enter. Waste container... This is searching for a pin in the haystack. No, I do not know."* It was remarkable that when participants typed in "container", then they did find results. However, the right link to the right page was on the second page of results, which caused that multiple of participant still could not find the right link. Participant 10 (man, 28) *"I can also type 'container' (searching in the search bar). Hmm.. Okay with this word I will not be able to find it, at least not on page 1. Normally, people will give up by now."* The main issue with the information about the parking fine is that most participants were not aware of the fact that a fine belongs to parking tax. This will be discussed further in paragraph 4.3.7 about formulation. One participant stated that the search function needs to be enhanced or totally removed. Despite all the complications with the search bar, it can be concluded that the search engine needs to be improved instead of taking it out. The majority of the participants indicated that they find the search bar a handy tool under the condition that it will be upgraded. Participant 11 (man, 25) *"I would enhance the search function. I always use search functions."* Participant 10 (man, 28) also agrees: *"In the end, a search bar is pretty nice. You just have to type in a keyword and you will find what you need."*

Frequently Asked Questions Another subject what caused negative reactions regarding navigation among several participants, was the button referring to the Frequently Asked Questions (FAQ). The code "FAQ" was coded several times together with the code "visibility". Several participants noted that the FAQ-button was not clearly signalled within the website. Participant 1 (man, 23) *"At a given moment, during one of the last questions, I came up with the idea to look at the frequently asked questions. However, I actually cannot find them now either. Thus, it should be clearer where you can find the FAQs."* This was confirmed by participant 6, since this participant was not aware of the fact that the FAQ existed on the website. Participant 6 (man, 71,) *"The first page with the eight icons that was clear to me, but not useful for all questions. A tableau with 'other questions' is actually needed."*

Contact During the first task the participants had to look up information about submitting an objection towards a tax assessment. The page with information about submitting an objection stated that customers need to call GBTwente for more information. five participants had difficulties with finding the contact details on this page. The majority of these participants looked over the button which referred to

the contact details. Participant 4 (woman, 24) *"I have to call them.. Uhh. But if I want to call people, I want to see a phone number on the website and when I can reach them. So, this is annoying."* The others did find the button but found the button wrongly placed or hard to find. Participant 12 (woman, 25) *"Okay, I did find the phone number. However, it was a bit hard to find."* One participant suggested to insert a link to the contacts directly where the text states that customers have to call. The participant said *"Oh here is the button 'telephone numbers for contact'. Okay, there is also the number of Enschede. They should have put that link earlier."*

General There were 24 quotations which address the general negative points of the navigation. On the overall website, it is possible to find the same page with the same information via different ways. This led to multiple negative comments, since several participants find this confusing and say they lost the overview. The majority of these participants were the elderly. Participant 7 (woman, 61) said *"There is no straight line within the website, it is possible to take all these side tracks. That is why I get lost in the way."* Within the website, most of the pages have multiple links with the function to be able to click further for more information. This is among other things to create the possibility to reach the information via several different tracks. However, participants found it annoying to be obligated to click on multiple links in order to reach the right information. One of the suggestions was to offer customers the ability to choose earlier which information they want to see in the search process. This will solve the problem that the website is confusing.

The younger participants between 18 and 30 had the same amount of negative quotations regarding navigation compared with the elderly. However, the younger participants were mostly negative about the search engine, while the elderly were negative about the structure of the website.

4.1.2 Navigation (positive usability feedback)

There were some positive quotations regarding navigation. Most positive responses regarding navigation were due to the homepage with the eight icons functioning as shortcuts to specific information. The icons consist of the eight most used links referring to popular information. A screenshot of the home page including the eight icons can be seen in Appendix H, figure H.1. All the participants perceived these overall icons as handy. Participant 1 (man, 23) said *"The homepage with the links with pictures, that was handy."*, and participant 12 (woman, 25) also agrees by saying *"I find those icons very handy. Those are probably the things you should use the most. I like that."* The figures on the icons were seen as a nice addition, however, the text on the icons needed some adjustments according to several participants. This will be discussed in paragraph 4.3.7 formulation (negative). The answers to the first tasks could be found via the icons on the homepage, and all participant were able to find these answers. Thus, it can be concluded that these shortcuts were useful for customers of all ages. Several participants mentioned that they were

content with the fact that the “direct naar” (direct to), situated on the upper bar, was in line with the homepage. This made the navigation towards these specific subjects particularly easy.

It was striking that most of the positive quotations of navigation were said by the younger participants. 69.8% of the positive reactions were from the six participants between the 18 and 30 years. The other 30.2% were from the five participants of 50 or older. It can be concluded from these numbers that the website is easier to use for younger customers than for older customer. The general positive reactions of the younger customers stated that it is necessary to get used to the structure of the website, but in the end the navigation of the website is logical. Participant 10 (man, 28) *“It takes some time to get used to the structure, but afterwards it makes sense. So if you know how to get to one part of the information, you know how to get to the other part.”*. Participant 12 (woman, 25) confirmed this by saying while doing a task *“Okay, ‘submitting objection’. I know that this information can be find on the home page. I have learned that.”*.

4.2 Content

In total there were 76 quotations of content. Eight sub codes of content were formulated. An overview of the division of the quotations over the different sub codes can be found in table 4.2. All results of the sub codes will be discussed separately.

Table 4.2
Overview of division of quotations of content

Name of code	Number of quotations
Comprehension (negative)	17
Comprehension (positive)	10
Relevance (negative)	13
Relevance (positive)	4
Completeness (negative)	14
Completeness (positive)	5
Formulation (negative)	13
Formulation (positive)	0

4.2.1 Comprehension (negative usability feedback)

In general, the participants did not have major problems with the understanding the content of the website. There were 17 negative comprehension codes in total. Most of these quotations implied that participants had some trouble with understanding a sentence or a specific word. For example, a few participants had trouble with an abbreviation used on the “over ons” (about us) page. On this page the participants could find the answer of who is in the board of GBTwente. GBTwente has a “General Board” (Algemeen Bestuur (AB)) and a “Daily Board” (Dagelijks Bestuur(DB)), which is abbreviated on the website as “AB” and “DB”. This caused some confusion among participants. Participant 5 (woman, 53) *“Member AB’.. Wait a second.. What does ‘AB’ mean?”*. Participant 6 (man, 71) said *“I find the words ‘AB’ and*

'DB not clear. You have to know what it means, otherwise you do not even know what you are reading.'. Moreover, there were some other small things which were unclear, but not noteworthy. Participant 6 (man, 71) was the only participant who was not at all satisfied with the comprehension of the overall website *"My oh my, if the average man has to read all of this.. [...] It is awfully complicated what is written down here. Even with my university background, I would still have to put in a lot of effort into understanding this."*.

4.2.2 Comprehension (positive usability feedback)

There were no striking results concerning the positive code of comprehension. Participants mentioned that if they were capable of finding the information, the content was sufficient and clearly explained. Participant 1 (man, 23) said *"Yes, the language was clear. The sentences were not too long."*. Participant 2 (woman, 60) said during performing the tasks *"(Reads information about dog tax).. Okay the costs are also available per municipality. Seems pretty clear to me."*. Participant 7 (woman, 61) said afterwards *" There were several answers I could not find, but the answers I could find were good and informative enough. Since I got answers on my questions."*

4.2.3 Relevance (negative usability feedback)

In total 13 quotations were coded with relevance (negative). According to four participants, too much irrelevant content and information was present on the pages. Meaning that there was an excessive amount of information on the website and this led to the fact that participants looked over information. Participant 12 (woman, 25) *"I actually got lost in what I was looking for, due to the great amount of text. So in the end I did find it, but it was difficult."*. Participant 5 (woman, 53) *"Honestly, I do think that there is too much text. I thought to myself: 'I am not going to read all of it.'"* . Moreover, several participants who did not mention the problem of having too much to read for their liking, were still clearly struggling with the amount of information. For example, participant 11 (man, 25) did not acknowledge the great amount of text, however, the participant did use the "Ctrl + F" keys in order to be able to find the information in the large pieces of text. Furthermore, participant 2 (woman, 60) was lost on the page with information about submitting objection. The participant looked for a phone number but looked over the button.

Two participants did find the newsletters irrelevant. Participant 11 (man, 25) believed that not many people would look at the news items. Participant 10 (man, 28) did find the newsletter comprehensive but added *"This is a piece of information I do not need. I am here to get information or give information. This is something like a newsletter, this should be on the website of the municipality of Hengelo or something."*.

4.2.4 Relevance (positive usability feedback)

The positive relevance code consisted out of four quotations. Two participants were glad that the opening hours were mentioned next to the contact details of the municipalities. Participant 3 (woman, 23) *“At ‘bel ons’ (call us) is the phone number of Enschede given, and when they are reachable. That is nice.”*. Additionally, participant 1 mentioned that it is convenient to be able to see the prices from several years ago, on the page with an overview of the tax prices.

4.2.5 Completeness (negative usability feedback)

The negative completeness code regarding content, contains 14 quotations. There was no major concerns towards the completeness of the content of the website. One participant missed content on the page with information about submitting objection concerning the tax assessment. The participant said *“Yes I need to sign my objection, but should it be a scanned signature or whatever? That information is missing.”*. More of these small issues were present as quotations, but this were specific points experienced by just one participant. Nevertheless, two participants agreed on one missing tool within the website, namely a “walkway” which shows on which page within the website the visitor is. Participant 11 (man, 25) *“You often have a ‘footpath’ on the website what shows were you clicked on. I don't know what it's called, but this website does not have it. I noticed that.”*. Participant 9 agreed on this and added that this will be a valuable addition within the log in page ‘Mijn GBTwente’. Participant 9 (man, 63) *“You do not see any current issues here. It was about submitting a request, but I cannot see if I did I submit the request?”*. The suggestion of these participants to add a visual element which reveals were you are within the website, could solve the problem of participants losing track mentioned in paragraph 4.2.1 about navigation.

It was striking that participant 6 was not at all satisfied with the completeness of the content. The participant believed that the website lacked clarifying information. Participant 6 (man, 71) *“It must be much more extensive. In normal language. You have to have an explanation, because you visit the website just once a year. [...] There has to be more explanation on the website, it is just way to short.”*. This is remarkable since other participants believed that there was too much content on the website, as mentioned in paragraph 4.3.3 about relevance.

4.2.6 Completeness (positive usability feedback)

The positive code of completeness has just five quotations. Participant 1,2, 4, 5 and 10 were positive about the completeness of the information on the website. Participant 10 (man, 28) said *“I do not think I was missing information. I have had no thoughts like: ‘Now, I cannot proceed with my task.’”*. Participant 1 (man, 23) *“Yes, there was enough information, enough to answer my questions.”*

4.2.7 Formulation (negative usability feedback)

It appeared that almost every participant had trouble with the formulation of the information on the website. Several participants mentioned specifically the use of too much jargon on the website. Participant 10 (man, 28) *"Too much professional language is used."* To illustrate this, the majority of the participants were not aware of the fact that a parking fine is officially called parking tax. This confusion was the main reason for most of the quotations. Paragraph 4.2.1 about navigation (negative), the problem of finding information about the parking fine was also mentioned. However, the reason why participants had difficulties with finding the information and navigating for information of the parking fine, was due to unclear formulation. Almost all participants had difficulties with question 6, about the parking fine. Some participants said specifically that they had problems with the formulation, others showed it indirectly during the tasks. For example, participant 1 (man, 23) used the search bar to find the right information about the fine, and summed up his results *"I can choose between 'parking tax' or 'received mail'. Yes, so I did not get any useful results."* The right information was available underneath "parkeerbelasting" (parking tax), however the participant did not know that a fine is also seen as a tax. That was the reason why the participant thought there were no useful results from the search engine. Participant 3 (woman, 23) had the same problem as participant 1 (man, 23) *"Well, I am going to search for 'parking fine' (searching in the search bar). 'Parking taxes', 'received mail', Well, that is not what I am looking for."* Two other participants did mention specifically that they found the formulation of parking tax confusing. Participant 2 (woman, 60) *"Ah, I find that very unclear. Parking tax .. Personally, if I get a parking fine I would not call this a parking tax. This is very unclear. [...] I understand it from their point of view, but not from the customers point of view. The customer will never search for the word parking tax."* Participant 5 (woman, 53) *"That part about that the parking fee is called 'parking tax', I was not aware about that."* One participant suggested to add the word parking fine in the information on the page about parking tax *"You know, I figured it out, but I miss the word parking fine in the text. I noticed that I found it very difficult that parking fine is not mentioned at all."*

Another formulation issue was concerning the icons on the frontpage. Several participants found the text on the icons not always matching with the information on the page where the shortcut leads to. For example, when clicking on the icon "hond afmelden" (dog sign out), a page appears with general information about dog tax. participant 11 (man, 25) found this confusing and said that the button suggests that a customer will sign out their dog when clicking on the icon. Participant 9 (man, 63) experiences the same problem and recommended to generalize the text of the icons. For example, instead of "hond (af)melden" (dog sign in and -out), name the button "hondenbelasting" (dog tax). In this way it will be clear that information about dog tax can be found when clicking on that specific button. Further in the website the customer have to be able to click further for more information about the costs and sign in and

-out. It is likely that such adaptations to the content formulation will make the website more well-structured.

4.2.8 Formulation (positive usability feedback)

The code formulation (positive) did not have any quotations.

4.3 Design

In total there are 50 quotations (20.3%) coded with design. The division between the positive and negative codes is fairly equal, 27 codes are negative and 23 codes are positive.

4.3.1 Graphic design (negative usability feedback)

The navigation balk on the website caused multiple negative quotations regarding the design. It was difficult to find a common thread within the negative codes of graphic design, since the participants had different opinions with regard to the design. Nevertheless, two parts of the website can be highlighted concerning the design. In Appendix H, figure H.2 is the navigation bar is pointed out. Due to the eight icons on the homepage, several participants forgot to look at the bar at the top of the website. Participant 10 (man, 28) *“At first, I looked not further than the menu with those eight tiles. In the end I discovered that there was more.”*. This was not experienced as a severe problem. Nevertheless, it would be beneficial to make the navigation bar stand out more, since several participants did not find the “over ons” (about us) page on the website which is situated on the navigation bar. Besides, one participant noticed justly that the second dropdown menu of the dropdown menu from the navigation bar, did not fit in the website. Which the participant found annoying and said it looked sloppy. A screenshot of the dropdown menu can be found in Appendix H, figure H.2.

The login portal “Mijn GBTwente” (My GBTwente) is not mentioned within the previous codes. However, within graphic design (negative), there are 12 out of the 27 quotations concerning the login portal. A screenshot of the login portal can be seen in Appendix H, figure H.4. In general, multiple participants perceive the login page as an incoherent whole in comparison with the website with general information. Several participants had the feeling that they entered a whole different website when logging in, and it was experienced as confusing. Participant 3 (woman, 23) said *“If this is the same website.. Yes, I assume it is, because this page also contains the GBTwente logo. However, it is suddenly a completely different environment, so that can be confusing.”*. The others mentioned the simplicity of the overall design of the login page compared with the general website, Some participants did not mind, but the majority did not like the simplistic design. Participant 1 (man, 23) *“Yes, it is a bit simplistic. The login page is not that appealing.”*. Several participants stated that the login portal is visually not a coherent whole. This was the reason why the login page was unclear for some participants. Participant 4 (woman, 27) *“This website (login portal) looks less well-organized than the other (general website).”*. According to participant 12 the portal consist of different styles which is the cause of the lack of coherency. Participant 12 (woman, 25)

“At the bottom you have a different style and on top you have another different style. It doesn't really feel like one complete thing that all belongs together.”. The participant suggests to choose one way of stressing information, since important content is alternately underlined or bold. Participant 12 (woman, 25) *“I would like it if one way was chosen to highlight content, which gives you immediately the thought like: ‘Ok this important. I can click on this.’”*. Taking this suggestion into account will provide more consistency in the design of the login portal.

4.3.2 Graphic design (positive usability feedback)

8 out of the 11 participants were positive about the overall design of the website. Nearly all participants believed that the graphic design was fine but not special. However, according to the costumers the design was, for a website of a public organisation, more than sufficient . It appeared that the participants of this study did not perceive the design of the website as relevant or important. Participant 10 (man, 28) *“Furthermore, the look and feel is ... Yes, it is just a website of a tax office. It is not a commercial company or something. Simply very functional. [...] I think that's what you should aim for as a tax office.”*. Participant 4 and 5 mentioned that the colours of the house style matched the aim of the website. Participant 5 (woman, 53) *“I think this is a neat colour. It creates a calm atmosphere and is not too intense, just calm, professional, and clear.”*. To conclude the majority of the participants found the overall design of the GBTwente website clear and neat, hence the design is not considered as important.

Secondly, four participants acknowledged that they liked how some information, for example the tax prices and the board, was displayed with the help of tables. According to the participants this provided a clear overview of all the different numbers and names. Participant 1 (man, 23) *“Those tables with the rates were clearly displayed.”*. Participant 4 (woman, 24) *“Here is a very nice overview of who is in the board.”*. An example of such a table is viewed in Appendix H, figure H.3.

5. Discussion

In this chapter, the results of this research will be discussed based on the main codes. This includes answering the sub question which are based on the concepts of usability of a website: ease-of-navigation, content, and design. Afterwards, a practical implication will be highlighted. In the end a reflection and future research of this paper is taken into account.

5.1 Interpretation results

5.1.1 Ease-of-navigation

As mentioned in the theoretical framework, navigation is according to literature a major factor in the usability of a website. Furthermore, the results of this research demonstrates how important navigation is to web users, since the participants had by far the most comments about the ease-of-navigation. The sub question concerning navigation was: Do navigation paths of the website meet user's expectations? It was striking that the participants between the age of 18-30 were generally more positive about the navigation compared to the participants from the age of 50 and above. It is generally known and proved by multiple researchers that elderly find it more difficult to use ICT (Castilla et al., 2016; Eggermont, Vandebosch & Steyaert, 2006). That is why it was expected that the elderly would quote the navigation more negatively in comparison with the younger participants. Nevertheless, the two age groups had the same amount of negative comments regarding navigation. The younger generation was particularly negative about the search engine, while the elderly were negative about the overall navigation structure of the website.

In this study, the elderly found the general structure of the website confusing and felt lost while doing the tasks. Fukuda and Bubb (2003) revealed that the standard memory loss of elderly may be the reason why the older participants had difficulties in remembering and organizing the navigation of the website. On the basis of this knowledge Castilla et al. (2016) aimed to decrease the influence of navigation on elderly in the context of usability. Two variants with two different navigation styles were tested, linear navigation and hypertextual navigation. Linear navigation means that each page is simply linked to the one before, so that the user should only choose between 2 or 3 options on each screen. The hypertextual navigation is what normally is used on websites, including the website of GBTwente. The study revealed that a website with linear navigation had a higher success rate and the elderly had spent less time on solving a task. Thus, it can be concluded that websites should have a linear navigation structure in order to be more usable for elderly. However, this kind of navigation only works if the website does not contain a large amount of pages. That being the case, the linear structure would generally not be suitable for public websites, but it is possible to apply the linear navigation as much as possible. When designing a website of a public organisation it would be beneficial to keep this knowledge about elderly in mind, since the website needs to be usable for all ages. Moreover, there are other tools to make sure that older people do

not get lost on the website. Krug (2013) mentions the use of 'you are here' indicators on a website to reduce the feeling of being lost. For example, breadcrumbs indicating on which pages users have clicked and indicating where the user is in the website.

During the usability tests, it appeared that the participants between the age of 18 and 30 used the search engine regularly. That is the reason why the majority of the quotations regarding the search bar were from the younger participants. According to Nielsen (1997), half of all internet users are search-dominant, about a fifth of the users are link-dominant, and the rest expresses mixed behaviour.

The search-dominant users will normally go direct for the search engine when entering a website. Search-dominant users are task-focused and not curious in looking around the site. This may explain why the younger participants used the search engine more often, since young people are well known for being less patient and task-focused. In contrast, the link-dominant users prefer to search on the website with the help of the links available. Only when the link-dominant users get off-track, the search engine may be used. Mixed-behaviour users shift between the link-dominant and search-dominant behaviour. Thus, in view of the fact that half of the website users are search-dominant, it is valuable to make sure that the search engine on a website is helpful. Nielsen (1997) suggests that a search bar should be available on every page on the site. In this way the search-dominant users do not have to look for the search engine, which can evoke annoyed reactions. Killoran (2013) and Redish (2012a) also acknowledged the importance of a search engine to enhance the navigation within a website. Nielsen (1997) mentions that it is critical to make search systems more usable by incorporating spelling checks, synonym expansion, and showing results relative to the structure and importance of the site. These advices were confirmed by the participants of the usability tests of this research, as multiple participants were annoyed by the fact that the search bar on the website of GBTwente had no spelling check or synonym expansion, and the results were not structured logically. In order to make search engines even more customer-oriented, it is necessary to analyse and learn from what users search for to be able to write with the words that the site visitors use.

As last point of navigation, the buttons of contact and FAQ were not visible enough on the website of GBTwente. This led to many annoyed participants. It can be concluded that customers find these buttons important to be visible, as the participants are most of the time already irritated when they need to use the contact or FAQ buttons. During the usability tests the majority of the participants were looking for these buttons when they could not find the desired information on other pages of the website. Krug (2013) said: "In general, I think it's safe to say that users don't mind a lot of clicks as long as each click is painless and they have continued confidence that they're on the right track." (p. 54). To conclude, Krug (2013) implies that buttons like 'contact' and 'FAQ' needs to be put in a standard place, to let customers locate the button quickly, with a minimum of effort. On the website the FAQ button is placed underneath

the heading 'contact'. All participants of the case study did not find this a logical place, and suggested to put the FAQ in a separate header on the navigation bar named 'FAQ'.

5.1.2 Content

As stated in the theoretical framework, customers come to websites to find information to answer their questions. The content needs to be accurate, credible, and easy to understand. The sub question concerning content was: Is the content on the website useful and clear to users? According to the participants the website of GBTwente had too much text to read, which caused that participants read over important information and did not know where to look. Literature states that visitors of websites want to read as little as possible, and even information pages are often skimmed and scanned first by users (Krug, 2013). To illustrate, the participants in the usability study of Nielsen and Loranger (2006) left the home page within 30 seconds on average. It can be concluded that web-users want a website with content which is easy to scan, as they do not feel like reading all the information. Redish (2012a) presents multiple suggestions on how to make webpages scan-friendly; Highlight key terms, use bullet points, use headings, and keep paragraphs short. Moreover, it is possible to illustrate the content to make it more fun and easier to read. In this way the customers will be able to find the information more efficient, without the obligation to read all the information.

Participants of this case study noticed that there is too much use of jargon on the website of GBTwente. This can be confusing, as the meaning of particular words or abbreviations are not clear to non-employees. For example, during the usability tests the majority of participants were not aware of the fact that a parking fine is also called a parking tax. This was the reason that multiple participants were not able to find information about parking fines. The problem of using too much professional language is well known by web designers, however, the case study illustrates that the user is still overestimated in terms of knowledge. It is highly important to have insight into the words site visitors use, in this way the content of the website contains the vocabulary of the user (Redish, 2012b). This can be achieved through interviews with customers or analysing the terms used by the visitors in the search engine. Nevertheless, a public organisation like GBTwente has a variety of customers with vastly different experiences and expertise. It is a challenge to make sure that the content is usable for all these different kind of people. An example can be presented of how the top clinical hospital Medisch Spectrum Twente (MST) situated in the Netherlands, has solved this specific problem. Namely, the MST has three whole different kind of site visitors; patients, visitors and health professionals. The patients will not understand the professional health language, while health professionals are seeking for more in-depth information and information about job possibilities. Visitors are looking as example for information about visiting hours. In order to solve this problem, the MST had decided to provide the opportunity to choose between three sets of

information. One set for the patients, one set for the health professionals, and one set for visitors. Though, this solution can be highly time consuming or expensive, since a second website needs to be designed.

5.1.3 Design

The participants of this study did not consider the graphic design of the GBTwente as the most important part of usability. It was mentioned by multiple users that a website of a public organization has an informative goal, and does not have to be good looking. The sub question concerning design was: Do the users like the design of the site? The design of GBTwente was according to the participants sufficient for the aim of informing. This finding is contrary to previous studies concerning e-commerce, which have suggested that the design of a website is an important factor of usability. Krug (2013) mentions in his book that the design of a homepage is important, as it is the 'front door' of every website. The design of the homepage needs to be obvious and informative in terms of where to go. The homepage of GBTwente is a great example of a usable homepage due to design, according to the participants. The eight buttons ensure a beautiful and clear layout and help the users with where they have to go right away. As noted above, Nielsen and Loranger (2006) state that users leave the home page on average within 30 seconds. Notwithstanding, there is not just one simple answer to how the design of a public organization should look like, there are multiple answers possible. It is important to keep in mind that a public website has a broad target audience consisting of a variety of groups who differ in wishes and needs. This can be affirmed with the results of this case study, as the quotations of graphic design consisted out of differing opinions. Campos, Neto, Neves, and Correia (2014) said "However, many of the design solutions created in visual interfaces enables greater access and comfort to certain groups, but at the same time may turn difficult or impossible the access by other specific group of users." (P. 82) . For example, using graphics, icons and symbols instead of text can be perceived as handy and clear by several customers, however, this can become restrictive for users with visual impairment. With this in mind, it can be concluded that it is the best solution to keep the design of websites from public organizations as simplistic as possible. In this way the website will be usable for a broad range of people. Rosen and Purinton (2004) support the simplistic approach and add that the design goal should be to provide access, not abundance.

During the usability test multiple participants perceived the login page as an incoherent whole in comparison with the general website. Which caused that several participants thought they went to a whole different website. Thus, when a website of a public agency contains a login page, it is useful to make sure that the visuals of the login page is similar with the general website. In that case the site visitors will not become disoriented and are still pleased when searching for information.

5.2 Practical implication

As discussed in the theoretical framework, maturity models are a useful tool to serve as a guide to improve the quality of a website in terms of the relation between the public agency and customers. A strong relationship with customers will enhance the ability for organizations to design a customer-oriented website. According to the UN's four stage model (United Nations, 2012) is the ultimate goal for a website to be proactive in requesting citizens' feedback with the help of Web 2.0 tools. These are online software programs that allow users to interact with each other or with the creator of the website. For example, including like buttons on web pages enables users to indicate that they are satisfied with the information. When being able to receive daily feedback, the website can be adjusted based on the preferences of the customers of the organization. Moreover, it will be visible if the opinion of the user changes. Another advantage of constant feedback is that it will be easier to adapt the content of the website to the vocabulary of the customers. To conclude, it will be beneficial to include Web 2.0 tools requesting citizens' feedback, as this will generate a customer-oriented website.

5.3 Reflection and suggestions for future research

Within this research 11 participants performed the usability test with usable results. According to Pendell and Bowman (2012), 5 to 8 participants are usually required for an effective usability test. Dickstein and Mills (2000) disagree and state that 8 to 10 participants are needed to get significant results. Thus, it can be stated that with 11 participants the important problems of the GBTwente website are detected and it is possible to answer the question on how to adapt a website of a tax office to create a customer-oriented website.

This research, however, is subject to several limitations. The first limitation concerns the sampling of the participants, which caused a sample bias. There was a limited ability of having influence on the population of this research, since the participants had to volunteer to participate. The participants were recruited via an announcement on the website of GBTwente. It appeared that the message on the website, which asked customers to participate (Appendix B), did not reach the lower educated customers of GBTwente. All participants had university of applied science or higher as highest education, with the exception of one participant. This is a limitation since the participants of this research may not be truly representative for the population of this study. For other studies making use of a probability sampling method, it will be beneficial to focus more on reaching a diversity people instead of just a part of the population. In this way the participants will be more representative for a population and the results will be more relevant.

Within this research it was chosen to focus on the usability of the website, however, not all facets of usability were taken into account. Accessibility is also a subset of usability and thus has influence on a website being customer-oriented. For example, making the website accessible for blind or visually

impaired customers. While this includes customer with disabilities, the use of accessible design principles should enhance the online experience of all users (Paris, 2005). That is why it would be valuable to take accessibility of the website also in account in further research.

To collect the data an usability test with the think-aloud method has been used. This data collection method was the best method to use in this research, however, it does have its limitations. Such as participants' incapability of verbalizing all the thoughts they have. Elling (2012) says that participants are not always aware of everything in their minds, since many processes take place rather quickly. Besides, research has shown that participant often stop with talking at the point that they encounter a problem (Cooke, 2010; Elling, Lentz & De Jong, 2012), which makes it difficult to observe the problems that participants experience during these silences. This was also the case during this study, as it occurred that participants were clearly struggling but did not mention their problem. For a subsequent research, it would be a solution to record the facial expressions and the actions on the website of the participants, besides recording the voices. In this way it will be more clear, when participants fall silent, if they experience a problem and where on the website they experience this problem. Moreover, it will be valuable to conduct more research regarding the think-aloud method to reduce bias when using this method in the future.

Lastly, the readers of this paper have to take into account that just one case study has been conducted within this research. In order to be able to justify generalizing the findings, more similar case studies have to be conducted as the website of GBTwente is not representative for public websites in general. This implies that more research is needed, in order to be able to answer the formulated research question correctly.

6. Conclusion

Based on the results and findings of this research, the research question can be answered:

How to adapt e-government websites in order to provide a usable and customer-oriented website?

The results of this study reveal that elderly wish to have a linear navigation structure. It is recommended to create a linear structure where possible, and add “you are here” indicators such as breadcrumbs. Moreover, it appeared that younger participants make extensive use of search engines on websites. That is the reason why it is critical to make the engine within a public website usable by including spelling checks, synonym expansion, and to structure the results logically. Lastly, it is important to put frequently used buttons, like “contact” and “FAQ”, at a standard place within the website.

Literature stated that in general people skim content of websites and do not want to read a great amount of text. Additionally, professional language makes information unclear for customers. Thus, the content of a public website needs to be scan-friendly and contain clear vocabulary in order to be perceived as usable by customers. Because of the fact that public organizations have a broad target group, it is suggested to offer customers the choice within public websites between two sets of information. One making use of professional language, and one making use of simple vocabulary explaining difficult terms.

The participants of this study did not perceive the design of the website as important regarding usability. The majority of the participants believed that an informative website of public organizations does not have to be attractive. The only part considered as important to be visually attractive and clear, is the homepage as it is the “front door” of every website.

In the end, it is recommended for public organizations to create a website which proactively asks feedback from the customers, since this is the ultimate goal when wanting to design a customer-oriented website.

The results of this report provide further support in the qualitative research knowledge regarding customer-oriented public websites, and usability. This is valuable as little qualitative literature is available, even though including real end-users is seen as critical within this subject. It is crucial to conduct more case studies comparable to this study in order to be fully able to determine the wishes and needs of customers concerning websites of public organizations.

References

- Ancarani, A. (2005). Towards quality e-service in the public sector: *Managing Service Quality: An International Journal*, 15(1), 6-23. doi:10.1108/09604520510575236
- Alhomod, S. M., Shafi, M. M., Kousarrizi, M. N., Seiti, F., Teshnehlal, M., Susanto, H., & Batawi, Y. A. (2012). Best practices in E government: A review of some Innovative models proposed in different countries. *International Journal of Electrical & Computer Sciences*, 12(1), 1-6. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.655.694>
- Andersen, K. V., & Henriksen, H. Z. (2006). E-government maturity models: Extension of the Layne and Lee model. *Government Information Quarterly*, 23(2), 236-248. doi:10.1016/j.giq.2005.11.008
- Barnard, P., Hammond, N., Morton, J., Long, J., & Clark, I. (1981). Consistency and compatibility in human-computer dialogue. *International Journal of Man-Machine Studies*, 15(1), 87-134. doi:10.1016/s0020-7373(81)80024-7
- Boeije, H. R. (2009). *Analysis in qualitative Research* (1st ed.). Thousand Oaks, CA: SAGE.
- Campos, F. F., Neto, E. V., Neves, M., & Correia, W. F. (2014). The paradigm of meta-interface as a facilitator of websites usability and accessibility. In *Design, User Experience, and Usability* (pp. 81-91). doi:10.1007/978-3-319-07626-3_8
- Castilla, D., Garcia-alacios, A., Miralles, I., Breton-Lopez, J., Parra, E., Rodriguez-Berges, S., & Botella, C. (2016). Effect of Web navigation style in elderly users. *Computers in Human Behavior*, 55, 909-920. doi:10.1016/j.chb.2015.10.034
- Chen, C., Yu, C., Yang, S., & Chang, H. (2004). A customer-oriented service-enhancement system for the public sector. *Managing Service Quality: An International Journal*, 14(5), 414-425. doi:10.1108/09604520410558010
- Cooke, L. (2010). Assessing concurrent think-aloud protocol as a usability test method: A technical communication approach. *IEEE Transactions on Professional Communication*, 53(3), 202-215. doi:10.1109/tpc.2010.2052859
- Daly, A., & Moloney, D. (2005). Managing corporate rebranding. *Irish Marketing Review*, 17(1/2), 30-36.
- Dhouib, A., Trabelsi, A., Kolski, C., & Neji, M. (2016). A classification and comparison of usability evaluation methods for interactive adaptive systems. *2016 9th International Conference on Human System Interactions (HSI)*, 246-250. doi:10.1109/hsi.2016.7529639
- Dias, G. P., & Rafael, J. A. (2007). A simple model and a distributed architecture for realizing one-stop e-government. *Electronic Commerce Research and Applications*, 6(1), 81-90. doi:10.1016/j.elerap.2006.02.001

- Eggermont, S., Vandebosch, H., & Steyaert, S. (2006). Towards the desired future of the elderly and ICT: policy recommendations based on a dialogue with senior citizens. *Poiesis & Praxis*, 4(3), 199-217. doi:10.1007/s10202-005-0017-9
- Elling, S. (2012). *Evaluating website quality: Five studies on user-focused evaluation methods* (promotion thesis). Universiteit Utrecht.
- Elling, S., Lentz, L., & De Jong, M. (2012). Combining concurrent think-aloud protocols and eye-tracking observations: An analysis of verbalizations and silences. *IEEE Transactions on Professional Communication*, 55(3), 206-220. doi:10.1109/tpc.2012.2206190
- Fernandez, A., Insfran, E., & Abrahão, S. (2011). Usability evaluation methods for the web: A systematic mapping study. *Information and Software Technology*, 53(8), 789-817. doi:10.1016/j.infsof.2011.02.007
- Fukuda, R., & Bubb, H. (2003). Eye tracking study on Web-use: comparison between younger and elderly users in case of search task with electronic timetable service. *PsychNology Journal*, 1(3), 202–228. Retrieved from researgate.net
- Gant, J. P., & Gant, D. B. (2002, January). Web portal functionality and State government E-service. In *Proceedings of the 35th Annual Hawaii International Conference on System Sciences* (pp 1627-1636). IEEE
- Gould, J. D., & Lewis, C. (1985). Designing for usability: key principles and what designers think. *Communications of the ACM*, 28(3), 300-311. doi:10.1145/3166.3170.
- Gould, J. D. (1988). How to design usable systems. *Handbook of Human-Computer Interaction*, 757-789. doi:10.1016/b978-0-444-70536-5.50040-3
- Gouscos, D., Kalikakis, M., Legal, M., & Papadopoulou, S. (2007). A general model of performance and quality for one-stop e-Government service offerings. *Government Information Quarterly*, 24(4), 860-885. doi:10.1016/j.giq.2006.07.016
- Hassan, H., Shehab, E., & Peppard, J. (2011). Recent advances in e-service in the public sector: state-of-the-art and future trends. *Business Process Management Journal*, 17(3), 526-545. doi:10.1108/14637151111136405
- Hiller, J. S., & Belanger, F. (2001). In M. A. Abramson, & G. E. Means (Eds.), *Privacy strategies for electronic government, in e-government 2001*. Oxford: Rowman and Littlefield Publishers
- Huang, Z., & Benyoucef, M. (2014). Usability and credibility of e-government websites. *Government Information Quarterly*, 31(4), 584-595. doi:10.1016/j.giq.2014.07.002

- Huang, Z., & Brooks, L. (2012). Usability evaluation and redesign of e-Government: Users' centred approach. *Recent Advances in Computer Science and Information Engineering*, 615-625. doi:10.1007/978-3-642-25781-0_90
- International Organization for Standardization. (1998). *Ergonomic requirements for office work with visual display terminals (VDTs) - Part 11: Guidance on usability* (ISO Standard No. 9241-11). Retrieved from <http://www.it.uu.se/edu/course/homepage/acsd/vt09/ISO9241part11.pdf>
- Javadin, S. S., Shafie, H., & Adbollahi, B. (2012). Service Quality and Customer Loyalty in Software Companies of Iran: A Canonical Correlation Analysis. *Research Journal of Applied Sciences, Engineering and Technology*, 4(20), 4178-4186.
- Jimenez, C., Rusu, C., Roncagliolo, S., Inostroza, R., & Rusu, V. (2012). Evaluating a methodology to establish usability heuristics. *2012 31st International Conference of the Chilean Computer coScience Society*, 51-59. doi:10.1109/sccc.2012.14
- Khan, A., & Krishnan, S. (2019). Conceptualizing the impact of corruption in national institutions and national stakeholder service systems on e-government maturity. *International Journal of Information Management*, 46, 23-36. doi:10.1016/j.ijinfomgt.2018.11.014
- Killoran, J. B. (2013). How to use search engine optimization techniques to increase website visibility. *IEEE Transactions on Professional Communication*, 56(1), 50-66. doi:10.1109/tpc.2012.2237255
- Krishnan, S., Teo, T. S., & Lymm, J. (2017). Determinants of electronic participation and electronic government maturity: Insights from cross-country data. *International Journal of Information Management*, 37(4), 297-312. doi:10.1016/j.ijinfomgt.2017.03.002
- Krug, S. (2013). *Don't make me think, revisited: A common sense approach to web usability* (3rd ed.). Retrieved from <https://www.pdfdrive.com/dont-make-me-think-revisited-d33494890.html>
- Kokil, U., & Scott, S. (2017). Usability Testing of a School Website using Qualitative Approach. *Proceedings of the 12th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications*. doi:10.5220/0006295500550064
- Kotamraju, N. P., & Van der Geest, T. M. (2012). The tension between user-centred design and e-government services. *Behaviour & Information Technology*, 31(3), 261-273. doi:10.1080/0144929x.2011.563797
- Layne, K., & Lee, J. (2001). Developing fully functional E-government: A four stage model. *Government Information Quarterly*, 18(2), 122-136. doi:10.1016/s0740-624x(01)00066-1
- Lyzara, R., Purwandari, B., Zulfikar, M. F., Santoso, H. B., & Solichah, I. (2019, January). E-Government Usability Evaluation: Insights from A Systematic Literature Review. In *Proceedings of the 2nd*

- International Conference on Software Engineering and Information Management* (pp. 249-253). ACM. Retrieved from <https://doi.org/10.1145/3305160.3305178>
- Moon, M. J. (2002). The evolution of e-Government among municipalities: rhetoric or reality? *Public Administration Review*, 62(4), 424-433. doi:10.1111/0033-3352.00196
- Nielsen, J. (1997, July 15). *Search and you may find*. Retrieved June 9, 2019, from <https://www.nngroup.com/articles/search-and-you-may-find/>
- Nielsen, J. (1999). User interface directions for the web. *Communications of the ACM*, 42(1), 65-72. doi:10.1145/291469.291470
- Nielsen, J., & Loranger, H. (2006). *Prioritizing web usability*. Pearson Education.
- Paris, M. (2005). Website accessibility: a survey of local e-government websites and legislation in Northern Ireland. *Universal Access in the Information Society*, 4(4), 292-299. doi:10.1007/s10209-003-0081-7
- Pyon, C. U., Lee, M. J., & Park, S. C. (2009). Decision support system for service quality management using customer knowledge in public service organization. *Expert Systems with applications*, 36(4), 8227-8238. doi:10.1016/j.eswa.2008.10.021
- Ranganathan, C., & Ganapathy, S. (2002). Key dimensions of business-to-consumer web sites. *Information & Management*, 39(6), 457-465. doi:10.1016/s0378-7206(01)00112-4
- Reddick, C. G. (2004). A two-stage model of e-government growth: Theories and empirical evidence for U.S. cities. *Government Information Quarterly*, 21(1), 51-64. doi:10.1016/j.giq.2003.11.004
- Reddick, C. G. (2009). The adoption of centralized customer service systems: A survey of local governments. *Government Information Quarterly*, 26(1), 219-226. doi:10.1016/j.giq.2008.03.005
- Redish, J. (2012a). Content! Content! Content! In *Letting go of the words: Writing web content that works* (2nd ed., pp. 1-16). Retrieved from <http://redish.net/books/item/5-letting-go-of-the-words-writing-web-content-that-works>
- Redish, J. (2012b). Planning: Purposes, Personas, Conversations. In *Letting go of the words: Writing web content that works* (2nd ed., pp. 1-16). Retrieved from <http://redish.net/books/item/5-letting-go-of-the-words-writing-web-content-that-works>
- Rosen, D. E., & Purinton, E. (2004). Website design: Viewing the web as a cognitive landscape. *Journal of Business Research*, 57(7), 787-794. doi:10.1016/S0148-2963(02)00353-3
- Tan, W., Liu, D., & Bishu, R. (2009). Web evaluation: Heuristic evaluation vs. user testing. *International Journal of Industrial Ergonomics*, 39(4), 621-627. doi:10.1016/j.ergon.2008.02.012

- Tan, G. W., & Wei, K. K. (2006). An empirical study of web browsing behaviour: Towards an effective website design. *Electronic Commerce Research and Applications*, 5(4), 261-271.
doi:10.1016/j.elerap.2006.04.007
- Twizeyimana, J. D. (2017, September). User-centeredness and usability in e-government: A reflection on a case study in Rwanda. In *Proceedings of the International Conference on Electronic Governance and Open Society: Challenges in Eurasia* (pp. 172-178). ACM.
doi:10.1145/3129757.3129786
- Van den Haak, M. J. (2018). *A penny for your thoughts - Investing the validity and reliability of think-aloud protocols for usability testing* (978-90-9023216-4) (Master's thesis). Retrieved from Research Gate. (978-90-9023216-4)
- Wallach, D., & Scholz, S. C. (2012). User-Centered Design: Why and how to put users first in software development. *Management for Professionals*, 11-38.
doi:10.1007/978-3-642-31371-4_2
- Wallin Andreassen, T. (1994). Satisfaction, loyalty and reputation as indicators of customer orientation in the public sector. *International Journal of Public Sector Management*, 7(2), 16- 34.
doi:10.1108/09513559410055206
- Wang, J., & Senecal, S. (2007). Measuring perceived website usability. *Journal of Internet Commerce*, 6(4), 97-112. doi:10.1080/15332860802086318
- Wimmer, M. A., Traunmüller, R., Grönlund, A., & Andersen, K. V. (2005a). A quality inspection method to evaluate e-Government sites. In *Electronic Government: 4th International Conference, EGOV 2005, Copenhagen, Denmark, August 22-26, 2005, Proceedings* (4 ed., p. 198–209). Retrieved from <https://doi.org/10.1007/11545156>
- Wimmer, M. A., Traunmüller, R., Grönlund, A., & Andersen, K. V. (2005b). The governance of back office integration in e-Government: Some dutch experiences. In *Electronic Government: 4th International Conference, EGOV 2005, Copenhagen, Denmark, August 22-26, 2005, Proceedings* (4 ed., pp. 12-25). Retrieved from <https://doi.org/10.1007/11545156>
- Zhou, T., Lu, Y., & Wang, B. (2009). The relative importance of website design quality and service quality in determining consumers' online repurchase behavior. *Information Systems Management*, 26(4), 327-337. doi:10.1080/10580530903245663

Appendix A: Literature study log

Research questions literature study

1. *What is E-Government?*
2. *What is the evolutionary path of online services between public agencies and users?*
3. *What are the phases of the user-centred design of a website?*
4. *What are the important factors of usability?*
5. *What is the best usability evaluation method?*

Criteria preferred materials

The materials picked for the literature study had to be scientific, preferably articles in english. To be sure to use reliable and relevant literature, the articles had to be recent. However, former articles were also used with the aim to be able to analyse trends within the literature.

Selected databases

The databases that were used during the literature study are: Google Scholar, Scopus and Web of science. These databases were optimal to user for the literature search, since the databases deliver a broad overview of global, interdisciplinary scientific data and literature, across all research fields. Moreover, it was possible to perform a detailed search within these databases.

Relevant terms

<i>Concepts</i>	<i>Related terms</i>	<i>Smaller terms</i>	<i>Broader terms</i>
E-Government	Website of government	Online service of government	Websites
User-centered design	User experience	User, design	Customer-oriented
Usability	Usage, convenience,	Satisfaction	Adoption, user friendly

Search actions

	<i>Date</i>	<i>Database</i>	<i>Search action + search technique (and/or/ truncatie/ phrase searching)</i>	<i>Total hits</i>
1	26-3-2019	Web of science	TOPIC:("usability testing" AND website AND "user-centered")	14
2	26-3-2019	Scopus	TITLE-ABS-KEY ("usability testing" OR "usability test" AND website AND methodology)	99
3	01-4-2019	Scopus	TITLE-ABS-KEY (concepts AND usability AND website)	251
4	03-4-2019	Scopus	TITLE-ABS-KEY ("public service" AND e-commerce)	62
5	11-4-2019	Scopus	TITLE-ABS-KEY (e-government AND customer-oriented OR user-centered)	100
6	16-4-2019	Web of science	TOPIC:("usability evaluation method" AND website OR "e-government")	6453
7	16-4-2019	Web of science	TOPIC: ("e-government maturity models")	16
8	18-4-2019	Scopus	TITLE-ABS-KEY ("user-centred design" AND e-government)	38
9	18-4-2019	Scopus	TITLE-ABS-KEY (elderly AND ict)	1087
10	19-4-2019	Web of science	TITLE-ABS-KEY (navigation AND website AND usability)	395

Reflection

The most important decision that I have made during the literature search process, was to use frequently cited articles with a high impact factor. This was not always easy, as the literature of e-governments was not that advanced yet. Thus, for older articles it was crucial to be cited frequently, but on the other hand, new and recent articles which are not cited that much were also relevant in this literature study. The terms that were relevant within this research were e-government, usability, public service, customer-oriented, and User-Centred Design . These terms did not differ from the terms I used at first. Combining the term e-government with usability gave really important results. Besides these articles I also borrowed two useful books from Dr. J. Karreman, which she recommended. I was really glad with how I performed the literature study, but in the next search operation I will try even more to use only high quality articles.

Appendix B: Participant message

Help GBTwente te verbeteren!

Ons doel is om onze klanten zo goed mogelijk te helpen. Op dit moment zijn wij bezig om deze website te verbeteren. Wij verbeteren onze diensten graag samen met u! Uw mening is belangrijk voor ons. Wij zijn op zoek naar mensen die mee willen doen aan ons onderzoek. Dat doen we op ons kantoor. Het onderzoek zal een uurtje duren. Tijdens dit onderzoek gaat u de website testen en vragen wij feedback over de website.

In ruil krijgt u:

- Een kijkje in ons nieuwe kantoorpand
- Een cadeaubon t.w.v. 15 euro
- Een begrijpelijke GBTwente website!

U kunt zich aanmelden via dit formulier:

Indien u nog verdere vragen heeft over het onderzoek kunt u mailen naar r.tromer@gbtwente.nl

Appendix C: Introduction usability test

Beste deelnemer,

Allereerst, bedankt voor uw tijd! U kan op elk moment stoppen met dit onderzoek. U hoeft geen uitleg te geven waarom u bent gestopt en er zullen ook geen consequenties zijn.

Dit onderzoek wordt gehouden om de website van Gemeentelijk Belastingkantoor Twente te verbeteren. Het doel is om de website gebruiksvriendelijk te maken, zodat klanten beter en sneller geholpen kunnen worden.

Tijdens dit onderzoek krijgt u taken die u moet uitvoeren op de website. Terwijl u de taken uitvoert, vraag ik u om hardop te denken. Dit betekent, alles zeggen wat er tijdens dit onderzoek in uw hoofd op komt. Vertel waarom u bepaalde handelingen uitvoert en welke gedachten u hierbij heeft. Na de taken zal ik een paar vragen stellen over uw ervaring met de website.

Het doel van dit onderzoek is om de website te testen, dus niet uw vaardigheid met computers!

Tijdens het onderzoek zal ik alles opnemen en maak ik ondertussen aantekeningen. Dit materiaal zal vertrouwelijk worden behandeld en zal alleen worden gebruikt voor dit onderzoek. De opnames worden direct verwijderd zodra deze niet meer nodig zijn.

Indien u vragen hebt, aarzel niet om ze te stellen!

Appendix D: Demographics

1. Wat is uw geslacht?

Man/ Vrouw

2. Wat is uw leeftijd?

..... jaar

3. Waar woont u?

- Almelo
- Berkelland
- Borne
- Bronckhorst
- Enschede
- Haaksbergen
- Hengelo
- Losser
- Oldenzaal
- Twenterand

4. Wat is uw hoogst genoten opleiding?

- Basisonderwijs
- VMBO
- MAVO
- HAVO/VWO 64
- MBO
- HBO
- Universiteit, BSc / MSc
- Anders, namelijk:

5. Heeft u de website van GBTwente al een keer eerder gebruikt of bezocht?:

Ja / Nee

5. Zo ja, hoe vaak? (Ongeveer):

6. Voor welk doeleinde heeft u de website van GBTwente bezocht?

Appendix E: Tasks usability test

Deel 1

De antwoorden van de taken in deel 1 zijn allemaal te vinden op de website. U hoeft hiervoor niet in te loggen met Mijn GBT.

1. U wilt graag bezwaar indienen. Zoek informatie over hoe dit in zijn werk gaat.
2. U wilt uw gemeente bellen om meer informatie te vragen over het bezwaar indienen. Zoek het nummer van uw eigen gemeente.
3. U had geen fijn telefoongesprek en wilt graag een klacht indienen. Zoek het klachtenformulier.

Ga terug naar de home pagina

4. U krijgt een hond! U wilt graag weten hoeveel belasting u moet betalen voor uw *eerste* hond. Zoek dit op.

Ga terug naar de home pagina

5. U bent benieuwd wie er in het bestuur zit van GBTwente. Zoek dit op.

Ga terug naar de home pagina

6. U heeft in Hengelo een parkeerboete gekregen. U had wel een geldig parkeerkaartje maar deze was door het dichtdoen van uw portier op de grond beland. Zoek op de website op of het zin heeft om bezwaar te maken tegen de parkeerboete, in deze specifieke situatie.

Ga terug naar de home pagina

7. U wilt graag een extra afvalcontainer, maar u weet niet waar u deze kan aanvragen. Zoek dit op.

Ga terug naar de home pagina

8. Bekijk de aanslag.
9. U vindt de voorlopige aanslag afvalstoffenheffing 2017, aan de hoge kant. Kijk op de website of het bedrag klopt.

Deel 2

De taken in dit deel vindt enkel plaats in het digitale loket. Het digitale loket is waar men terecht komt als ze klikken op "Inloggen Mijn GBT"

Ga naar <https://mijntest.gbtwente.nl/egouw/view/EGW0001> en log in met DigiD

Gebruikersnaam: Janpaspoort

Wachtwoord: Test123!

Bekijk hoe het Digitale loket in elkaar zit.

10. Klik op "hond (af)melden".

Ga terug

11. Klik op "mijn gegevens".

Einde van de taken

Appendix F: Interview questions

Content

- Was de informatie op de website nuttig?
- Snapte je de informatie op de website?
- De taal op de website was begrijpelijk?

Ease-of-navigation

- Wat vond je van de indeling van de website?
- Kon je alles makkelijk vinden?
- Kon je alles snel vinden?
- Wist je waar je was met betrekking tot de home page?

Interface

- Zorgde het visuele design er voor dat de website prettig was om te gebruiken?
- Wat vond je leuk aan de site?
- Wat vond je niet leuk aan de site?

Verdere suggesties voor verbetering?

Appendix G: Codebook

Nr	Code	Nr.	Subcode	Description	Example
1	Ease-of-navigation	1.1	Navigation (negative)	The participant finds the order of information illogical or that the structure is not clearly signalled	<i>"Ik zou niet weten waar ik dat zou moeten vinden."</i>
		1.2	Navigation (positive)	The participant finds the order of information logical or that the structure is clearly signalled	<i>"Het was gewoon duidelijk met de iconen, dat je dus gewoon kan kiezen wat je wil hebben en dan kun je informatie krijgen."</i>
2	Content	2.1	Comprehension (negative)	The participant finds the information on the site not clear or applicable	<i>"Voor leken zoals ik, is het handig om wat duidelijker neer te zetten dat die site meer is voor de informatie."</i>
		2.2	Comprehension (positive)	The participant finds the information clear and applicable	<i>"Ja, dat was duidelijk, dat wel. Een paar waar ik niet de ingang kon vinden zeg maar, maar de anderen die ik meteen zag dat was heel prettig en informatief genoeg. Want ik kreeg antwoord op mijn vraag."</i>
		2.3	Relevance (negative)	The participant feels that certain information should not be included or should be cut down	<i>"Waarom staat hier nog dingen van 2017 op? Ik ben alleen geïnteresseerd in 2019."</i>
		2.4	Relevance (positive)	The participant finds certain information relevant and an useful addition.	<i>"Er staat bij "bel ons" wel het nummer voor Enschede, en wanneer ze bereikbaar zijn, dat is fijn."</i>
		2.5	Completeness (negative)	The participant feels that information is missing or more elaboration is needed	<i>"Vergeet niet te ondertekenen", ja moet dat dan een ingescande handtekening zijn of whatever? Dat is ook niet duidelijk." "Sommige stukken zijn niet heel specifiek. Er staat dan informatie en die is best wel breed omschreven."</i>

		2.6	Completeness (positive)	The participants finds the information complete	<i>“Wat er voor mogelijkheden zijn? Ja dat is in mijn idee voldoende. Ja. Ja, want je hebt hier natuurlijk van alles waar je uit kan kiezen. Ja weet je er zijn genoeg mogelijkheden om te kiezen dus, ik denk dat het voldoende moet zijn.”</i>
		2.7	Formulation (negative)	The participant does not appreciate a particular formulation	<i>“Persoonlijk zou ik als je een boete krijgt dit niet een parkeerbelasting noemen. Dit is heel onduidelijk.”</i>
		2.8	Formulation (positive)	The participant appreciates a particular formulation	
3	Interface	3.1	Graphic design (negative)	The participant does not appreciate layout or illustrations	<i>“Deze website ziet er wel minder overzichtelijk uit dan die andere.” “Ik heb nu even het venster verkleint en ik denk “oh ja nu staat alles onder onder elkaar”. Dit is niet zo handig.”</i>
		3.2	Graphic design (positive)	The participant does appreciate layout or illustrations	<i>“Oh je bedoelt gewoon de vormgeving hè? Het was wel redelijk. Als ik het een cijfer zou moeten geven denk ik dat ik het een 7 ofzo zou geven.” “De kopjes vind ik wel oké.”</i>

Appendix H: Screenshots website

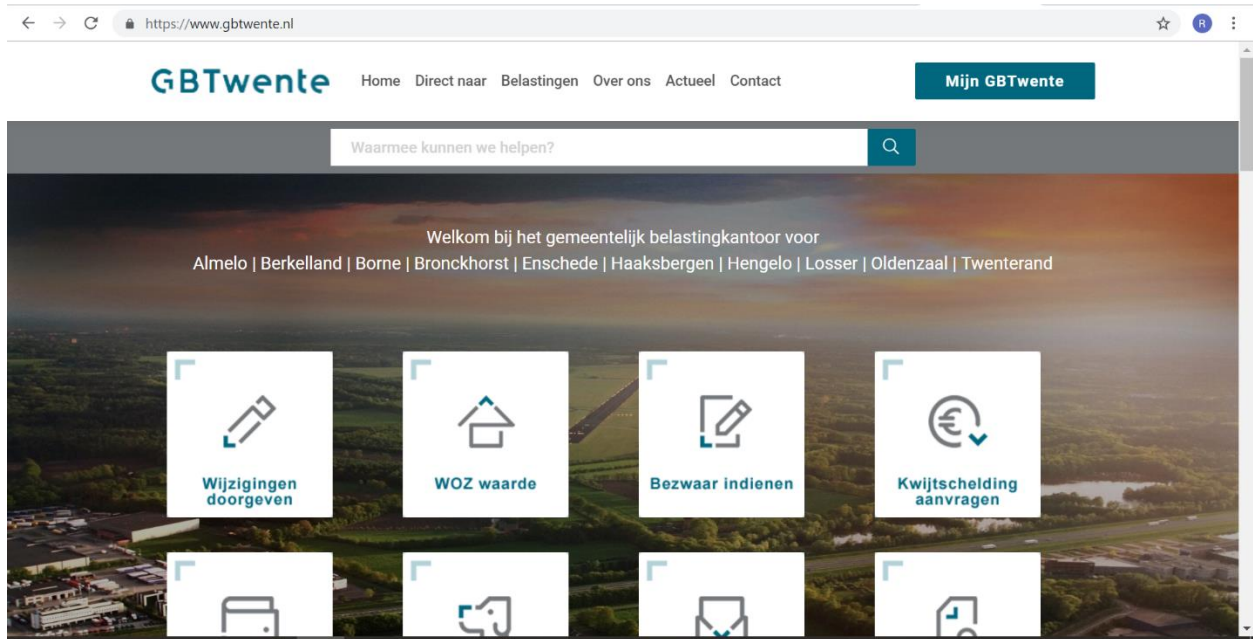


Figure H.1 Screenshot home page with the icons

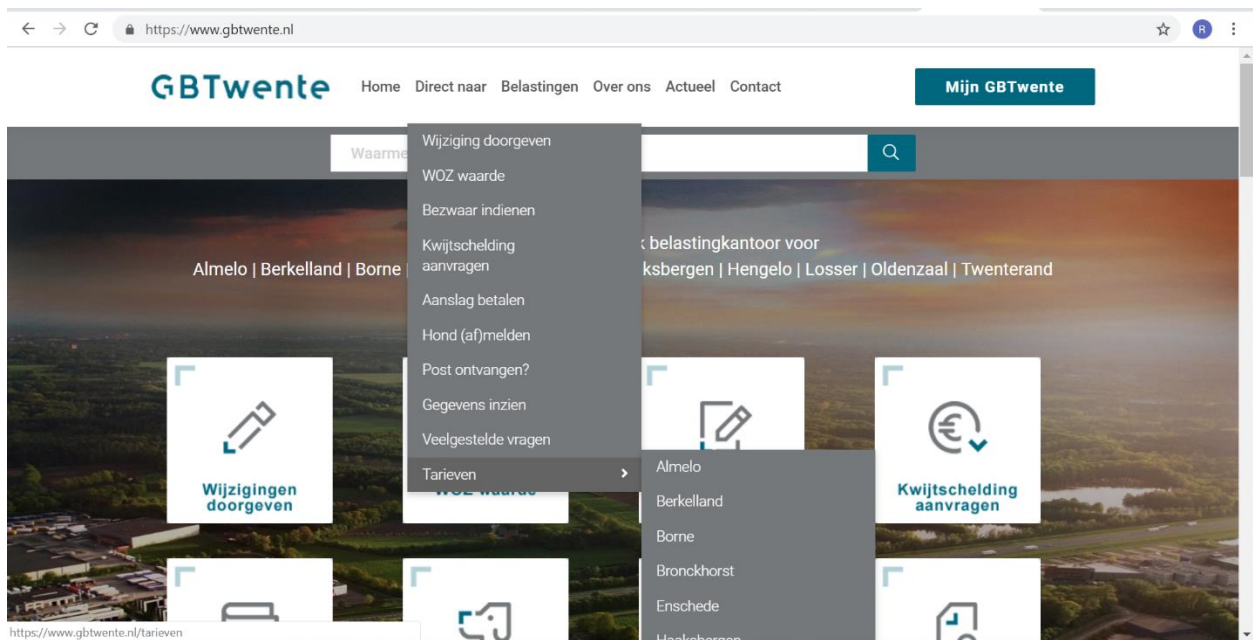


Figure H.2 Navigation bar and dropdown menu

The screenshot shows the GBTwente website with a navigation menu and a search bar. Below the search bar is a table listing council members by municipality.

Gemeente	Lid AB	Lid AB, tevens lid DB
Almelo	dhr. A. Langius	dhr. A. Langius (voorzitter)
Borne	dhr. H. Mulder	
Enschede	dhr. E. Eerenberg	
Haaksbergen	dhr. L. Koopman	
Hengelo	mw. M. ten Heuw	mw. M. ten Heuw
Losser	dhr. H. Nijhuis	
Oldenzaal	mw. E. Zinkweg	mw.E. Zinkweg
Twenterand	dhr. R.Koster	
Secretaris: dhr R. Toet		

Figure H.3 Example of a table

The screenshot shows the GBTwente login portal. The page features a header with the GBTwente logo and navigation links for 'BEGIN' and 'AFMELDEN'. The main content area includes a welcome message and a list of service buttons.

Goedemorgen meneer geen Paspoort,
 Welkom op de digitaal loket van het Gemeentelijk Belastingkantoor Twente.

Voordat u een keuze maakt uit een van onze producten vragen wij u om uw gegevens te controleren en aan te vullen. Dit kunt u doen bij **mijn gegevens**.
 Als wij geen e-mail adres van u hebben dan ontvangt u ook geen ontvangstbevestiging van uw wijziging, bezwaar of aanvraag kwijtschelding.

Kies hieronder wat u wilt doen.
 Heeft u vragen en of opmerkingen, kijk op onze website of neem contact met ons op. Wij helpen u graag verder.

MIJN GEGEVENS	KWIJTSCHELDING AANVRAGEN
AUTOMATISCH BETALEN	BEZWAAR INDIENEN
TAXATIEVERSLAG INZIEN	BETALINGSREGELING AANVRAGEN
AANSLAGEN INZIEN	MEDISCH AFVAL
HOND (AF)MELDEN	RESTAFVAL ALMELO
TOERISTENBELASTING	

vrijdag 14 juni 2019

Figure H.4 Login portal

